Wisconsin Department of Transportation

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January 18, 2024

NOTICE TO ALL CONTRACTORS:

Proposal #11: 2395-05-71, WISC 2024223
C Milwaukee E/W Howard Avenue
S 6th Street to S Clement Avenue
LOC STR
Milwaukee County

Letting of February 13, 2024

This is Addendum No. 01, which provides for the following:

Special Provisions:

The wrong project's special provisions were inadvertently inserted in the proposal. This addendum adds the correct special provisions.

Plan Sheets:

Revised Plan Sheets	
Plan Sheet	Plan Sheet Title (brief description of changes to sheet)
3	Utility Contacts - Utility contacts updated

The responsibility for notifying potential subcontractors and suppliers of these changes remains with the prime contractor.

Sincerely,

Mike Coleman
Proposal Development Specialist
Proposal Management Section

END OF ADDENDUM

Special Provisions

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SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for Project 2395-05-71, C Milwaukee, E/W Howard Avenue, S 6th Street to S Clement Avenue, Local Street, 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, 2024 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 (20230629)

2. Scope of Work.

The work under this contract shall consist of concrete roadway reconstruction, new curb & gutter, new sidewalk, new storm inlets & lateral connections, new curb extensions and pedestrian ramps, planting trees, monotube poles and mast arms, conduit, control vaults traffic signals 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.

A General

Begin work within 10 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 commence work under this contract until the required traffic control devices and markings are in place and the engineer approves the installations.

Take special precautions to avoid damage to all existing utility facilities in the proximity of the construction area.

Supplement standard spec 107.18 with the following:

Use equipment having vacuum or water-spray mechanisms to eliminate the dispersion of dust when performing roadway-cleaning operations. Provide suitable, self-contained particulate collectors, if vacuum equipment is used, to prevent discharge from collection bin into the atmosphere.

Except where noted, keep all intersections accessible at all times. Include any costs associated with staging operations at intersections that are to remain accessible at all times in the unit bid price for Traffic Control (2395-05-71).

Maintain or provide where necessary, as directed by the engineer, pedestrian access to adjacent properties, businesses, recreation areas, and bus stops. Provide adequate temporary sidewalk and bridging between the curb and the right-of-way line over freshly paved concrete or other obstructions on the sidewalk area at entrances to buildings or as directed by the engineer. The cost of bridging shall be included in the unit bid price for Concrete Sidewalk 5-Inch.

Once concrete sidewalks are poured, take necessary precautions to preserve the condition of the new concrete items. Any pavement or sidewalk that is damaged shall be replaced at the contractor's expense.

Maintain pedestrian facilities according to American with Disabilities Act Accessibility Guidelines (ADAAG) requirements at all times. Construct temporary pedestrian access accommodations (crosswalks, curb ramps, and pedestrian surfaces) as shown in the plans, or where necessary, as directed by the engineer.

Existing trees and utility poles are to remain in place during construction unless otherwise noted in the plan.

Conduct an on-site visit prior to bidding to determine any special measures required for proper clearance between features for the paving and grading equipment.

Maintain vehicular access to all business and commercial properties at all times except as noted in the traffic control plans and specifications.

Store drums, buckets and other containers related to construction operations in a secure area to prevent vandalism, spills, and unwanted dumping. If an abandoned container is discovered on the project site, notify the WDNR at (800) 943-0003.

Northern Long-eared Bat *(Myotis septentrionalis)*

Northern long-eared bats (NLEB) have the potential to inhabit the project limits because they roost in trees, bridges and culverts. Roosts may not have been observed on this project, but conditions to support the species exist. The species and all active roosts are protected by the federal Endangered Species Act. If an individual bat or active roost is encountered during construction operations, stop work, and notify the engineer and the WisDOT Regional Environmental Coordinator (REC).

Ensure all operators, employees, and subcontractors working in areas of known or presumed bat habitat are aware of environmental commitments and avoidance and minimization measures (AMMs) to protect both bats and their habitat.

Direct temporary lighting, if used, away from wooded areas during the bat active season April 1 to October 31, both dates inclusive.

The department has contracted with others and will perform the following operations after October 31 and prior to April 1:

- Cutting down and removing trees.

Contractor means and methods to remove additional trees will not be allowed. If it is determined that additional trees with a 3-inch or greater diameter at breast height (dbh) need to be removed beyond contractor means and methods, notify the engineer to coordinate with the WisDOT REC to determine if consultation with United States Fish and Wildlife Service (USFWS) is required. The contractor must be aware that the WisDOT REC and/or USFWS may not permit modifications.

B Contractor Coordination

Coordinate the work according to standard spec 105.5.2.

Arrange and conduct weekly progress meetings. The contractor's superintendent or representative, designated materials representative, subcontractor's representatives for ongoing subcontract work or subcontract work expected to begin within the next three weeks shall attend. Provide and discuss the schedule and updates at the weekly progress meetings. Agenda items at the meeting shall include, but not be limited to, the following:

- Review of the contractor's and subcontractors' schedule. Indicate if the project is on, ahead or behind schedule. If behind indicate why, how much behind and how the project will get back on schedule.
- Utility conflicts and relocation schedule.
- Evaluation of progress to date.
- Outstanding Requests for Information (RFI's) or issues that may cause contract modifications.
- Shop drawing submittal status.
- Materials submittal status.
- Materials sampling and testing activities and results.
- Lane, road, and ramp closure schedules.
- Impacts to businesses and private properties.

- Impacts to bus routes, emergency services, postal services.
- Equipment status of orders and deliveries.

Obtain permission from the engineer a minimum of 48 hours prior to any construction schedule change.

The labor and materials required to restore concrete sidewalk, after saw cutting, will be deemed incidental to the bid item 690.250, Sawing Concrete.

C Work Restrictions

C1 General

Comply with all local ordinances which apply to work operations, including those pertaining to work during night-time hours. Furnish any and all ordinance variances issued by the municipality or required permits to the engineer in writing three working days before performing such work. Night-time and weekend work will not be allowed without written approval from the engineer and the City of Milwaukee at least three days in advance of the planned work during night-time and weekend hours.

Do not store equipment, vehicles, or materials on adjacent streets beyond the project limits without specific approval from the engineer. Park and store equipment and material only at work sites approved by the engineer.

Complete all contract work excluding signals, street lighting, all trees, shrubs, plants, and other landscaping in 2024. Complete the remaining work in 2025.

C2 Interim Completion and Liquidated Damages: December 20, 2024

Complete all contract work excluding signals, street lighting, all trees, shrubs, plants, and other landscaping and open the roadway to through traffic by December 20, 2024.

If the contractor fails to complete the work necessary to reopen complete all contract work excluding signals, street lighting, all trees, shrubs, plants, and other landscaping and open the roadway to through traffic by December 20, 2024, the department will assess the contractor $2185 in interim liquidated damages for each calendar day the contract work remains incomplete beyond 12:01 AM on December 21, 2024. An entire calendar day will be charged for any period of time within a calendar day that the road remains closed beyond 12:01 AM.

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

C3 Winter Shutdown

Winter shutdown will commence with the completion of all contract work excluding all trees, shrubs, plants, and other landscaping in the Fall of 2024. Do not resume work until April 1, 2025 unless approved by the engineer. Provide a start date in writing at least 14 days prior to the planned recommencement of work in 2025. Upon approval the engineer will issue the notice to proceed within 10 days of the approved start date.

C4 2025 Work

Complete signal and street lighting work between April 1, 2025 and May 31, 2025.

Complete the furnishing and planting of all trees, shrubs, and plants between May 1, 2025 and May 15, 2025. Perform care cycles according to standard spec 632.3.18.

4. Traffic.

A General

A1 Traffic Control

Undertake traffic control according to standard spec 643 and/or as approved by the engineer, except as hereinafter modified.

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

Provide 24 hours-a-day availability of equipment and forces to expeditiously restore lights, signs, or other traffic control devices that are damaged or disturbed, in accord with standard spec 643.3.1(6). The cost to maintain and restore the above items shall be considered incidental to the item as bid and no additional payment will be made.

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

During all construction operations, maintain adequate turning provisions for vehicles, including buses and trucks, at the intersections that are to remain open.

Contractor to provide all posting of no parking restrictions, necessary to facilitate construction operations. Contact Cameron Potter at (414) 286-3276, three working days prior to the start of construction.

When an area of the roadway is temporarily closed to traffic, sign and delineate the portion of the roadway that is to remain open, according to Part 6 of the Manual on Uniform Traffic Control Devices (MUTCD), and the WisDOT manual titled “Guidelines for Construction, Maintenance, & Utility Operations”.

Do not switch traffic to the next construction stage until all signing, pavement marking, traffic control devices for the stage are in place, conflicting pavement markings and signs are covered or removed, and as directed by the engineer.

Maintain a minimum of 1 foot of lateral clearance from the edge of live travel lanes to all traffic control devices.

A2 Traffic Control Signs PCMS

Install Traffic Control Signs PCMS at the project ends to notify motorists of upcoming construction activities two weeks before the start of construction activities and one week prior to beginning each construction stage or prior to any detour. These timeframes may be adjusted by the engineer.

Coordinate the locations of Traffic Control Signs PCMS with the engineer. Obtain acceptance from the engineer for all messages for all Traffic Control Signs PCMS.

A3 Railroad

Do not place any items within 50 feet of railroad right-of-way, including items that could foul the same area. Do not place any items including but not limited to signing, equipment, or material. This includes at grade crossings and structures with railroad under or over. If this is not adhered to, Railroad Protective Liability Insurance will be required of the contractor and incidental to the project.

The railroad spec is associated with traffic control detour route.

A4 Signals and Lighting

The project includes street lighting and traffic signals. Maintain existing traffic signals and functionality of the lighting system during the project with existing lighting or temporary lighting. Maintain existing traffic signals at each intersection until temporary traffic signals are in place and operating at that intersection.

Temporary signals shall include the relocation of street name signs at traffic signals to the temporary poles prior to removal of existing poles as directed by the engineer. The cost to relocate the street name signs at signalized intersections shall be considered incidental to item 643.5000, Traffic Control and no additional payment will be made.

B Construction Contact Information

Designate an individual responsible for traffic control maintenance including access of local traffic, and 24-hour emergency traffic control repair. Provide the name and telephone number of this individual to the engineer.

Provide City of Milwaukee Police Department with a 24-hour emergency contact number for when traffic control maintenance is required.

In no case may any barricade, light, sign or other traffic control device be out of service for more than 2 hours. The cost to maintain and restore the above items is incidental to the bid item Traffic Control and no additional payment will be made.

Advance Notification

Notify City of Milwaukee first responders (police, fire, EMS), Milwaukee County Sheriff's Department, engineer, Milwaukee Public Schools, garbage/recycling pick-up companies, and the post office two weeks in advance of all traffic switches, lane closures, road closures, and detours. Notifications should be confirmed with all parties one week before implementation. Parties shall also be notified if a closure is cancelled.

C Vehicle Access

All construction vehicles and equipment entering or leaving traffic lanes shall yield to through traffic.

C1 Emergency Vehicle Access

Maintain emergency vehicular access at all times to roadways located within the project limits.

In the event where emergency vehicles and equipment which provide fire, police, and rescue service for the public need access to properties, the contractor shall cooperate to the fullest extent in accommodating emergency access in the shortest possible time.

C2 Driveway Construction/Access

Local access to residences and businesses within the project area shall be maintained to the maximum extent possible. No residential or commercial drive approach shall be closed without sufficient notice given to the occupants of the premise to remove their vehicles prior to removal or closing of the drive approach access. Reasonable access to abutting business locations shall be maintained at all times.

On-street parking will not be allowed during construction.

Inform property owners at least 48 hours prior to removing a driveway approach that serves that property, including giving owners 48-hours to remove their vehicles prior to driveway removal or closing of the driveway approach access.

Driveway approach removal and replacement should be scheduled, so that the time lapse between the removal and replacement is:

Seven days for normal strength concrete driveways.

Three days for HES concrete driveways.

Stage construction activities in order to maintain through vehicular access on East/West Howard Avenue according to the traffic control plans. The staging of work activities shall provide driveway access to local businesses at all times as specified below. Staging for driveway access shall include, but is not limited to the following four methods:

C3. HES Concrete Driveway

Construct driveway with 7-inch high early strength concrete (HES) on Friday and open to vehicular traffic on Monday. Contact property owners to make arrangements to pour driveways on other days for business access.

C4. Concrete Pavement Gap

In order to provide continuous access to the businesses, pavement gaps or adequate bridging to support businesses' vehicles shall be used. The access areas shall have ample width and length to accommodate turns from the businesses' vehicles. Temporary vehicle access to the businesses may be provided with base aggregate as directed by the engineer. Include the cost for the base aggregate in the unit bid price for Base Aggregate Dense 1¼-inch. The pavement, curb and driveways at the pavement gaps shall be constructed as soon as cure time allows vehicular access of the paved portions.

The access provided shall be wide-enough for a semi-truck turning radius.

C5. Alternate Driveways

Keep one driveway in place while the other is being constructed or open.

C6. Halves

Construct driveway one half at a time:

ADDRESS	LOCATION	METHOD
108 W Howard Ave	25+58 & 26+37; LT	C
3870 S Howell Ave	28+14 & 29+22; LT	C
360 W Howard Ave	36+90; LT	D
3902 S Whitnall Ave	38+94; RT	A&D
614 E Howard Ave	49+15; LT	A&B&D
1141 E Howard Ave	67+02; RT	A&D
1200 E Howard Ave	68+20 & 68+88; LT	C
1213 E Howard Ave	68+72; RT	C

D Definitions

The following definitions shall apply to this contract:

Night-Time Periods

10:00 PM to 6:00 AM Monday, Tuesday, Wednesday, Thursday, and Friday

Weekend Periods

10:00 PM Friday to 6:00 AM Monday

E Traffic Control Description

E1 Construction Staging

Note on OSOW routing on West Howard Avenue: West Howard Ave, between 6th Street and Howell Avenue, is required by state statue to remain open for OSOW high route purposes.

Pre-Stage:

During this stage, the inside lane in the eastbound direction will be closed from S. 6th St. to S. 3rd St. and the inside lane in the westbound direction will be closed from S. 5th St. to S. Clement Ave. This configuration will allow for the removal of median noses and the addition of temporary pavement to accommodate the traffic configuration in Stage 1.

Stage 1:

During Stage 1, two-way traffic will be shifted to the north side of E/W Howard Ave. with one lane in each direction. Traffic will be separated by flexible tubular markers with left turn lanes at the major intersections. Pavement gaps will be provided at the locations listed below to maintain driveway access and garbage collection operations.

Pavement Gaps

Location	Station
S. 2nd St.	STA 17+12 to STA 17+77
S. Austin St.	STA 31+92 to STA 32+48
S. Griffin Ave.	STA 41+92 to STA 42+45
611 E. Howard Ave.	STA 48+90 to STA 49+40
S. Logan Ave.	STA 60+30 to STA 60+85

Stage 2:

During Stage 2, two-way traffic from S. 6th St. to S. Howell Ave. will be one lane in each direction on the newly constructed EB lanes. One-way traffic in the eastbound direction will be provided on E. Howard Ave. from S. Whitnall Ave. to S. Clement Ave. on the newly constructed lanes. Pavement gaps will be provided at the locations listed below to maintain driveway access and garbage collection operations.

Pavement Gaps

Location	Station
S. 2nd St.	STA 17+12 to STA 17+77

Stage 3:

During Stage 3, traffic on E/W Howard Ave. will be in its final configuration where single lane closures will be used to complete construction of median curbs.

E2 Intersection Staging:

Intersection with I-43/94 Ramps:

In Stages 1A and 1B, both ramps from I-43/94 to W. Howard Ave. will be reduced to one lane to allow for staged construction one half at a time. In Stage 1C, the ramp from W. Howard Ave. to I-43/94 SB will be closed for a maximum of 72 hours for construction. In Stage 2, the ramp from W. Howard Ave. to I-43/94 NB will be closed for up to 72 hours for construction. Any ramp closure cannot occur during holiday periods as listed in the Special Provisions.

Intersection with S. Howell Ave.:

In Stages 1 and 2, the intersection of E. Howard Ave. and S. Howell Ave. will have staged construction to complete utility construction across E. Howard Ave. on the east and west sides of the intersection. In Stages 1A and 1B, the lanes on S. Howell Ave. will be shifted to allow for the construction in the southeast section and then the southwest section of the intersection. In Stage 1B, left turns will be prohibited from S. Howell Ave. NB to E. Howard Ave. WB. In stages 2A and 2B, lanes on S. Howell Ave. will be shifted to allow for the construction in the northwest section and then the northeast section of the intersection.

Intersection with S. Whitnall Ave.:

In Stage 1A, the southeast part of the intersection will be constructed, while two-way traffic is maintained on S. Whitnall Ave. In Stage 1B, the southwest part of the intersection constructed while maintaining one-way NB traffic on the east side of S. Whitnall Ave. In Stage 2A, the northeast part of the intersection will be constructed, while one-way SB traffic is maintained on S. Whitnall Ave. In Stage 2B, the northwest part of the intersection will be constructed, while two-way traffic is maintained on S. Whitnall Ave.

Intersection with S. Pine Ave.

In Stage 1A, southwest part of the intersection will be constructed while one-way northbound traffic on S. Pine Ave. is maintained. In Stage 1B, the southeast Part of the intersection constructed while maintaining one-way NB traffic on S. Pine Ave. on the newly constructed lanes. In Stage 2A, the northeast part of the intersection will be constructed while one-way SB traffic is maintained on S. Pine Ave. In Stage 2B, the northwest part of the intersection will be constructed while one-way SB traffic is maintained on S. Pine Ave.

Intersection with S. Clement Ave.

In Stage 1A, the southwest part of the intersection will be constructed while one-way northbound traffic is maintained on S. Clement Ave. In Stage 1B, S. Clement Ave. will be open to two-way traffic. In Stage 1C, the intersection will be open to one-way traffic while the southeast part of the intersection is being constructed. In Stage 2A, the intersection will remain open to two-way traffic. In Stage 2B, the intersection will remain open to one-way traffic while the northwest part of the intersection is being constructed. In Stage 2C, the intersection will remain open to one-way traffic on S. Clement Ave. while the northeast part of the intersection is being constructed.

E3 Bay View Montessori School Staging:

South Roadway between S. Austin St. and S. Whitnall Ave.:

During Stage 1, the southern roadway of E. Howard Ave. adjacent to Bay View Montessori School, 357 E. Howard Ave. shall remain open for drop-off and pickup of students until June 15, 2024. Complete all roadway and sidewalk construction work adjacent to Bay View Montessori School on or before September 3, 2024 to allow for the drop-off and pickup of students for the 2024-2025 school year.

In Stage 1A, the existing southern lanes of E. Howard Ave. from S. Austin St. to S. Whitnall Ave. will remain open for school drop off at Bay View Montessori while traffic is using the northern lanes. In Stage 1B, the resulting pavement gap on E. Howard Ave. from S. Austin St. to S. Whitnall Ave. will be completed.

E4 Sidewalk Construction

The sidewalk adjacent to the roadway pavement work must either remain in place through the duration and be replaced after, or be removed and replaced prior to undertaking the adjacent roadway pavement work to ensure adequate pedestrian access while vehicular access to properties is restricted.

Removal and replacement of sidewalk should be scheduled, so that the time lapse between the removal and replacement is minimal. Provide temporary sidewalk, when deemed necessary, or when directed by the engineer.

The cost of bridging shall be included in the unit bid price for 602.0410 Concrete Sidewalk 5-Inch.

Except where noted, keep all intersections accessible at all times, except during placing of concrete pavement and curing operations. Include any costs associated with staging operations at intersections that are to remain accessible at all times in the unit bid prices for Concrete Pavement, 9-Inch. Staging concrete paving operations in intersections will not be considered a pavement gap.

During construction operations, ramp sawed joints at intersecting streets with asphaltic surface material between the existing pavement surface and the adjacent milled surface, as directed by the engineer, to permit the safe passing of vehicles. The cost of the materials, labor, and equipment necessary to install such ramps is to be paid under bid item 465.0105, Asphaltic Surface.

The contractor may make other arrangements with individual businesses prior to construction. The arrangement must be in writing, signed by the contractor and business owner, and approved by the construction engineer.

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 E/W Howard Avenue 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, May 24, 2024 to 6:00 AM Tuesday, May 28, 2024 for Memorial Day;
- From noon Wednesday July 3, 2024 to 6:00 AM Friday July 5, 2024 for Independence Day;
- From noon Friday, August 30, 2024 to 6:00 AM Tuesday, September 3, 2024 for Labor Day.

stp-107-005 (20210113)

6. Utilities.

This contract does not come under the provision of Administrative Rule Trans 220.

stp-107-066 (20080501)

The City of Milwaukee has notified the department that the following operations necessary for the construction of new facilities and/or adjustment of existing facilities will be coordinated with the contractor’s construction operations by each representative utility unless otherwise noted. Coordinate construction activities with a call to Digger’s Hotline or a direct call to the utilities that have facilities in the area as required by statutes. Use caution to ensure the integrity of underground facilities and maintain code ranges from overhead facilities at all times.

Note: Bidders are advised to contact each utility company listed in the plans prior to preparing their bid to obtain current information on the status of each utility company's work required in association with the project. Existing trees, street light poles, hydrants and utility poles are to remain in place during construction unless noted on plans. Conduct an on-site visit prior to bidding to determine any special measures required for proper clearance between the trees, hydrants, poles, other utilities and any other physical structures and the construction equipment. During construction operations, keep all manholes accessible to utility companies for emergencies.

A. AT&T Wisconsin

AT&T Wisconsin has underground communication facilities within the project limits.
AT&T does not anticipate any relocations or placements of new facilities.
Adjustments of existing facilities are necessary during construction and to be coordinated with the road contractor.

- AT&T forces will adjust one manhole at Station 61+19 & 4' LT in coordination with paving operations.
- AT&T forces will adjust their underground conduits facilities, that will be in conflict with proposed sewer lateral pipe work, in coordination with paving operations at the following locations:

Station 7+61 & 56' L; Station 44+50 & 5' LT; Station 50+80 & 5' LT; Station 53+24 & 5' LT.

- AT&T forces will adjust their underground conduits facilities, that will be in conflict with proposed permanent street light poles basis work, in coordination with paving operations at the following locations:

Station 31+76 & 5' LT; Station 34+16 & 2' RT; Station 35+71 & CL; Station 40+59 & 2.9' LT; Station 41+79 & 5' LT; Station 52+73 & 5' LT; Station 56+86 & 5' LT; Station 58+91 & CL; Station 60+15 & 5' LT; Station 62+27 & CL; Station 63+53 & 5' LT.

- AT&T forces will adjust their underground conduits facilities, that will be in conflict with proposed temporary street light poles base work, in coordination with paving operations at the following location:

Station 36+98 & 5' LT; Station 41+53 & 5.3' LT; Station 53+23 & 5' LT; Station 56+33 & 5' LT; Station 59+48 & 5.5' LT; Station 62+67 & 5' LT;

- AT&T forces will adjust their underground conduits facilities, that will be in conflict with proposed permanent monotube base work, in coordination with paving operations at the following location:

Station 37+26 & 5' LT; Station 53+44 & 5' LT.

Estimated construction and/or adjustment work by AT&T – is 1 day for each manhole adjustment, 3 to 5 days for each conduit adjustment.

Anticipated start date is April 15, 2024.

Contact Mr. Nathan Gilbert of AT&T at (262) 720-8235; ng952w@att.com with concerns or questions.

B. Charter Communications/Spectrum

Spectrum operates overhead communications facilities located on WE-Energies poles within the project limits.
No conflict with Charter Communications/Spectrum is anticipated during construction.

Contact Mr. Beau Abuya of Charter Communications/Spectrum at (414) 758-9241;
Beau.Abuya@charter.com with concerns or questions.

C. City of Milwaukee

C.1 Sewer

The City of Milwaukee has sewer facilities within the limits of the project.
Adjust manholes to match the new finished pavement elevation. Perform this work in accordance with the requirements of Adjusting Sanitary Manholes.

Construct inlets, and adjust sewer manholes and catch basin inlet frames as shown in the plans and in the bid items for this project.

Contact Zafar Yousuf at (414) 286-2467 with any questions or concerns.

C.2 Water Works

The City of Milwaukee has underground water facilities within the limits of the project. No adjustments are planned for their water mains and water laterals.

Adjust water service boxes to match the new finished pavement elevation. Perform this work in accordance with the requirements of Adjust water service boxes.

Install water main protection as shown in the plans and in the bid items for this project.

Installations of water main protection at drainage structures located at the following stations and offsets:

- Station 26+50, 41’ RT
- Station 34+70, 41’ RT
- Station 37+36.5, 37’ RT
- Station 57+87, 27’ LT
- Station 61+18.5, 27’ LT
- Station 63+42.6, 27’LT
- Station 66+75, 27’ LT
- Station 68+95, 27’ LT

Contact Mr. Dave Goldapp at (414) 286-6301 or (414) 708-2695 for coordination of the work.

E. Everstream

Everstream has underground fiberoptic facilities from S Whitnall Avenue to S Clement Avenue.

The proposed City of Milwaukee (1) Underground Conduit (CUC) package will cross Everstream underground fiberoptic cable near Station 53+90 and 32.5' LT and (2) Traffic signal installation is located near Station 53+75 where Everstream underground fiberoptic is located around Station 53+50 and 44.5 LT.

Everstream personal will make adjustments of their facilities during paving operations to coordinate the CUC installations near Station 53+90 and 32.5’ LT by the paving contractor.

Contact Everstream two weeks prior to paving operations to have personnel on site during paving operations to coordinate the traffic signal placement with their fiberoptic cable located near Station 53+50 44.5' LT.
Estimated construction and/or adjustment work by Everstream forces is 6 working days.

Contact Shad Garcia at (414) 522-6685; sgarcia@everstream.net two weeks in advance to coordinate the work.

F. Lumen Technologies

Lumen Technologies has underground communication facilities within the project limits. There are no anticipated conflicts, and no relocation of their facilities is required.

Contact Daniel Shea at 319-423-5242 or dshea@terratechllc.net with concerns or questions.

G. Midwest Fiber Networks (MWFN)

Midwest Fiber Networks has underground communications facilities within the project limits.

MWFN will be adjusting their cable 2’ east in the NE corner of Howell and Howard to accommodate the new additional signal pedestal. MWFN will be removing and replacing 9 sidewalk slabs to do this adjustment beginning approx. 40’ north of the curb and ending 5’ north of the curb. The landing and three slabs north will be asphalted as they are to be replaced per the project, the remainder will be concrete.

MWFN has (2) 1.25” HDPE at approx. 24” deep from curb to curb crossing Howard at Howell Ave at approximately Station 27+79.4 at the north ada ramp and approx. Station 27+83.6 at the south ada ramp. It is anticipated to be 12” of clearance between MWFN and the proposed CUC concrete encasement.

MWFN will require 2 week notification for the proposed CUC work at approx. Station 27+81 LT 9’.

MWFN anticipates to start work on March 2024. That work will take 20 working days to complete.

Contact Cory Schmuki at (414) 349-2764 for coordination and with questions or concerns.

H. TDS Telecom

TDS has underground communications facilities within the project limits. There are no anticipated conflicts, and no relocation of their facilities is required.

Contact Richard Trgovec at (541) 585-2965 or richard.trgovec@tdstelecom.com with concerns or questions.

I. Teleport Communications America, LLC (AT&T LNS)

TCA has underground communications facilities within WE-Energies Electric conduit at Station 63+97 and 6’ RT.
There are no anticipated conflicts, and no relocation of their facilities is required.

K. Verizon Business (MCI)

Verizon Business has underground facilities and one manhole located within the project limits. The manhole is located at Station 32+00.

Verizon Business forces will adjust the manhole at Station 32+00 in coordination with paving operations.

That work will take 1 day to complete during the construction.

Contact RJ Cicatello at (262) 232-1323 at least 7 days in advance of excavation or construction to coordinate manhole adjustment work by Verizon Business forces.

L. WE Energies – Electric

WE Energies - Electric has underground facilities within the project limits.

WE Energies - Electric forces will replace and adjust 4 manhole frames, covers and chimney located at Station 25+32, 28’ RT; Station 29+59, 13’ RT; Station 63.97, 6’ RT and Station 67+52, 6’ RT in conjunction with paving operations.

Contact Pete Ostrowski at (262) 378-2005, 16 calendar days each in advance to coordinate relocation and/or adjustment work by WE Energies – Electric forces.

WE Energies – Electric forces require 10 working days to complete.

Contact Jacob Schoenung at (414) 416-3365 or Jacob.schoenung@we-energies.com with questions or concerns.

M. WE Energies – Gas

WE Energies – Gas has underground facilities within the limits of the project.
Relocations and/or adjustments of We Energies facilities will be constructed by WE Energies staff during construction in coordination with the paving operations.

WE-Energies- Gas will install the gas mains at the following locations prior to the start of the paving operations. All proposed gas main will be installed 4' below existing grade under roadway and 3' below existing grade outside of roadway.

4" PE MAIN - (STA 04+56), 46’ LT- (Station 09+50), 46’ LT
4" PE MAIN - crossing W Howard Ave. at (Station 04+56) 46’ LT- 50’ RT
2" PE MAIN - (STA 14+43), 46’ RT- (Station 14+75), 46’ RT
2" PE MAIN - crossing W Howard Ave. at (Station 14+45) 46’ LT- 46’ RT
4" PE MAIN - (STA 14+75), 46’ LT - (Station 24+13), 46’ LT
4" PE MAIN - (STA 38+18), 45’ RT - (Station 43+39), 45’ RT
2" PE MAIN – crossing E Howard Ave. at (Station 41+91) 45’ LT- 45’ RT
2" PE MAIN - (STA 41+77), 45’ LT - (Station 42+45), 45’ LT
4" PE MAIN - (STA 43+39), 45’ RT - (Station 49+87), 45’ RT
4" PE MAIN - (STA 49+87), 45’ RT - (Station 53+55), 45’ RT
6” PE MAIN - (STA 54+40), 44’ RT - (Station 56+35), 44’ RT

2" PE MAIN – crossing E Howard Ave. at (Station 54+64) 49’ LT – 44’ RT
2" PE MAIN - (STA 54+27), 49’ LT - (Station 54+64), 49’ LT
6" PE MAIN - (STA 56+35), 44’ RT - (Station 57+02), 44’ RT
6" PE MAIN - (STA 57+54), 44’ RT - (Station 62+82), 44’ RT
2" PE MAIN - (STA 57+53), 48’ LT - (Station 57+87), 48’ LT
6" PE MAIN - (STA 62+82), 44’ RT- (Station 69+30), 45’ RT
2" PE MAIN - (STA 64+20), 46’ LT - (Station 65+60), 46’ LT
2" PE MAIN - (STA 69+09), 49’ LT - (Station 69+72), 49’ LT

We-Energies will connect proposed main into existing main on all side streets outside of project limits. All existing main depths are no less than 3' below existing grade.

Existing gas main in the area that was relocated will be discontinued and left in place. All main being discontinued will be identified with retirement symbol.

We-Energies will be sampling the wrap on all main exposed during relocation work. The 1950's vintage pipe could contain asbestos and will be known until exposed for construction and testing.

We-Energies will share the reports with the city as sample and test get completed. If there is discontinued pipe that contains hazardous wrap that conflicts with the project, we-energies will remove it at the time of construction.

Take extra caution to avoid unnecessary disturbance to the existing gas facilities. Call Digger’s Hotline (811 or 1-800-242-8511) three business days before you dig to obtain locates and standby. If there is any unusual situation that requires assistance or relocation, please contact the 24-hour Customer Service number, 1-800-450-7260. In the event of a gas emergency (e.g., damage to gas carrying facilities including nicks, dents, scratches, gas bowling, etc.), please contact the WPS 24-hour Emergency Gas number, 1-800-450-7280.

We Energies Gas work will take 90 days to complete.

Any facilities not explicitly identified as being relocated and/or adjusted have been deemed to be not in conflict and will remain in place as is. WE Energies has determined that the project is constructible with these facilities left within the work zone.

Exercise caution when excavating near any gas facilities. It is imperative that the highway contractor contact WE Energies before removing any gas facilities or electrical underground cables, to verify that they have been discontinued and carry no natural gas or electrical current. The contractor must not assume that unmarked facilities have been discontinued. At no time is it acceptable to push, pull, cut, or drill an unmarked facility without explicit consent from WE Energies. Call WE Energies 24-hour Dispatch lines to arrange this verification.

WE Energies Gas Dispatch # 1 (800) 261-5325

Contact Wesley Nunn at (414) 659-4933 or Bob Sweigart at (414) 935-4438 with questions or concerns.

7. Notice to Contractor-City of Milwaukee Coordination.

A. City of Milwaukee, Forestry

The City of Milwaukee has irrigation within the existing medians throughout the project. The city will relocate irrigation taps within the project limits prior to construction.

Contact James Kringer, (414) 708-2428, of City of Milwaukee at least 7 days in advance of excavation or construction to coordinate locations near the irrigation tap facilities.

B. City Communications

The City of Milwaukee Communications operates communications underground facilities within the project limits. These facilities are to remain. Furnish and install fiber optic cable outdoor plant 72-CT within City of Milwaukee City Underground Conduit as shown in the plans and in the bid items for this project.

Contact Communication Dispatch at (414) 286-3686 with any questions or concerns.

C. City Underground Conduit (CUC)

The City of Milwaukee City Underground Conduit utility has communications fiber and copper cables in underground conduit located throughout the project limits.

Adjust manholes to match the new finished pavement elevation. Perform this work in accordance with the requirements of Adjusting CUC Manhole Covers.
Install new conduit as shown in the plans and in the bid items for this project.

Contact Karen Rogney at (414) 286-3243 with comments and concerns.

D. City of Milwaukee, Traffic Signals

There are seven existing signalized intersections within the limits of the project at the following intersections with Howard Avenue:

South 6th Street
South 5th Street
South 3rd Street
South Howell Avenue
South Whitnall Avenue
South Pine Avenue
South Clement Avenue

Existing pullboxes and signal bases will be discontinued by the city for removal with the exception of South 5th Street, South 3rd Street, and South Howell Avenue where un-impacted signal materials will remain in use. Install temporary overhead and temporary traffic signals.
Temporary overhead and traffic signals shall be installed prior to any pavement saw-cutting or excavation. Furnish and install bases, PVC conduit, cabling, and polymer concrete pullboxes.
All above ground signal work including installing traffic signal standards, monotube poles, monotube arms, traffic signals heads, signal cabinets, and any additional permanent traffic control equipment shall be furnished and installed by the contractor. Electrical service for all signals will be provided by the City of Milwaukee. The signal cabinet bases will be provided by the City of Milwaukee.

Traffic signal materials shall be installed on street lighting poles. Coordinate construction to ensure street lighting installation does not impede traffic signal installation.

Provide a 30-working day advance notice to Mr. Rudy Gutierrez of the City of Milwaukee’s Traffic Signal

Field Operations at (414) 286-5941 office, or (414) 708-5148 mobile, to coordinate the installation of temporary traffic signal materials as well as any city traffic signal concerns.

Contact Scott Reinbacher at (414) 286-3232 or sreinb@milwaukee.gov with any questions or concerns regarding City of Milwaukee, Traffic Signals facilities.

E. City of Milwaukee, Street Lighting

The City of Milwaukee has street lighting facilities within the limits of the project.
One existing street lighting enclosure will be relocated to the north side of Keefe Ave.
This project will have temporary overhead installed in order to keep the street light working. For area where it is not feasible to install temporary overhead, street lighting facilities shall be protected and adjusted as shown in the plans and in the bid items for this project.
Street Lighting anticipates this work will begin 35 days prior to the beginning of construction and will take 60 working days to complete.

Contact Neal Karweik, manager, at (414) 708-4245 to coordinate temporary street lighting work and for questions or concerns.

Contact Mark MacRae, manager, at (414) 708-0434 to coordinate permanent street lighting work and for questions or concerns.

Report any accidental damages to street lighting facilities, as soon as possible to Street Lighting Shop Dispatcher (414) 286-5944. The contractor will be held liable for those costs.

Contact Ms. Denis Kozelek of the City of Milwaukee at (414) 286-3252 with only design/engineering concerns or questions. If you have questions or concerns about field work or work scheduling, please contact the managers noted above.

Notice to Contractor-WisDOT Street Lighting Coordination

WisDOT Street Lighting has underground communication facilities the construction limit. No conflict anticipated.
WisDOT communications has a fiber optic line running underneath Howard Ave between the North Bound I-43 on ramp and 3rd street. It should be 18 to 36" below pavement so it shouldn't conflict with operations unless EBS is called for in that area. Mark it with the caution fiber optic symbol as it is currently shown in the plans without a caution symbol.

Contact John Mittelstadt at 608-205-7859 with concerns or questions.

8. Notice to Contractor - Tree and Planting Area Protection.

1 Sidewalk Construction

A The root system on the walk side of the tree shall be cut not deeper than 9 inches below the finished grade of the new walks, and not more than 5 inches from the edge of the new walk. Roots in the walk area shall be removed only to a depth of 9 inches below finished grade of the new walk.

B When replacing walks adjacent to the following trees, a slip or thin form must be used. Additionally, soil disturbance in the tree border should be limited to not more than ¼” beyond the edge of the new walk.

5+99 N/S	9+31 N/S	16+00 S/S	16+37 S/S	18+11 S/S
18+72 S/S	19+31 S/S	19+64 S/S	30+08 N/S	31+09 S/S
31+50 S/S	39+58 S/S	41+22 S/S	43+06 S/S	45+08 N/S
48+31 S/S	48+70 S/S	49+11 S/S	54+79 S/S	

C Place arc on the new sidewalk adjacent to the following trees.

3+40 S/S	5+35 S/S	18+14 N/S	18+58 N/S	20+35 N/S	21+65 N/S
22+52 S/S	22+59 N/S	23+16 S/S	33+37 S/S	35+78 N/S	38+74 N/S
39+22 N/S	39+82 N/S	40+39 S/S	41+00 N/S	43+04 S/S	43+62 S/S
44+79 N/S	45+79 N/S	46+46 N/S	46+95 N/S	47+35 N/S	48+83 N/S
49+60 N/S	52+00 N/S	52+95 N/S			

D Where sidewalks are to be narrowed, all old sidewalks should be removed prior to any root cutting. If necessary, the root system should be cut within *Y."* of the edge of the proposed new walk, and not more than 9" below the finished grade of the new walk.

E Sidewalks are to be removed, and roots cut, by use of **hand implements only.**

2 Carriage Walk Construction

A When constructing or replacing carriage walks, roots shall not be cut by means of mechanical root cutting machines. If root removal is essential to carriage walk replacement, roots shall be manually cut with hand implements. Roots shall be removed not deeper than 9 inches below the finished grade of the new carriage walk.

B Move the carriage walk to a position that does not interfere with the street tree at the following locations:

59+70 S/S, move 6’ west

3 Curb, Gutter, and Road Construction

A The root system on the curb side shall be cut not more than 2 inches behind the back edge of the new curb, and not more than 18 inches in depth when constructing the new curb and gutter.

B The root system on the curb side shall be cut not more than a 1/4“ from the back edge of the new curb, and a ¼” slip or thin form, or slip form paver, shall be used for the following trees:

4+16 N/S	5+32 N/S	53+39 N/S	55+10 N/S
56+60 N/S	59+35 N/S	61+90 N/S	65+52 N/S

C The root system on the curb side; **shall not be cut;** I) a **0" clearance** slip or integral form paver can be used; or (2) gap and hand form using '!." steel plate for the following trees:

5+55 N/S	5+64 N/S	5+99 N/S	16+44 N/S	18+14 N/S
20+33 N/S	22+52 S/S	22+59 N/S	23+16 S/S	38+74 N/S

D Exposed tree roots shall be covered with mulch and watered from a period immediately following curb and gutter removal, until the area is backfilled following construction.

4 General

All cutting for the removal of sod and soil in order to establish a finished grade within 4 feet of existing trees must be done manually if necessary.

No construction equipment, cars trucks, materials shall be parked or stored on any median or tree borders on this project or adjacent roadways.

Root foundations must remain adequate to withstand heavy windstorms.

Root systems of street trees shall not be cut for the installation of any type of cable by the contractor or city department. Contact the Forestry Division at (414) 708-2428 for directional boring specification.

Caution shall be used during the construction process to avoid damage to the roots, trunks, and branches of all street trees. Damage caused to any street tree or irrigation system will be repaired by the City of Milwaukee’s Forestry Division and the costs of repair, rejuvenation, and/or value lost will be billed to the contractor or credited against the contract at the option of the city.

At locations where the contractor has not complied with the forestry special requirements stated in the special provisions above, and the maximum clearance was exceeded or a thin form was not used, a minimum credit to the city of $50.00 per location will be taken. The credit will increase in proportion to the excess distance beyond clearance allowed. The credit will be $50.00 for each 2-inch increment or part thereof in excess of the initial clearance allowed. Any damage to the tree’s structure totaling 15 percent of the trees value will be billed on a prorated basis. If, in the opinion of the City of Milwaukee’s Forestry Division, the tree has been damaged to the point that it warrants removal, the credit that will be taken will be equal to $100.00 per inch diameter of the tree. A field measurement will be taken to determine the tree size.

9. Notice to Contractor – Work without a Construction Permit.

All work including the removal and replacement of sidewalk and sod must be done within the right-of-way, unless a construction permit has been obtained to work on private property abutting the project.

10. Notice to Contractor – Restoration within Right-of-Way.

Excavation and restoration for installation of sidewalk will be limited to 9 inches, beyond the back (high side) of the sidewalk, unless otherwise shown on the plans. This includes installation of sod lawn. Contractor must stay within right-of-way unless a construction permit has been obtained.

11. Notice to Contractor - Survey.

Digital design file information/existing surface data, including design surface DTMs and/or coordinate system GPS information will not be available for this project.

All survey work necessary to stake out and construct all portions of this project will be measured and paid for under the staking bid items designated in this contract.

12. Notice to Contractor – Installing City Furnished Signs.

Contact Mike Chaneske, Sign Shop Manager, (414) 286-5965, at least 10 business days in advance to coordinate pick-up of city furnished signs, poles, and mounting materials.

13. Notice to Contractor – Sod.

Topsoil and sod are to be applied after sidewalk.

Fertilizer is to be applied to sod five days after sod is placed.

14. Notice to Contractor-Temporary Lighting Installation

Do not remove permanent street lighting until temporary street lighting has been installed and is operational. Removal work may not commence until temporary street lighting has been installed and is operational. Contact Joe Mestnick at (414) 286-0447 office, or (414) 708-7015 cell, prior to commencing removal work.

15. Notice to Contractor – Signalized Intersections

There are seven existing signalized intersections within the limits of the project at the following intersections with East/West Howard Avenue:

- South 6th Street
- South 5th Street
- South 3rd Street
- South Howell Avenue
- South Whitnall Avenue
- South Pine Avenue
- South Clement Avenue

Existing pullboxes and signal bases will be abandoned by the city for removal by contractor with the exception of South 5th Street, South 3rd Street, and South Howell Avenue where un-impacted signal materials will remain in use. The contractor shall install temporary overhead and temporary traffic signals. Temporary overhead and traffic signals shall be installed prior to any pavement saw-cutting or excavation. The contractor shall furnish and install bases, PVC conduit, cabling, and polymer concrete pullboxes. All above ground signal work including installing traffic signal standards, monotube poles, monotube arms, traffic signal heads, signal cabinets, and any additional permanent traffic control equipment shall be furnished and installed by the paving contractor. Electrical service for all signals will be provided by the City of Milwaukee. The signal cabinet bases will be provided by the City of Milwaukee and installed by the contractor.

Traffic signal materials shall be installed on street lighting poles. The main contractor shall coordinate construction to ensure street lighting installation does not impede traffic signal installation.

16. Notice to Contractor – Milwaukee County Transit System.

The Milwaukee County Transit System (MCTS) operates the following bus routes within and/or directly adjacent to the construction limits: Route 80 (S. 6th Street), Green Line (S. Howell Avenue), and Route 20 (S Clement Avenue-E Howard Avenue).

Impacts to MCTS Routing

Invite MCTS to all coordination meetings between the contractor, the department, local officials and business stakeholders to discuss the project schedule of operations including vehicular and pedestrian access during construction operations. Notify MCTS at least 10 business days prior to beginning project work to provide advance notice of potential service impacts.

Impacts to MCTS Signs and Posts

Notify MCTS of work impacting MCTS signs and posts in advance 5 or more business days. MCTS signs include “Bus Stop” and turn disc signs. MCTS signs are mounted on MCTS posts; and on assets owned by others including streetlights, traffic regulators, crosswalk and street signposts. MCTS shall be responsible for MCTS sign and post removal and installation, with the contractor granting access to MCTS personnel to perform such work. Signs stating “No Parking Bus Stop” are the under the ownership and responsibility of City of Milwaukee.

Impacts to Bus Shelters

Contractor work may require bus shelter(s) to be temporarily removed. MCTS will be responsible for the removal and reinstallation of bus shelters, with the contractor granting access to MCTS personnel for the purposes of reinstallation before new pavement opens to vehicular traffic. Notify MCTS in advance ten (10) business days for each site-specific bus shelter location.

Non-detour Service Suspension at MCTS Bus Stops

Occasions may arise when work requires neither a detour nor the physical alteration of MCTS bus stop assets, but out of passenger safety requires MCTS to temporarily suspend service at a bus stop location. Notify MCTS in advance 5 business days of site-specific occasion, and MCTS will sign appropriately to instruct passengers to board at a secondary location. Notify MCTS upon completion of work. MCTS will resume service to any suspended bus stop locations when it is safe to do so.

17. Public Convenience and Safety.

Revise standard spec 107.8(6) as follows:

Check for and comply with all local ordinances governing the hours of operation, of construction equipment. Do not operate any motorized construction equipment from 9:00 PM until 7:00 AM, unless prior written approval is obtained from the engineer.

Motorized equipment shall be operated in compliance with all applicable local, state, and federals laws and regulations relating to noise levels. All motorized construction equipment will be required to have mufflers constructed according to manufacturer’s specifications, and it will be required that mufflers and exhaust systems be maintained in good working order, free from leaks or holes.

Upon request the City of Milwaukee’s Department of Neighborhood Services (DNS), may issue a construction noise variance, to work outside of the hours listed above.

Department of Neighborhood Services
4001 South 6th Street
(414) 286-2268

18. Archaeological Site.

Woodlawn Cemetery (BMI-0052) and Adalbert’s Catholic Cemetery (BMI-0181) sites are located approximately (Station 0+00 to Station 0+55); LT and (Station 42+50 to 53+55); LT within the limits shown on the plans.

Notify the Bureau of Technical Services – Environmental Process and Document Section (BTS-EPDS) at (608) 266-0099 at least two weeks before commencement of any ground disturbing activities beyond the existing right-of-way limits. BTS-EPDS will determine if a qualified archaeologist will need to be on site during construction of this area.

Do not use the site for borrow or waste disposal. Do not use the site area not currently capped by asphalt/concrete for the staging of personnel, equipment and/or supplies.

stp-107-220 (20180628)

19. Removing Traffic Signals W Howard Ave & S 6th St, Item 204.9060.S.001; Removing Traffic Signals W Howard Ave & 3rd St, Item 204.9060.S.002; Removing Traffic Signals W Howard Ave & S Howell Ave, Item 204.9060.S.003; Removing Traffic Signals W Howard Ave & S Whitnall Ave, Item 204.9060.S.004:

Removing Traffic Signals W Howard Ave & S Pine Ave, Item 204.9060.S.005: Removing Traffic Signals W Howard Ave & S Clement Ave, Item 204.9060.S.006.

A Description

This special provision describes removing all existing traffic signal standards and signal heads from intersection conforming to standard spec 204.

B Materials

Vacant.

C Construction

Signal standards and signal heads are to be disposed of by the contractor. These heads and standards may be used as part of the temporary traffic signals.

D Measurement

The department will measure Removing Traffic Signals in each (EACH) unit of measure, acceptably completed.

E Basis of 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.001	Removing Traffic Signals; S 6th St	EACH
204.9060.S.002	Removing Traffic Signals; S 3rd St	EACH
204.9060.S.003	Removing Traffic Signals; S Howell Ave	EACH
204.9060.S.004	Removing Traffic Signals; S Witnall Ave	EACH
204.9060.S.005	Removing Traffic Signals; S Pine Ave	EACH
204.9060.S.006	Removing Traffic Signals; S Clement Ave	EACH

Payment is full compensation for removing and reinstalling the signal standard and furnishing soil to fill the hole.

The department will pay separately for the disconnection and disposal of lighting units under the bid item Lamp, Ballast, LED, Switch Disposal by Contractor.

20. Removing City Installed Wood Poles, Item 204.9060.S.310.

A Description

This special provision describes removing existing wood poles and delivering them to the City of Milwaukee street lighting yard. Perform the work in accordance with standard spec 651.

B Materials

Existing poles, including bracket arm(s), clamp(s), conduit, cabling, and any other equipment mounted to the poles.

C Construction

Disconnect and strip all cables and wiring that are mounted on or inside the pole and carefully remove the bracket arm(s), and other non-street lighting materials from the pole. Then remove pole and backfill resulting hole in accordance with standard spec 206.2.

Salvaging Materials

Materials for Salvage and Delivery to City of Milwaukee Street Lighting Shop Yard:

- Only the following Poles: Wood
- Bracket arm(s), Bracket Arm Clamp(s) and hardware.
- Breakaway transformer Pedestal(s)
- Side Pole Mounted Wiring Pedestal(s) (Green in Color)

Carefully remove materials designated for salvage to avoid damage. Place salvaged materials in neat piles outside construction limits but within the right-of-way, at locations the street lighting Field Supervisor

or Street Lighting Project Engineer approves. Stockpile materials designated for salvage without contaminating the material with dirt or foreign matter.

Contractor is responsible to protect and deliver the removed and salvaged street lighting equipment to 1540 West Canal Street, Milwaukee, Wisconsin. The contractor will need to coordinate for the delivery of all the materials that will be dropped off either all at one time or all on the same day between the hours of 8 a.m. and 2 p.m. and call three (3) working days in advance. Monday through Friday. Contractor must be out of the shop yard by 2pm NO LATER. Call Neal Karweik 414-286-5943 (office) 414-708-4245 (cell)

D Measurement

The Department will measure Removing City Installed Wood Poles as each individual pole, or stub removed that includes the removal of mounted equipment on the pole, the backfilling of the hole, plus the delivery of salvaged pole with attached salvaged materials to the City of Milwaukee Yard

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.310	Removing City Installed Wood Poles	EACH

Payment is full compensation for disconnecting any necessary wiring, removing the poles and equipment mounted on the poles; temporarily storing the pole and any equipment attached to it; transportation, excavating, backfilling, and surplus materials.

21. Removing Poles, Item 204.9060.S.311.

A Description

This special provision describes removing existing concrete, aluminum, steel, and wood poles for the proper disposal of pole and miscellaneous materials. Perform the work in accordance with standard spec 651.

B Materials

Existing poles, including bracket arm(s), clamp(s), conduit, cabling, and any other equipment mounted to the poles.

C Construction

Disconnect and strip all cables and wiring that are mounted on or inside the pole and carefully remove the bracket arm(s), and other non-street lighting materials from the pole. Then remove pole and backfill resulting hole in accordance with standard spec 206.2.

Disposing of Materials

Materials for Disposing of safely:

- Concrete, Aluminum, Steel, and Wood pole(s)
- Stone and brick
- Conduit and Cabling
- And other material not designated for salvage.

Salvaging Materials

Materials for Salvage and Delivery to City of Milwaukee Street Lighting Shop Yard:

- All City Provided Temporary Overhead Ballasts (High Pressure Sodium & LED “OV20”)

Carefully remove materials designated for salvage to avoid damage. Place salvaged materials in neat piles outside construction limits but within the right-of-way, at locations the street lighting Field Supervisor or Street Lighting Project Engineer approves. Stockpile materials designated for salvage without contaminating the material with dirt or foreign matter.

Contractor is responsible to protect and deliver the removed and salvaged street lighting equipment to 1540 West Canal Street, Milwaukee, Wisconsin. The contractor will need to coordinate for the delivery of all the materials that will be dropped off either all at one time or all on the same day between the hours of

8 a.m. and 2 p.m. and call three (3) working days in advance. Monday through Friday. Contractor must be out of the shop yard by 2pm NO LATER. Call Neal Karweik 414-286-5943 (office) 414-708-4245 (cell)

D Measurement

The department will measure Removing Poles as each individual pole, or stub removed that includes the removal of mounted equipment on the pole, 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.311.	Removing Poles	EACH

Payment is full compensation for disconnecting any necessary wiring, and removing the poles and equipment mounted on the poles.

22. Removing Aerial Cable, Item 204.9090.S.001.

A Description

The work under this item consists of removing temporary overhead service lines as shown on the plans; including all associated guy wires, anchors, and electrical wire; and removing materials from the site.

B (Vacant)

C Construction

Contractor shall properly dispose of materials off site.

D Measurement

The department will measure Removing Aerial Cable by linear foot pole to pole.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
204.9090.S.001	Removing Aerial Cable	LF

Payment is full compensation for all work, for disposal of materials.

23. Notice to Contractor – Contamination Beyond Construction Limits.

The department completed testing for soil and ground water contamination for locations within this project where excavation is required. Testing indicated that petroleum-contaminated soil is present at the following sites:

1. Station 67+50 to 69+00, beyond project limits left (Hometown (Marc's Service), 1200 E. Howard Ave., WDNR BRRTS No. 03-41-001651, Closed LUST Site).

The contaminated soils at the above sites are expected to be beyond the excavation limits necessary to complete the work under this project. Control construction operations at these locations to ensure that they do not extend beyond the excavation limits indicated in the plans. If contaminated soils are encountered at these sites or elsewhere on the project during excavation, terminate excavation in the area and notify the engineer.

The Hazardous Materials Report is available by contacting:

Andrew Malsom
WisDOT SE Region
141 NW Barstow St.
Waukesha, WI 53187
(262) 548-6705
andrew.malsom@dot.wi.gov

stp-107-100 (20230113)

24. Excavation, Hauling, and Disposal of Petroleum Contaminated Soil, Item 205.0501.S.

A Description

A.1 General

This special provision describes excavating, loading, hauling, and disposing of petroleum contaminated soil at a WDNR-approved bioremediation facility. The closest WDNR-approved bioremediation facilities are:

Waste Management Metro Landfill
10712 S. 124th St.
Franklin, WI 53051
(866) 909-4458

Green For Life (GFL) Emerald Park Landfill
W124S10629 South 124th Street
Muskego, WI 53132
(414) 529-1360

Perform this work according to standard spec 205 and with pertinent parts of Chapters NR 700-754 of the Wisconsin Administrative Code, as supplemented herein. Per NR 718.07, a solid waste collection and transportation service-operating license is required under NR 502.06 for each vehicle used to transport contaminated soil.

A.2 Notice to the Contractor – Contaminated Soil Locations

The department completed testing for soil contamination at locations within this project where excavation is required.

Testing indicated that petroleum-contaminated soil is present at the following locations as shown on the plans:

Intersection of W./E. Howard Ave. and S. Howell Ave.

- Station 25+70 to 26+40, from reference line to project limits left, from 1 to 6 feet below grade. The estimated volume of contaminated soil to be excavated at this location is 0 CY (approximately 0 tons using a conversion factor of 1.7 tons per cubic yard).
- Station 26+00 to 26+20, from 35 feet right of reference line to project limits right, from 1 to 6 feet below grade. The estimated volume of contaminated soil to be excavated at this location is 0 CY (approximately 0 tons using a conversion factor of 1.7 tons per cubic yard).
- Station 26+50 to 27+25, from reference line to project limits right, from 1 to 10 feet below grade. The estimated volume of contaminated soil to be excavated at this location is 9.4 CY (approximately 16 tons using a conversion factor of 1.7 tons per cubic yard).
- Station 28+35 to 29+25, from reference line to project limits right, from 4 to 8+ feet below grade. The estimated volume of contaminated soil to be excavated at this location is 2.33 CY (approximately 3.96 tons using a conversion factor of 1.7 tons per cubic yard).
- Station 29+25 to 30+00, from project limits left to project limits right, from 1 to 6 feet below grade. The estimated volume of contaminated soil to be excavated at this location is0 CY (approximately0 tons using a conversion factor of 1.7 tons per cubic yard).

Intersection of E. Howard Ave. and S. Whitnall Ave.

- Station 37+15 to 38+45, from reference line to project limits left, from 4 to 12+ feet below grade. The estimated volume of contaminated soil to be excavated at this location is 20.08 CY (approximately 34.15 tons using a conversion factor of 1.7 tons per cubic yard).
- Station 37+70 to 39+40, from reference line to project limits right, from 1 to 16+ feet below grade. The estimated volume of contaminated soil to be excavated at this location is 10.49 CY (approximately 17.83 tons using a conversion factor of 1.7 tons per cubic yard).

Intersection of E. Howard Ave. and S. Clement Ave.

- Station 66+90 to 67+50, from reference line to project limits right, from 1 to 16+ feet below grade. The estimated volume of contaminated soil to be excavated at this location is 10.41 CY (approximately 17.70 tons using a conversion factor of 1.7 tons per cubic yard). Groundwater at this location is contaminated with petroleum.

Directly load soil excavated by the project at the above locations into trucks that will transport the soil to a WDNR-licensed bioremediation facility.

If contaminated soils are encountered elsewhere on the project, terminate excavation activities in the area and notify the engineer.

No active groundwater monitoring wells were observed within the construction limits. If active groundwater monitoring wells are encountered during construction, notify the engineer and protect them to maintain their integrity. The environmental consultant will determine if monitoring wells need to be maintained. For monitoring wells that do need to be maintained, adjust the wells that do not conflict with structures or curb and gutter to be flush with the final grade. For wells that conflict with the previously mentioned items or if monitoring wells are not required to be maintained, they will be abandoned by others.

A.3 Excavation Management Plan

The excavation management plan for this project has been designed to minimize the offsite disposal of contaminated material. The excavation management plan, including these special provisions, has been developed in cooperation with the WDNR. The WDNR concurrence letter is on file at the Wisconsin Department of Transportation. For further information regarding previous investigations, remediation activities and waste characterization within the project limits, contact:

Name:	Andrew Malsom
Address:	141 NW Barstow Street, PO Box 798, Waukesha, WI 53187-0798
Phone:	(262) 548-6705
Fax:	(262) 548-6891
e-mail:	andrew.malsom@dot.wi.gov

A.4 Coordination

Coordinate work under this contract with the environment consultant:

Consultant:	TRC Environmental Corporation
Address:	6737 W. Washington St., Suite 2100, West Allis, WI 53214
Contact:	Bryan Bergmann
Phone:	(262) 901-2126 office / (262) 227-9210 cell
Fax:	(262) 879-1220
E-mail:	bbergmann@trccompanies.com

The role of the environmental consultant will be limited to:

1. Determining the location and limits of contaminated soil to be excavated based on soil analytical results from previous investigations, visual observations, and field screening of soil that is excavated;
2. Identifying contaminated soils to be hauled to the bioremediation facility;
3. Documenting that activities associated with management of contaminated soil are in conformance with the contaminated soil management methods for this project as specified herein; and
4. Obtaining the necessary approvals for disposal of contaminated soil from the bioremediation facility.

Provide at least a 14-calendar day notice of the preconstruction conference date to the environmental consultant. At the preconstruction conference, provide a schedule for all excavation activities in the areas of contamination to the environmental consultant. Also notify the environmental consultant at least three calendar days prior to commencement of excavation activities in the contaminated area.

Coordinate with the environmental consultant to ensure that the environmental consultant is present during excavation activities in the contaminated area. Perform excavation work in each of the contaminated areas on a continuous basis until excavation work is completed.

Identify the DNR approved bioremediation facility that will be used for disposal of contaminated soils and provide this information to the environmental consultant no later than 30 calendar days prior to

commencement of excavation activities in the contaminated areas or at the preconstruction conference, whichever comes first. The environmental consultant will be responsible for obtaining the necessary approvals for disposal of contaminated soils from the bioremediation facility. Do not transport contaminated soil offsite without prior approval from the environmental consultant.

A.5 Health and Safety Requirements

Add the following to standard spec 107.1:

During excavation activities, expect to encounter soil contaminated with gasoline, diesel fuel, fuel oil, or other petroleum related products and metals. Site workers taking part in activities that will result in the reasonable probability of exposure to safety and health hazards associated with hazardous materials shall have completed health and safety training that meets the Occupational Safety and Health Administration (OSHA) requirements for Hazardous Waste Operations and Emergency Response (HAZWOPER), as provided in 29 CFR 1910.120.

Prepare a site-specific Health and Safety Plan, and develop, delineate and enforce the health and safety exclusion zones for each contaminated site location as required by 29 CFR 1910.120. Submit the site-specific health and safety plan and written documentation of up-to-date OSHA training to the engineer prior to the start of work.

B (Vacant)

C Construction

Add the following to standard spec 205.3:

Control operations in the contaminated areas to minimize the quantity of contaminated soil excavated.

The environmental consultant will periodically evaluate soil excavated from the contaminated areas to determine if the soil will require offsite bioremediation. The environmental consultant will evaluate excavated soil based on field screening results, visual observations, and soil analytical results from previous environmental investigations. Assist the environmental consultant in collecting soil samples for evaluation using excavation equipment. The sampling frequency shall be a maximum of one sample for every 20 cubic yards excavated.

Directly load and haul soils designated by the environmental consultant for offsite bioremediation to the DNR approved bioremediation facility. Use loading and hauling practices that are appropriate to prevent any spills or releases of petroleum-contaminated soils or residues. Prior to transport, sufficiently dewater soils designated for off-site bioremediation so as not to contain free liquids.

Contractor shall ensure continuous dewatering and excavation safety at all times. Provide, install, operate, maintain adequate pumping equipment, disassemble, and remove pumping equipment.

Costs associated with excavation and dewatering in the contaminated area are considered incidental to this pay item. The Wisconsin Department of Transportation will be the generator of regulated solid waste from the construction project.

Limit excavation in the location described in A.2 to minimize the handling of groundwater. Notify the engineer of any dewatering activities and obtain any permits necessary to discharge or dispose of contaminated water. Provide copies of such Permit to the engineer. Meet any requirements and pay any costs for obtaining and complying with such permit use. Follow all applicable legislative statutes, judiciary decisions, and regulations of the State of Wisconsin.

D Measurement

The department will measure Excavation, Hauling, and Disposal of Petroleum Contaminated Soil in tons of contaminated soil, accepted by the bioremediation facility as documented by weight tickets generated by the bioremediation facility.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
205.0501.S	Excavation, Hauling, and Disposal of Petroleum Contaminated Soil	TON

Payment is full compensation for excavating, segregating, loading, hauling, and treatment via bioremediation of contaminated soil; obtaining solid waste collection and transportation service operating licenses; assisting in the collection soil samples for field evaluation; and dewatering of soils prior to transport, if necessary.

25. Erosion Control.

The contractor shall prepare and submit an erosion control implementation plan (ECIP) for the project including borrow sites, material disposal sites, dust control, and dewatering according to Chapter TRANS 401 requirements. The erosion control implementation plan shall supplement information shown on the plans and shall not reproduce it. The erosion control implementation plan will identify how the contractor intends to implement the project's erosion control plan.

Provide the ECIP 14 calendar days prior to the pre-construction conference. Provide 1 copy of the ECIP to WisDOT and 1 copy of the ECIP to the WDNR Liaison (Mr. Ryan Pappas; WDNR Southeast Region Headquarter; 1027 W. St. Paul Ave.; Milwaukee, WI 53233). Pursue operations in a timely and diligent manner, continuing all construction operations methodically from the initial removals and topsoil stripping operations through the subsequent grading, paving, and re-top soiling to minimize the period of exposure to possible erosion. Do not implement the ECIP until it has been approved by the department.

Re-topsoil graded areas, as designated by the engineer, immediately after grading is completed within those areas. Place sod, as designated by the engineer, within five calendar days after placement of topsoil.

When performing roadway cleaning operations, the contractor shall use equipment having vacuum or water spray mechanism to eliminate the dispersion of dust. If vacuum equipment is employed, it shall have suitable self-contained particulate collectors to prevent discharge from the collection bin into the atmosphere.

26. Protection of Concrete.

Supplement standard spec 415.3.14 as follows:

Provide for a minimum of one concrete finisher to remain on the project site after final finishing of all concrete surfaces until such time as the concrete has hardened sufficiently to resist surface scarring caused by footprints, handprints, or any other type of imprint, malicious or otherwise. Finisher must actively and continuously patrol on foot the newly placed concrete and repair any damage to the surface that might be sustained as described above.

Include the cost for providing the finisher(s), the necessary equipment, and materials in the contract unit price for each concrete item.

27. Concrete Aggregates.

Modify standard spec 501 as follows:

Size Requirements

Under standard spec 501.2.5.4.4, supplement standard spec (4) with the following:

Coarse aggregate for Concrete Grade A must consist entirely of size No. 1 when used in curb, curb and gutter, driveways, sidewalks or steps.

28. Concrete Identification Stamping.

Stamp ends of all monolithic portland cement concrete surfaces with a stamp bearing the contractor's name and the year of construction. Make all letters 2-inches in height.

Include the cost of this work in the contract unit price for other Portland cement concrete items and no additional payment will be made.

29. Cover Plates Temporary, Item 611.8120.S.

A Description

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

B Materials

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

C (Vacant)

D Measurement

The department will measure Cover Plates Temporary as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
611.8120.S	Cover Plates Temporary	EACH

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

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

stp-611-006 (20151210)

30. Landscape Planting Surveillance and Care Cycles.

If the care specialist fails to perform any of the required care cycles as specified in standard spec 632.3.19.1, the department will assess daily damages in the amount of $500 to cover the cost of performing the work with other forces. The department will assess these damages for each day the requirements of the care cycle remain incomplete, except when the engineer extends the required time period.

stp-632-005 (20070510)

Provide for one growing season of plant establishment period according to standard spec 632.3.18.

31. Signs Type II Reflective SH, Item 637.2220; Signs Type II Reflective F, Item 637.2230.

A Description

Furnish and install signs according to the plans and standard spec 637, except as follows:

B Materials

According to the plans and standard spec 637, except as follows:

The contractor shall provide all necessary sign mounting hardware as shown in the detail drawings which includes but is not limited to 5/16” x 1 ¼” Stainless Steel Fender Washers, 5/16”-18 x 3/4” Stainless Steel Hex Head Bolt, 201 Stainless Steel Banding ¾” x 0.20., Stainless Steel Flared Leg Sign Mount Bracket for ¾” banding, 201 Stainless Steel Wing Seal (buckle) for ¾” banding and one- or two-sided sign mounting Z-brackets that fit 2 3/8 inch post or approved equal.

The contractor shall affix the installation date sticker on back of sign in lower right corner. Stickers will be provided at pre-construction meeting or by the Inspector.

C Construction

According to the plans and standard spec 637, except as follows:

The contractor shall be responsible for recording the location, type, and installation date of the signage using the provided Sign Installation Log (L-101).

D Measurement

The department will measure Signs Type II Reflective SH and Signs Type II Reflective F by the square foot unit of measure.

E Payment

Payment includes furnishing Signs Type II Reflective SH and Signs Type II Reflective F.

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

ITEM NUMBER	DESCRIPTION	UNIT
637.2220	Signs Type II Reflective SH	SF
637.2230	Signs Type II Reflective F	SF

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

The Sign Installation Log (L-101) shall be complete and submitted for all signing locations prior to finalization of sign item payments.

32. Construction Staking Electrical Installations (Project), Item 650.8501

The work under this item shall be performed according to the requirements of standard spec 650, and as shown in the plans.

The street lighting poles and pull boxes / vaults are both stationed to the center with the conduit stationed at the ends. See drawing details for any additional information.

33. Lamp Ballast, LED, Switch Disposal by Contractor, Item 659.5000.S.

A Description

This special provision describes the detachment and packaging of lamps, ballasts, LEDs, and mercury containing switches (e.g., overhead roadway lighting, underdeck bridge, wall packs, pedestrian signals, traffic control stop lights and warning flashers, fluorescent bulbs, and thermostats) removed under this contract for disposal as hazardous materials.

For Lamp, Ballast, LED, Switch Disposal by Contractor, coordinate removal from the work site by the department's hazardous waste disposal vendor. Disposal will be billed to the department by the hazardous waste disposal vendor.

B Materials

B.1 Disposal by Contractor

Items removed under this contract will be considered the property of the department for waste generator identification. The contractor is responsible for coordinating with the department's hazardous waste vendor for disposal:

https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/environment/hazwaste-contacts.pdf

B.2 Disposal by Department

Items turned in to the department will be considered the property of the department for proper future disposal, and the contractor will have no further obligation for the disposal.

C Construction

C.1 Removal

Arrange for the de-energizing of luminaires after receiving approval from the engineer that the existing luminaires can be removed. Do not remove luminaires that cannot be replaced with proposed LED units and operational within the same workday. The new LED units need to be operational prior to sunset of the same workday.

Detach and remove luminaires and lamps from the existing traffic signal poles or respective structure. Avoid breaking fixtures whenever possible.

Lamps, ballasts, LED, and switches will become property of the department, and will be disposed of in an environmentally sound manner.

C.2 Packaging of Hazardous Materials

Provide a secure, level location removed from the travelled way for storage of the material for disposal.

Pack intact fixtures in the packaging of the new lamps used to replace them, or packaging affording the equivalent protection. Place in full, closed stackable cartons.

Pile cartons no more than four high if palletized and secure cartons with shrink wrap to prevent shifting or falling of the loads. Clearly mark each pallet with the words “Universal Waste Lamps” or “Universal Waste Ballasts”, the date, and the number of fixtures on each pallet.

Pack broken fixtures into (min.) 6 mil thick plastic bags and place inside sturdy cardboard boxes or the equivalent. Mark the outer packaging with the term “Broken Fixtures/Lamps”, the date and the number of broken fixtures clearly marked on the box.

The hazardous waste vendor will not accept fixtures improperly packaged. The vendor will reject any fixtures not removed as part of a contract pay item or otherwise required under this contract.

Pack ballasts and mercury containing switches in appropriate containers.

C.3 Disposal by Contractor

Complete the lamp and ballast inventory (https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/environment/dotlampballastinventory.dotx) and contact the hazardous waste vendor to coordinate pickup and disposal at a location specified by the contractor. Consolidate all pallets and boxes from one project at a single location. Contact the hazardous waste vendor to set up an appointment for pickup. The hazardous waste vendor requires a minimum of one week advance notice to schedule pickup.

D Measurement

The department will measure Lamp, Ballast, LED, Switch Disposal by Contractor as each individual unit removed and received by the hazardous waste vendor, properly packaged and acceptably completed, matching the total number of units provided on the inventory form. The department will not measure broken fixtures that exceed a total of 10 percent of all fixtures to be disposed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
659.5000.S	Lamp, Ballast, LED, Switch Disposal by Contractor	EACH

Payment for Lamp, Ballast, LED, Switch Disposal by Contractor is full compensation for detachment, handling, packaging, labeling and scheduling disposal with the hazardous waste vendor; and scrapping and disposal of all other materials.

Payment for Lamp, Ballast, LED, Switch Disposal by Department is full compensation for detachment, handling, packaging, labeling and delivering for disposal by the department; and scrapping and disposal of all other materials.

stp-659-500 (20220628)

34. Temporary Traffic Signals for Intersections (Location), Item 661.0201.

Modify standard spec 661.0201 with the following.

661.2.1 General

The City of Milwaukee will furnish control cabinet, signal controller, and NEMA monitor.

The City of Milwaukee will provide the temporary electrical service for temporary traffic signals.

The City of Milwaukee-Traffic Signals is the applicable electrical utility.

All installation of wood poles are paid for under the temporary street light item.

35. Adjusting Water Service Boxes, Item SPV.0060.001.

A Description

This special provision describes adjusting, protecting, and maintaining accessibility, for the duration of the paving project, to all City of Milwaukee water service boxes and water valve boxes located within the project limits.

B Materials

All material for the adjustment of these facilities shall meet City of Milwaukee specifications and will be provided by the City of Milwaukee by contacting Syreeta Woodley, Milwaukee Water Works, at (414) 708- 2753 (or Andray DeCordova, Milwaukee Water Works at (414) 286-6302).

If there is contractor damage, the materials must still be provided by the City of Milwaukee, however, in this case, the contractor will be charged for all materials. Materials furnished by the City of Milwaukee and not used on the project shall be delivered back to DPW Field Headquarters – Infrastructure, Operations, Water Works at 3850 N. 35th St.

C Construction

The contractor, or authorized project representative, shall contact Milwaukee Water Works prior to the start of construction. The city will locate, mark, inspect and repair all water service boxes and water valve boxes within the limits of the project prior to commencement of work on the project.

All water service boxes and water valve boxes within the project limits shall be adjusted to proposed elevations by the contractor using materials meeting city specifications.

Throughout the duration of the project, the contractor must ensure that all water service boxes, and water valve boxes are adequately located and identified by blue paint, and that at all times, all water appurtenances remain accessible for operation by city forces. Exercise caution working adjacent to water facilities to avoid damage and ensure accessibility.

Upon completion of the contract, the city will inspect all water facilities to ensure the water boxes are clean, properly aligned, and accessible. The contractor shall be responsible to make identified repairs and adjustments, and if any repairs or adjustments are made by the city, the cost will be charged to the contractor.

D Measurement

The department will measure Adjusting Water Service Boxes as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.001	Adjusting Water Service Boxes	EACH

Payment is full compensation for all excavation, backfilling, disposal of surplus materials, water box adjustments, water box clean-out, and restoration of the work site.

36. Water Main Protection, Item SPV.0060.002.

A Description

This special provision describes protecting existing water mains from newly constructed storm drainage facilities. No structures will be allowed over the existing water main or hydrant branch with less than 18” of vertical out-to-out clearance. Alternate drainage structures shall be used to provide minimum sewer-water clearances required by Wisconsin DNR.

B Materials

Contractor shall furnish and install materials as detailed on the construction plans and in the Construction section below.

C Construction

Construct drainage structure, located above and across an existing water main, by utilizing materials and joints that are water tight. For all catch basins and inlets that have less than 24” out-to-out of horizontal clearance, the following water main protections shall be made:

The catch basins and inlets shall be altered to provide 18” of vertical clearance to the water mains or hydrant branches.

The catch basins and inlets shall be wrapped with 2 layers of 8 mil polyethylene around the base and extending 1 foot vertically on all sides of the drainage structure.

D Measurement

The department will measure Water Main Protection as each individual water main protection, 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.0060.002	Water Main Protection	EACH

Payment is full compensation for protecting existing water mains; and for all excavation, backfilling, disposal of surplus materials, and restoration of the work site.

37. Signature Beds, Item SPV.0060.015.

A Description

This special provision describes the requirements for constructing signature beds as shown in the plans

B Materials

Plant materials shall be paid for under their respective items. Annuals will be provided and planted by the City of Milwaukee. Limestone Blocks & Steel Border will be incidental to the Signature Beds item.

C Construction

The signature beds shall be graded and shaped as shown in the plans with a shovel cut bed edge.

D Measurement

The department will measure Signature Beds by each bed, 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.0060.015	Signature Beds	EACH

Payment is full compensation for excavating and grading, shovel cutting, and providing and applying required topsoil and mulch; and for disposing of all excess and waste materials.

38. Utility Line Opening (ULO), Item SPV.0060.050.

A Description

This special provision describes excavating to uncover utilities for the purpose of determining elevation or location and potential conflicts as shown on the plans or as directed by the engineer.

B (Vacant)

C Construction

Perform the excavation in such a manner that the utility in question is not damaged and the safety of the workers is not compromised.

Perform the utility line openings (ULOs) as soon as possible and at least 10 days in advance of proposed utility construction to allow any conflicts to be resolved with minimal disruption. Give the engineer a minimum of three working days once utility line opening information is received to review all relevant design information prior to proposed utility construction. Where utilities are within 6 feet of each other at a potential conflict location, only one utility line opening will be called for. In these cases, a single utility line opening will be considered full payment to locate multiple utilities. Utility line openings include a trench up to 10 feet long as measured at the trench bottom, and of any depth required to locate the intended utility.

Approve and coordinate all utility line openings with the engineer. Notify the utility engineers or their agents of this work a minimum of 3 days prior to the work so they may be present when the work is completed.

Replace pavement over utility line opening trenches which are within the staged traffic area as directed by the engineer. Replace pavement and open to traffic within 24 hours of the excavation.

D Measurement

The department will measure Utility Line Opening 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.0060.050	Utility Line Opening (ULO)	EACH

Payment is full compensation for the excavation required to expose the utility line; backfilling with existing material removed from the excavation; compacting the backfill; restoring the site; and for cleanup.

Existing pavement, concrete curb, gutter, and sidewalk removals necessary to facilitate utility line openings are not considered part of or paid for under Utility Line Openings but are considered separate and measured and paid for separately as removal items. Pavement replacement material, concrete curb, gutter, and sidewalk items will also be considered separate from Utility Line Openings and will be measured and paid for separately.

39. Adjusting Sanitary Manholes; Item SPV. 0060.100.

A Description

This work includes adjusting sanitary manholes to an elevation as determined by the engineer as well as installing frame and cover, internal frame/chimney seal, according to the Standard Specifications for Sewer and Water Construction in Wisconsin, latest edition and amendments (SSSW).

Add or remove masonry adjusting rings as needed. This item applies to structures to be lowered less than 6 inches or raised less than 12 inches.

B Materials

B.1 Adjusting Rings

Adjustment rings shall be concrete with steel reinforcement in conformance with ASTM C-478. Precast concrete rings shall have an inside diameter to match the manhole opening, be not less than 2 inches nor more than 6 inches high, and have a wall thickness of 6 inches unless otherwise specified. The rings shall contain a minimum of one No. 2 reinforcing rod centered within the ring. Do not use any cracked or broken rings. The top of precast manhole cones shall be set a maximum of 18 inches lower than established grade in unimproved areas, with the top of the manhole cover being ringed up flush with the existing ground. The minimum number of adjusting rings shall be one 2-inch ring. The maximum height of adjusting rings shall be 8 inches in paved areas. All joints between the adjusting rings shall be filled with

grout or mortar, including between the cone and the adjusting ring and the adjusting ring and the frame. Rings shall be grooved to receive a step.

B.2 Manhole

Precast manholes and cones shall conform to ASTM Specifications, C478, latest revision.

B.4 Manhole Seal

Furnish new Cretex, NPC Flexrib, or approved equal internal frame/chimney Seal, as shown in the plans. The seal shall meet the material requirements of section 8.42.3 and the performance requirements of section 8.42.4 of the SSSW.

C Construction

C.1 General

The location of existing sanitary manholes to be adjusted is indicated on the plans. Adjust these items as shown in the plans. Reconstruct manholes as necessary so that the frames and cover when placed will be at the established required grade; remove the existing frame and cover. Any temporary adjustment (wood) shims shall be removed and backfilled with grout or mortar prior to installing the seal. Install seals according to the manufacturer's recommended installation procedures. Furnish and use Backfill Slurry in the manhole excavation area to existing surface or to appropriate depth for pavement restoration. Salvage the existing frame and cover.

C.2 Surface Preparation

Remove manhole cover and power wire brush the lower 3 inches of the manhole frame to remove any loose rust or scale and repair any imperfections by either grinding smooth or filling with mortar. A smooth, clean sealing surface is required. Realign the casting if it is offset more than approximately 2 inches from the chimney. Remove all loose and protruding mortar and brick from the upper 7-Inch chimney and clean surface by power wire brushing. Provide a 4-Inch wide sealing surface starting 2 inches down from the bottom of the frame.

All sealing surfaces must be circular, reasonably smooth, clean and free of any loose material or excessive voids. If such a surface does not exist for the bottom of the sleeve to seal against, use one-component, quick-set, high strength, non-shrink, polymer modified patching mortar which has been formulated for vertical or overhead use. If the bottom of the sleeve is to seal against the top of an eccentric (straight side) cone and an inadequately high vertical surface does not exist, contact the manufacturer to obtain details to build the required vertical surface.

Use caulk to fill minor irregularities in the bottom sealing surface. The caulk shall be a butyl rubber caulk conforming to AASHTO M-198, Type B. Apply a single bead of the caulk to the center portion of the lower sealing surface of the sleeve.

Any flaws in the manhole frame, such as minor cracks, pits or protrusions, shall be repaired by either filling with mortar or grinding smooth.

D Measurement

The department will measure Adjusting Sanitary Manhole as each 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.0060.100	Adjusting Sanitary Manholes	EACH

Payment is full compensation for furnishing and installing all materials including adjusting rings, masonry, and internal frame/chimney seals; for excavating, backfilling, and compacting; for disposing of surplus materials; and for cleaning out and restoring the structure.

40. Inlet Covers Type MS 55, Item SPV.0060.101; Inlet Covers Type MS 57, Item SPV.0060.102; Manhole Covers Type MS 58-A, Item SPV.0060.103; Storm Inlet Type 45A, Item SPV.0060.112.

A Description

This special provision describes inlet covers, manhole covers, and inlets.

Perform work under these items according to the requirements of standard spec 611 and the details as shown on the plans.

B Materials

Furnish materials under these items according to the requirements of standard spec 611 and the details as shown on the plans.

Structures with traps shall arrive at the site assembled. Trap assembly reinforced concrete shall be integral with the circumferential reinforced wall.

C (Vacant)

D Measurement

The department will measure Inlet Covers Type MS 55; Inlet Covers Type MS 57; Manhole Covers Type MS 58-A; Storm Inlet Type 45A by each 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	Inlet Covers Type MS 55	EACH
SPV.0060.102	Inlet Covers Type MS 57	EACH
SPV.0060.103	Manhole Covers Type MS 58-A	EACH
SPV.0060.112	Storm Inlet Type 45A	EACH

Payment is full compensation for furnishing and installing the manhole covers, inlet covers, and inlet.

41. Install City Precast Controller Base, Item SPV.0060.201.

A Description

This special provision describes the installation of precast controller bases furnished by the City of Milwaukee, for traffic signal control cabinets as shown on the plans.

B Materials

The 36”x21.25”x20” pre-cast concrete foundation for traffic signal cabinets P1 and P2 will be furnished by the City of Milwaukee. The contractor shall contact Mr. Rudy Gutierrez, Electrical Services Manager (414) 286-5941-office, (414) 708-5148-mobile; or the Electrical Services Dispatcher at (414) 286-3687 to coordinate pickup of the concrete foundation at the City of Milwaukee Electrical Services headquarters located at 1540 West Canal Street Milwaukee, WI 53233.

C Construction

Install concrete traffic cabinet bases according to the plans. Plan changes must be approved by a City of Milwaukee Electric Services Manager or Traffic Engineer. The primary contacts are Mr. Rudy Gutierrez, Electrical Services Manager (414) 286-5941 office, (414) 708-5148 mobile.

D Measurement

The department will measure Install City Precast Controller Base as each individual unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.201	Install City Precast Controller Base	EACH

Payment is full compensation for installing city furnished controller base; for excavation, backfilling and disposal of surplus material.

42. ATC Controller and Cabinet Installed, Item SPV.0060.205.

A Description

Furnish and install an ATC Traffic Signal Controller and NEMA TS2 Type 1 Traffic Signal Control Cabinet.

B Materials

Furnish equipment and assemble the cabinet conforming to the latest revision of NEMA Standards Publication TS 2-2003, Traffic Controller Assemblies with NTCIP requirements, National Electrical Manufacturers Association, hereinafter called NEMA TS2 Standard.

The cabinet shall be designed for TS2 Type 1 operation and shall conform to the design shown in DWG TF5016TWI02.

All equipment, materials, and cabinet features shall be the same type, make, and model on all cabinets delivered under any one order.

Furnish an Econolite Cobalt-C shelf mount controller with the latest ASC/3 software installed.

Furnish any equipment and materials not specifically described but required in order to perform the intended functions in the cabinet.

C Construction

Conform all work to the Wisconsin State Electrical Code (WSEC). Conform all work to standard spec 651, as supplemented or modified in this specification.

C.1 Definitions

Vendor – the firm under contract with the City of Milwaukee for furnishing the fully equipped and operational traffic signal cabinet.

Construction contractor – the firm under contract with the City of Milwaukee or another agency to construct a roadway facility. The construction contractor will install the traffic signal cabinet or may designate a subcontractor, such as an electrical subcontractor, to represent them with regards to the signal cabinet installation.

Owner – City of Milwaukee

Manufacturer – the firm that builds or produces the traffic signal equipment other than the cabinet. For example, the “controller manufacturer”.

C.2 Terminal Facility

Fully wire the terminal facility with sixteen load switch sockets: eight phases of vehicular, four phases of pedestrian, and four phases of overlap operation; eight flash transfer relay sockets; one flasher socket; and two terminal facility Bus Interface Unit (BIU) rack slots. The use of printed circuit boards is not acceptable on the terminal facility, except printed circuit boards are acceptable for the BIU interface with the load bay. Position the 16 load switch sockets in two horizontal rows of eight sockets each. Support the load switches and flasher by a bracket or shelf extending at least three inches from the terminal facility.

Label all terminals, load switches, and flash transfer relay sockets. Label reference designators by silk-screening on the front and rear of the terminal facility to match drawing designations.

Provide rack mounted BIU’s. Provide a dual-row, 64-pin female DIN 41612 Type B connector for each BIU rack position. Provide card guides for both edges of the BIU. Terminal and facilities BIU mounting shall be an integral part of the terminal facility.

Provide a 16-channel, 8-position, TS2 detector rack, with an integrally mounted BIU mounting. Racks shall be addressable. Power a detector rack by the cabinet power supply. Fasten the loop detector rack towards the left side of the lower shelf.

For BIU rack connectors, provide pre-wired address pins or jumper plugs corresponding to the requirements of the NEMA TS2 Standard. The address pins or jumper plugs shall control the BIU mode of operation. BIUs shall be capable of being interchanged with no additional programming.

For the terminal facility, contain all field wires within one or two rows of horizontally-mounted heavy duty terminal blocks. Terminate all field output circuits on an unfused terminal block with a minimum rating of 10 amps. Use mechanical connector lugs rated for copper wire.

Angle the lower section of the terminal block out from the back of the cabinet at approximately a 45 degree angle.

Identify all field input/output (I/O) terminals by permanent alphanumeric labels. All labels shall use standard nomenclature per the NEMA TS2 Standard.

All field flash sequence programming at the field terminals shall be able to be accomplished with the use of only a screwdriver.

Wire field terminal blocks to use three positions per vehicle or overlap phase (green, yellow, red).

Wire one RC network in parallel with each flash transfer relay coil.

Permanently label all logic-level, NEMA-controller and MMU input and output terminations on the terminal facility. Identity the function of each terminal position on the cabinet drawings.

Terminal blocks for DC signal interfacing shall have a number 6-32 x 7/32 inch screw as minimum.

Functions to be terminated shall be as specified in the listing of Input/Output Terminals in Section 5 of the NEMA TS2 Standard.

Conform all terminal facility and cabinet wiring to the WSEC. The green/walk, yellow, and red/don't walk load switch outputs shall be minimum 16 gauge wire. The MMU (other than AC power), controller I/O, and logic ground shall be minimum 22 gauge wire. All wire colors shall be consistent.

C.3 Vehicle Detection Interface Panel

Provide a 16-position interface panel. Interface panel shall allow for the connection of 16 independent field loops. The panels shall have barrier strip type terminals using 8-32 screws and be rated for 20 inch pounds of torque. Provide a ground bus terminal between each loop pair terminal to provide a termination for the loop lead-in cable ground wire. Secure the interface panels to a mounting plate attached to the left interior side wall of the cabinet. The panel shall also include inputs for up to 4 preempts.

Provide a cable consisting of 20 AWG twisted pair wires to enable connection to and from the interface panel to a detector rack. The twisted pair wires shall be color-coded wires. Provide a cable of sufficient length to allow the detector rack to be placed on either shelf.

Identify all termination points by a unique number silk screened on the panel.

C.4 Conductors and Cabling

All conductors in the cabinet shall be copper 22 AWG or larger. All 14 AWG and smaller wire shall conform to MIL-W-16878/1, Type B, 600V, 19-strand tinned copper. The wire shall have a minimum of 0.010 inches thick PVC insulation without clear nylon jacket and rated to 105 degrees Celsius. All 12 AWG and larger wire shall be UL or NRTL listed THHN/THWN 90 degrees Celsius, 600V, 0.020 inches thick PVC insulation, and clear nylon jacketed.

Provide controller and MMU cables of sufficient length to allow the units to be placed on either cabinet shelf in the operating mode. Connecting cables shall be sleeved in a braided nylon mesh. Exposed tie-wraps and interwoven cables are unacceptable.

Provide the cabinet configuration with up to 6 SDLC RS-485 Port 1 communication cables to allow full capabilities of that cabinet. Each communication cable connector shall be a 15-pin metal shell D subminiature type. The cable shall be a shielded cable suitable for RS-485 communications. Secure all connecting cables and wire runs by mechanical clamps. Stick-on type clamps are not acceptable.

Pre-wire the terminal facility for a Type 16 MMU.

All wiring shall be neat in appearance. Stow excess cable behind the terminal facility or below the shelves in order to allow easy access to the terminal facility and cabinet components. All cabinet wiring shall be continuous from its point of origin to its termination point. Butt type connections/splices are not acceptable.

Wire the grounding system in the cabinet into three separate circuits: AC Neutral, Earth Ground, and Logic Ground.

Optoisolate all pedestrian pushbutton inputs from the field to the controller through the BIU and operate at 12 VAC.

Hook or loop all wire, size 16 AWG or smaller, at solder joints around the eyelet or terminal block post prior to soldering to ensure circuit integrity. Lap joint soldering is not acceptable.

C.5 Cabinet Switches

The above switches shall function as follows:

Off: Signals Dark

Signal: Signals On and operating as follows:

Auto	Hand
Flash: Signals Flash	Signals Flash
Normal: Signals Normal	Signals Advance by use of hand control

Provide manual detector switches. Provide four pedestrian detector switches. The switches shall be spring loaded and automatically return to the center position. Wire the pedestrian switches to the T&F BIU slot 1. The switches shall operate as follows:

Position	Function
Up	Detector Disabled
Center	Detector Enabled
Down	Detector Called

C.6 Bus Bar

Provide a minimum 20-position neutral bus bar capable of connecting three #12 AWG wires per position.

C.7 Circuit Breakers

House in the power panel the following vertically mounted, single pole, 120 volts AC, 60 Hertz circuit breakers, with the ON position being up:

- One 30-amp signal breaker. This breaker shall supply power for all cabinet functions not powered through one of the other breakers or fuses listed below. Streetlights will be powered from outside the cabinet in the meter breaker pedestal. This breaker shall feed a signal bus supplied through a solid state bus relay and a radio interference line filter. The bus relay, in all cases, shall be a solid state contactor and shall not be jack mounted. Breakers shall be thermal magnetic type, UL or NRTL listed, with a minimum of 22,000 amp interrupting capacity.
- One 15-amp auxiliary breaker. This breaker shall supply power to the fan and heater.
- One 10-amp breaker. This breaker shall supply power for control equipment: controller, MMU, and cabinet power supply.
- One 20-amp circuit breaker for future use.

Power the cabinet light through the GFI fuse, not a circuit breaker.

C.8 Radio Interference Suppressor

Equip each control cabinet with a single radio interference suppressor (RIS) of sufficient ampere rating to handle the load requirements. Install the RIS at the input power point. The RIS shall minimize interference in both the broadcast and the aircraft frequencies and shall provide a maximum attenuation of 50 DB over a frequency range from 200 KHZ to 75 MHZ, when used in connection with normal installations. The RIS shall be hermetically sealed in a substantial metal case filled with a suitable insulating compound. The terminals shall be nickel-plated brass studs of sufficient external length to provide space to connect two #8 AWG wires and shall be so mounted that they cannot be turned in the case. Ungrounded terminals shall be properly insulated from each other and shall maintain a surface leakage distance of not less than 6.35 mm between any exposed current conductor and any other metallic parts. The terminals shall have an insulation factor of 100-200 megaohms dependent upon external conditions. The RIS shall be rated at minimum 50 amperes. Design the RIS for operation on 115 VAC +/- 10%, 60HZ, single-phase circuits, and to meet the standards of UL or a NRTL and Radio Manufacturer's Association.

C.9 Bus Relay

Provide a normally-open, 60 amp, solid state relay.

C.10 Surge Protector

Install a plug-in type EDCO SHA-1250, or Atlantic/Pacific approved equal, surge protector across the load terminal of the 10-amp circuit breaker. Install a General Electric Varistor, catalog #V130PA20A, at the load terminals of the circuit breaker from the hot line to the grounded current carrying neutral conductor

C.11 Power receptacles

Mount a 120 VAC 20 amp, NEMA 5-20R GFCI convenience outlet at each of these two locations:

- On the interior right side wall above the power panel. The outlet shall be fully operational and fuse protected.
- Near the power panel where it will not interfere with power panel maintenance. This outlet is to be wired by field installation personnel.

C.12 Suppressors and RC Network

Provide a suppressor for each 120 VAC circuit that serves an inductive device, such as a fan motor or a mechanical relay, to protect the controller's solid state devices from excessive voltage surges. Such suppressors shall be in addition to the surge protector at the input power point. Wire one RC network in parallel with each inductive device.

C.13 Auxiliary Devices

C.13.1 Load Switches

Provide 16 solid state load switches conforming to the requirements of section 6.2 of the NEMA TS2 Standard.

C.13.2 Flashers

Provide one solid state flasher conforming to the requirements of section 6.3 of the NEMA TS2 Standard.

C.13.3 Flash Transfer Relays

Provide 4 flash transfer relays conforming to the requirements of section 6.4 of the NEMA TS2 Standard.

C.13.4 Inductive Loop Detector Units

Provide 8 inductive loop detector units conforming to the requirements of section 6.5 of the NEMA TS2 Standard for 2-channel, rack mount detector units, type C.

C.13.5 Cabinet Power Supply

Provide one cabinet power supply with each cabinet conforming to the requirements of section 5.3.5 of the NEMA TS2 Standard. Provide LED indicators for the 12 VDC, 12 VAC, and 24 VDC outputs. Provide jack plugs on the front panel for access to the +24 VDC for test purposes.

C.14 Bus Interface Units (BIU)

Provide three BIUs conforming to the requirements of section 8 of the NEMA TS2 Standard.

Provide two BIUs with the main panel and one BIU with one of the detector racks.

C.15 Malfunction Management Unit (MMU)

Provide one shelf-mountable, 16 channel, solid-state MMU with Ethernet capability. The MMU shall meet the requirements of Section 4 of the NEMA TS2 Standard. The MMU shall be an Eberle Design Inc. Model MMU2-16LE or preapproved equal.

The MMU shall be capable of the following:

- Detecting simultaneously active inputs of Green (Walk), Yellow, or Red (Don’t Walk) on the same channel.
- Determining if the field signal input states detected as active or inactive by the MMU correspond with the data provided by the Controller Unit.
- Monitoring an optional external watchdog output from a Controller Unit or other external cabinet device.
- Monitoring an intersection with up to four approaches using the Flashing Yellow Arrow (for protected/permissive left and right turn movements).
- Event logging for the following; AC Line log, Prior/Previous Faults log, and Monitor Reset Log. All log entries shall include a date and time stamp.
- All monitor functions shall be capable of being programmed through the front panel, without the need for computers or special programs cards.
- A built-in Diagnostic Wizard shall be provided that displays detailed diagnostic information regarding the fault being analyzed. This mode shall provide a concise view of the signal states

involved in the fault, pinpoint faulty signal inputs, and provide guidance on how the technician should isolate the cause of the malfunction.

The MMU shall have an LCD display that allows for viewing of log files and field indications, as well as the viewing and setting of date and time and configuration parameters.

C.16 Documentation

C.16.1 Cabinet Intersection Wiring Diagrams

For each individual cabinet ordered, within 10 calendar days after receipt of the procurement order, furnish to the City of Milwaukee's electrical lead electrician two sets of 22X34-inch detailed printed cabinet intersection wiring diagrams for information only.

At the time of the cabinet delivery, furnish to the City of Milwaukee's electrical lead electrician two sets of printed 22X34-inch cabinet intersection wiring diagrams and one set of .dgn CAD files per cabinet. Printing the 22X34-inch sheet in smaller sizes is not acceptable. Leave a third drawing in the signal cabinet. After cabinet acceptance is complete, if any cabinet wiring changes were made, revise the cabinet wiring diagrams, leave one drawing in the signal cabinet, and furnish to the City of Milwaukee's electrical lead electrician two sets of as-built printed cabinet wiring diagrams and one set of as-built .dgn CAD files per cabinet. If no changes were made from time of cabinet delivery, notify the City of Milwaukee's lead electrical technician in writing.

C.16.2 Manuals

At the time of the cabinet delivery, furnish to the City of Milwaukee's electrical lead electrician one set of installation, operations, and maintenance manuals per cabinet including each type of equipment in the cabinet. The manuals shall as a minimum include the following information: a) table of contents, b) operating procedure, c) step-by-step maintenance and trouble-shooting information for the entire assembly, d) schematic diagrams, e) pictorial diagrams of parts locations, f) itemized parts lists with parts numbers, g) theory of operation, and h) maintenance checklists.

The itemized parts lists shall include the manufacturer's name and parts number for all components (such as IC, diodes, switches, relays, etc.) used. The list shall include cross-references to parts numbers of other manufacturers who make the same replacement parts.

For each of the traffic signal controller and MMU, in addition to the above manual requirements, furnish one reference manual for the processor and components proposed to perform the controller and MMU functions. Include a complete set of schematics for the controller, MMU, and any auxiliary circuit boards either in the reference manual or in a separate volume. In addition, furnish a written narrative describing the controller and MMU operation and front panel configuration, and a conceptual flow chart illustrating the control logic for comparison with these specifications. The narrative shall include a discussion of any limitation or exceptions to the performance described in these specifications, and a discussion of any control capabilities provided in addition to that required in these specifications.

C.17 Cabinet Delivery

The construction contractor will provide the traffic signal specifications and plans, including the sequence of operation, to the vendor. The vendor shall determine the required cabinet equipment and assembly requirements from the plans and specifications and provide the owner a list of procurement items. The contractor will order the procurement items. The City of Milwaukee will provide the signal timing to the vendor a minimum of two weeks before the scheduled cabinet delivery date.

For cabinets to be installed in the field by the construction contractor, provide the list of procurement items to the City of Milwaukee a minimum of 60 days before the cabinet is scheduled to be installed in the field. The vendor is responsible for coordinating with the project construction contractor to determine the scheduled cabinet installation date. Cabinets shall be completed, delivered, and accepted within 50 calendar days after the initiation of the procurement request. The City of Milwaukee reserves the right to require up to five cabinets per month to be completed, delivered, and accepted.

If the City of Milwaukee makes a modification to any cabinet order before the entire cabinet is completely built in the vendor's shop, the delivery time does not change. If the owner accepts a vendor requested cabinet order or other modification at any time, the delivery time does not change. All cabinet modifications will be made without additional cost to the owner, except if an additional equipment item is added that is under procurement contract, the established price in the procurement contract will be paid the vendor.

Deliver cabinets to City of Milwaukee Electrical Services headquarters located at 1540 West Canal Street Milwaukee, WI 53233. Final wiring/terminations in all cabinets that are to be city owned will be performed

by city forces. Coordinate final cabinet wiring with the City of Milwaukee's Traffic Signal Field Operations unit.

Delivery will be received by the owner. Schedule the delivery directly with the construction contractor. The vendor is responsible for arranging the unloading of the cabinet. Notify the electrical shop of the intent to deliver a minimum of two business days ahead of the desired delivery time. The owner will provide the vendor a list of names, phone numbers, and email addresses for contact information.

The vendor is notified that delivery times and schedules may be changed or delayed at any time for any reason. The vendor may be required to store completed cabinets at their facility for extended periods of time.

C.18 Acceptance Testing

Complete on-site traffic signal acceptance testing in the presence of the owner. The acceptance testing will occur after the signal cabinet is fully installed at the project intersection by the construction contractor and before the traffic signal is turned on. The construction contractor and the owner will determine the time for the acceptance testing. In addition to the cabinet as specified in this specification, add-on accessory items, traffic signal interconnect, system communication, and closed loop system operation are included in the acceptance testing.

Provide an IMSA certified Traffic Signal Bench Technician, Level II, or an IMSA certified Traffic Signal Field Technician, Level II, with a minimum of three years' experience in construction and operation of traffic signal cabinets similar to the cabinets specified in this specification. Alternatively, provide a technician or electrician with a minimum of three years' experience in construction and operation of traffic signal cabinets similar to the cabinets specified in this specification. The technician shall be on-site during the entire acceptance testing and shall be capable and equipped to make in-field revisions / repairs to the signal cabinet to conform to this specification.

Upon successful completion of the acceptance testing as determined by the Owner, a 30-day conditional acceptance of the signal cabinet will be provided to the vendor. Should the cabinet within the 30-day conditional acceptance period fail to perform in any way as determined by the Owner, the vendor shall repair the cabinet to bring it into conformance with this specification and the acceptance testing shall be repeated. Repair times shall conform to the warranty service response times in this specification. The acceptance testing shall be repeated. Upon successful completion of the retesting, a new 30-day conditional acceptance period shall begin. After the signal cabinet runs 30 days without failure, the cabinet will be fully accepted by the Owner.

The vendor will be allowed up to two 30-day conditional acceptance periods. If the cabinet fails during the second 30-day period, an entirely new cabinet shall be furnished and made operational in the field by the vendor at no cost to the owner and a new acceptance testing procedure shall begin. Cabinet replacement times shall conform to the warranty service response times in this specification. The original cabinet becomes the property of the vendor.

The owner reserves the right to perform its own tests on the traffic signal cabinet at any time using the owner's control equipment. Should an individual traffic signal cabinet be found to not meet the requirements of these specifications, the vendor shall pick up the traffic signal cabinet from the owner or from the field, perform at their shop repairs / revisions as necessary to bring the traffic signal cabinet into conformance with these specifications, and deliver the repaired / revised traffic signal cabinet back to the designated location, all at no additional cost to the City of Milwaukee.

C.19 Certification

Provide a written certification with the cabinet delivery that the equipment meets the requirements of the plans and specifications and will fully run the sequence of operation and the signal timing, including closed loop system operation if applicable. The certification shall be on the vendor's company letterhead, shall be addressed to both the City of Milwaukee and the construction contractor, and shall be signed by a company officer authorized to legally obligate the company.

C.20 Warranty

The warranty shall start upon delivery of the cabinet and all supplied equipment to the owner designated location. Provide a warranty and guarantee statement which stipulates that the cabinet and all supplied equipment, including add-on accessory items, to be, individually and as a cabinet system, free from defects in materials and workmanship for a period of at least one year from the date of final cabinet acceptance in the field, or in the case of a cabinet that is to be delivered to the owner for use by the owner, from the date of delivery of an accepted cabinet to the owner. All warranty beyond the one year construction bond needs to be from the manufacturer or vendor. Final cabinet acceptance in the field is

after a successful 30-day conditional acceptance period is completed. Delivery of a cabinet for testing does not constitute acceptance of the cabinet. Turn over to the City of Milwaukee warranties and guarantees that are offered by the manufacturer as a customary trade practice. Name the City of Milwaukee as the obligee on all manufacturers' warranties and guarantees. Shipping costs, both to the factory or an Authorized Repair Depot, and return, shall be paid by the vendor.

The warranty shall provide for full repair or replacement, as determined by the owner, of the failed item or cabinet system, including removal and making the item or system fully operational in the cabinet, at no cost to the owner. Vendor warranty service response times after notification by the owner:

- 4 hours to have qualified service personnel on site at the intersection
- 12 hours to have the signal safely operational, including all phases and enough detection to run the intersection phasing (minimum 8 detectors)
- 48 hours on business days to restore the signal to full original operations

If a malfunction in the controller unit, MMU, module, or any auxiliary equipment occurs during the warranty period, the vendor shall, within 24 hours after notification (excluding Saturday and Sunday), furnish and make fully operational in the cabinet, an identical, programmed, controller unit, MMU, module, or auxiliary equipment, for use while the warranted unit is being repaired or replaced. The isolation of any malfunction during the warranty period shall be the responsibility of the vendor.

The City of Milwaukee reserves the right to make repairs to malfunctioning cabinets and equipment that are under warranty, up to and including complete replacement of the cabinet, when in the owner's determination the safety of the traveling public is best served. Such repair work will not in any way void or limit the vendor's warranty and guarantee specified above. The owner will notify the vendor in writing of the repair.

The vendor shall within five business days after notification replace, at the electrical shop, all cabinets, equipment, and supplies used by the owner in making repairs, with new parts meeting the requirements of this specification.

If any cabinet has three or more equipment or cabinet system failures, resulting from poor workmanship, within the first six months of operation after owner acceptance, an entirely new cabinet exactly matching the existing cabinet shall be furnished and made fully operational by the vendor at no additional cost to the owner. Any traffic control, including but not limited to signing, channelizing devices, temporary signals, police control, and flaggers, that becomes necessary as determined by the owner in order to safely replace the cabinet is the full responsibility of the vendor. The original cabinet becomes the property of the vendor.

Provide, at no additional cost, firmware/software maintenance, problem resolution phone technical support, problem resolution technical support in the supplier's facility, firmware/software patches, and firmware/software upgrades for a minimum of three years. The lead for technical support and primary owner contact for support shall be a qualified person employed by the vendor's local office who is personally familiar with the owner's software and signal operations. Help desks and manufacturer's representatives may be utilized by the lead technical support person as resources but are not acceptable for lead technical support.

Maintain an inventory of the firmware/software version on each controller provided. Notify the City of Milwaukee's electrical shop supervisor or lead electrician in writing when a firmware/software patch or upgrade is available. The owner will direct the vendor when to load the patch or upgrade for each controller. Load the patch or upgrade and provide a usable copy of the patch or upgrade to the owner. Alternatively, when requested by the owner, provide the patch or upgrade to the owner for installation by the owner.

D Measurement

The department will measure ATC Controller and Cabinet Installed by each controller, 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.0060.205	ATC Controller and Cabinet Installed	EACH

Payment is full compensation for furnishing and installing the traffic signal controller and control cabinet; for furnishing and installing all other items necessary (such as, wire nuts, splice kits and/or connectors,

tape, insulating varnish, ground lug fasteners, etc.) to make the proposed system complete from the source of supply to the most remote unit and for clean-up and waste disposal.

43. Fiber Optic Patch Panel, Item SPV.0060.212.

A Description

Furnish and install a fiber optic patch panel according to the following standards.

B Materials

Furnish a Fiber Optic Patch Panel with cable lengths as specified in the plans. The patch panel shall have 6 steps, 12 count single-mode OS2 fiber, ST connectors, and a pigtail end. The cable shall be for indoor or outdoor use and shall be riser cable. The body of the patch panel shall be black in color. No pull kit should be pre-installed.

C Construction

Have a certified fiber optic technician perform work for fiber optic terminations, splicing and testing. Have a certified fiber optic technician supervise all fiber optic cable installation. Test the panel and demonstrate that all equipment is operational to the inspector. Ensure termination does not exceed attenuation limits specified in standard spec 678.3.4.

D Measurement

The department will measure Fiber Optic Patch Panel by each 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.0060.212	Fiber Optic Patch Panel	EACH

Payment is full compensation for furnishing and installing fiber optic patch panel and for testing the equipment.

44. Ethernet Switch, Item SPV.0060.213.

A Description

Furnish and install an Ethernet switch according to the following standards.

B Materials

Furnish an Ethernet Switch with a compatible power supply.

Environmental: This equipment shall meet the NEMA environmental, power and surge ratings as set forth in NEMA TS2 specifications.

Mounting: This equipment must be DIN Rail mountable.

Interfaces: This equipment must support a minimum of 12 Ethernet interfaces, with a minimum of three being shared or dedicated SFP interfaces for pluggable optical connections and support for PoE+ on four or more interfaces.

Management: This equipment must be a managed switch with the ability to support 802.1Q VLAN Tagging, 802.1D Spanning Tree Protocol, and 802.1p Quality of Service. Multicast, broadcast, and flooding storm control should be features.

LEDs: This equipment must have a power input status LED, a ring status LED, and LEDs showing the port link and speed status per port.

Memory: This equipment must have a minimum of 128MB of DRAM, and a minimum of16MB of flash memory

C Construction

Install Ethernet switch into field cabinet. Connect switch to the devices as directed by the engineer. Contact Scott Reinbacher at (414) 286-3232 for more information.

D Measurement

The department will measure Ethernet Switch by each 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.0060.213	Ethernet Switch	EACH

Payment is full compensation for furnishing and installing ethernet switches and making necessary connections.

45. Electrical Service Pedestal, Item SPV.0060.215

A Description

Install meter breaker pedestal.

B Materials

Furnish 120/240V meter breaker pedestal conforming to state standard spec 656.2.3., except do not supply service.

C Construction

Install service pedestal at location shown in plans. Install grounding electrodes as required by local utility and install appropriate grounding conductors. Contact Mr. Rudy Gutierrez, Electrical Services Manager (414) 286-5941 office, (414) 708-5148 mobile when pedestal will be ready for service with two working days notice.

D Measurement

The department will measure Electrical Service Pedestal by each 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.0060.215	Electrical Service Pedestal	EACH

Payment is full compensation for furnishing and installing meter breaker pedestal.

46. EVP 1 Direction Detector, Item SPV.0060.218.

A Description

Furnish and install an Emergency Vehicle Preemption (EVP) 1 Channel 1 Direction Infrared Detector.

B Materials

Furnish a 1 Channel 1 Direction Infrared Detector.

C Construction

Install detector as shown in the plans and according to manufacturer’s recommendations.

D Measurement

The department will measure EVP 1 Direction Detector by each 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.0060.218	EVP 1 Direction Detector	EACH

Payment is full compensation for furnishing and installing the EVP detector.

47. EVP Phase Selector Card 4 Channel, Item SPV.0060.221.

A Description

Furnish and install an Emergency Vehicle Preemption (EVP) Phase Selector Card 4 Channel.

B Materials

Furnish a 4 channel phase selector card. The selector card shall be capable of functioning with a GPS radio unit as well as infrared system detectors simultaneously.

C Construction

Install phase selector card into the appropriate slot in the controller cabinet and make all necessary wiring connections to EVP detectors.

D Measurement

The department will measure EVP Phase Selector Card 4 Channel by each 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.0060.221	EVP Phase Selector Card 4 Channel	EACH

Payment is full compensation for furnishing and installing the phase selector card; and making necessary connections.

48. EVP Confirmation Light, Item SPV.0060.223.

A Description

Furnish and install an Emergency Vehicle Preemption (EVP) Confirmation Light Assembly.

B Materials

Furnish a typical confirmation light assembly and LED flood light.

C Construction

Install confirmation lights as described in the plans.

D Measurement

The department will measure EVP Confirmation Light by each 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.0060.223	EVP Confirmation Light	EACH

Payment is full compensation for furnishing and installing the EVP confirmation light assembly.

49. Vehicular Video Detection System-2 Cameras, Item SPV.0060.225.

A Description

This specification describes furnishing and installing a system that detects vehicles on a roadway using only video images of vehicle traffic. This item includes all materials and labor necessary to install a completely functional vehicle detection system as shown in the plans, including but not limited to cameras, processors, video monitor, mounting hardware, and power cable.

B Materials

This specification sets forth the requirements for a system that detects vehicles on a roadway and provides detection outputs to a traffic signal controller. The materials shall also include all brackets, risers, mounting hardware, cable, terminations, interface panels, and all other incidentals for the installation of the equipment. This equipment shall meet the NEMA environmental, power and surge ratings as set forth in NEMA TS2 specifications.

The video detection system shall include two video detectors with a high definition camera of at least 720p resolution with a 10x optical zoom with real time iris and shutter speed control by the integrated processor. The faceplate shall be glass with a hydrophilic coating on the exterior and with an indium tin oxide heater applied to the inner surface.

All communications to the video sensor shall be broadband-over-power via three conductor cable. No coaxial cable shall be used.

The video detection system shall include an interface panel that manages communication between sensors, remote access to the sensors, and the cabinet itself. The interface panel shall provide connection points for four video sensors. Each sensor connection shall have a power switch and a resettable fuse. All communications to the detection system shall be to a single IP address. The interface panel shall weigh less than 3 pounds.

All incidental mountings required for pole or mast arm mounted units to install the detector are included in this item.

C Construction

The video detection system shall be installed by supplier factory-certified installers and as recommended by the supplier and documented in installation materials provided by the supplier.

In the event, at installation or turn on date, a noticeable obstruction is present in line with the detection zone(s), the contractor shall be obligated to advise the engineer before setting the zone.

All cables associated with the video detection system shall be routed to the controller. Each lead shall be appropriately marked as to which street or avenue it is associated. Provide 6 feet of cable slack.

The video detection system, as shown in the traffic signal plans, shall be complete, in place, tested, and in full operation.

D Measurement

The department will measure this item by Vehiclular Video Detection System-2 Cameras by each 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.0060.225	Vehicular Video Detection System-2 Cameras	EACH

Payment is full compensation for furnishing and installing video detection system; making necessary connections; and testing video detection.

50. Vehicular Video Detection System-4 Cameras, Item SPV.0060.227.

A Description

This specification describes furnishing and installing a system that detects vehicles on a roadway using only video images of vehicle traffic. This item includes all materials and labor necessary to install a completely functional vehicle detection system as shown in the plans, including but not limited to cameras, processors, video monitor, mounting hardware, and power cable.

B Materials

This specification sets forth the requirements for a system that detects vehicles on a roadway and provides detection outputs to a traffic signal controller. The materials shall also include all brackets, risers,

mounting hardware, cable, terminations, interface panels, and all other incidentals for the installation of the equipment. This equipment shall meet the NEMA environmental, power and surge ratings as set forth in NEMA TS2 specifications.

The video detection system shall include four video detectors with a high definition camera of at least 720p resolution with a 10x optical zoom with real time iris and shutter speed control by the integrated processor. The faceplate shall be glass with a hydrophilic coating on the exterior and with an indium tin oxide heater applied to the inner surface.

All communications to the video sensor shall be broadband-over-power via three conductor cable. No coaxial cable shall be used.

The video detection system shall include an interface panel that manages communication between sensors, remote access to the sensors, and the cabinet itself. The interface panel shall provide connection points for four video sensors. Each sensor connection shall have a power switch and a resettable fuse. All communications to the detection system shall be to a single IP address. The interface panel shall weigh less than 3 pounds.

All incidental mountings required for pole or mast arm mounted units to install the detector are included in this item.

C Construction

The video detection system shall be installed by supplier factory-certified installers and as recommended by the supplier and documented in installation materials provided by the supplier.

In the event, at installation or turn on date, a noticeable obstruction is present in line with the detection zone(s), the contractor shall be obligated to advise the engineer before setting the zone.

All cables associated with the video detection system shall be routed to the controller. Each lead shall be appropriately marked as to which street or avenue it is associated. Provide 6 feet of cable slack.

The video detection system, as shown in the traffic signal plans, shall be complete, in place, tested, and in full operation.

D Measurement

The department will measure Vehicular Video Detection System by each 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.0060.227	Vehicular Video Detection System-4 Cameras	EACH

Payment is full compensation for furnishing and installing video detection system; making necessary connections; and testing video detection.

51. Electrical Riser, Item SPV.0060.228.

A Description

Fabricate and install an electrical riser.

B Materials

Furnish C-condulets, reducer bushings, banding, 1” aluminum conduit, ½” aluminum conduit, 1” terminal adaptor, weather head, and sealant as shown in electrical riser detail.

C Construction

Install materials as shown in electrical riser detail.

D Measurement

The department will measure Electrical Riser by each 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.0060.228	Electrical Riser	EACH

Payment is full compensation for fabricating and installing an electrical riser.

52. Pedestrian Countdown Signal Face 12-Inch, Item SPV.0060.267.

A Description

Furnish and install Pedestrian Countdown Signal Face 12-Inch according to the following standards.

B Materials

Furnish a 12-Inch Light Emitting Diode (LED) Pedestrian Countdown Module that meets ITE PTCSI-STD Part 2 from March 2004 or current Institute of Transportation Engineer (ITE) standards. The countdown digits shall be displayed with an LED color/type of Portland Orange. The unit shall be able to operate when exposed to temperatures between -40 to 165 degrees Fahrenheit. The operating voltage shall be between 80 to 135VAC, and the wattage drawn shall be 7W.

C Construction

Install Pedestrian Countdown Signal Face 12-Inch as shown in the plans and in accordance with standard spec 658.3. The Pedestrian Countdown Signal Face 12-Inch shall be installed in the same housing and immediately below the Pedestrian Signal Face 12-Inch.

D Measurement

The department will measure Pedestrian Countdown Signal Face 12-Inch by each 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.0060.267	Pedestrian Countdown Signal Face 12-Inch	EACH

Payment is full compensation for furnishing and installing pedestrian countdown signal face 12-inch.

53. Voice Instruction Audible Pushbutton, Item SPV.0060.268.

A Description

Furnish and install a Voice Instruction Audible Pushbutton.

B Materials

The Voice Instruction Audible Pushbutton shall be a 2-wire pushbutton that meets ADA requirements. The pushbutton shall be capable of providing audio cues with sound emanating from both the front and back of the unit. Sound shall be synchronized between units and automatically adjust to ambient sound levels. Changing settings and firmware updates shall be done wirelessly over Bluetooth. The switch operating life shall be greater than 20 million operations. The pushbutton station shall have an MUTCD compliant sign on its faceplate.

C Construction

Install a Voice Instruction Audible Pushbutton as shown on plans. Follow requirements outlined in MUTCD Section 4E.9 through 4E.12. Pushbutton plates and related signage should provide the direction of travel with a single or double arrow as required and shall be properly focused upon installation.

D Measurement

The department will measure Voice Instruction Audible Pushbutton by each 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.0060.268	Voice Instruction Audible Pushbutton	EACH

Payment is full compensation for furnishing and installing voice instruction audible pushbutton; focusing arrows.

54. Voice Instruction Audible Control Unit, Item SPV.0060.269.

A Description

Furnish and install a Voice Instruction Audible Control Unit.

B Materials

The Voice Instruction Audible Control Unit shall be a rack mount card able to be used in a 300 series cabinet. An interconnect panel shall provide enough connection for 16 or more pushbuttons. The panel shall have a separate power supply connection. No polarity requirement shall be needed for the pushbuttons. The control unit shall have LCD display showing status information. Setup shall be performable via Ethernet or Wi-Fi using a PC or by using an app. Any connection option should allow access to setup and configuration of the control unit and any attached voice instruction audible pushbutton.

C Construction

Install a Voice Instruction Audible Control Unit into the controller cabinet's detector rack. Mount the panel to the side of the cabinet in the side panel access. Terminate all pushbutton connections to the panel. Complete setup of the system and demonstrate the pushbuttons are correctly wired and configured.

D Measurement

The department will measure Voice Instruction Audible Control Unt by each 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.0060.269	Voice Instruction Audible Control Unit	EACH

Payment is full compensation for furnishing and installing voice instruction audible control unit; making necessary connections; and configuring the system.

55. Round Aluminum Sign Post System in Soft Surface 7-Foot, Item SPV.0060.280.

A Description

Work under this item consists of furnishing and installing sign post, post anchor and sign mounting hardware at the locations shown on the plans. All sign posts shall be round tubular aluminum and installed as shown in the plans.

B Materials

Furnish a round aluminum 2" Schedule 40 6061-T6 Extruded Aluminum post with a length of 7 feet, a V-loc Soft-Soil 30" with cleanout bar post anchor for 2 3/8" round post (TAPCO SKU 034-00085, Traffic Safety Supply Company SKU DP00239, Custom Products Corporation Item RPORZVRB23VR2B or approved equal), 5/16" x 1 ¼" Stainless Steel Fender Washers and one- or two-sided sign mounting Z-brackets that fit 2 3/8 inch post or approved equal, as shown in plans.

C Construction

Install Round Aluminum Sign Post System in Soft Surface as shown in plans.

D Measurement

The department will measure the Round Aluminum Sign Post System in Soft Surface by each unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.280	Round Aluminum Sign Post System in Soft Surface 7-Foot	EACH

Payment is full compensation for furnishing and placing the Round Aluminum Sign Post System in Soft Surface 7-Foot.

56. Round Aluminum Sign Post System in Soft Surface 10-Foot, Item SPV.0060.281.

A Description

Work under this item consists of furnishing and installing sign post, post anchor and sign mounting hardware at the locations shown on the plans. All sign posts shall be round tubular aluminum and installed as shown in the plans.

B Materials

Furnish a round aluminum 2” Schedule 40 6061-T6 Extruded Aluminum post with a length of 10 feet, a V-loc Soft-Soil 30” with cleanout bar post anchor for 2 3/8” round post (TAPCO SKU 034-00085, Traffic Safety Supply Company SKU DP00239, Custom Products Corporation Item RPORZVRB23VR2B or approved equal), 5/16” x 1 ¼” Stainless Steel Fender Washers and one- or two-sided sign mounting Z-brackets that fit 2 3/8 inch post or approved equal, as shown in plans.

C Construction

Install Round Aluminum Sign Post System in Soft Surface as shown in plans.

D Measurement

The department will measure the Round Aluminum Sign Post System in Soft Surface by each unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.281	Round Aluminum Sign Post System in Soft Surface 10-Foot	EACH

Payment is full compensation for furnishing and placing the Round Aluminum Sign Post System in Soft Surface 10-Foot.

57. Round Aluminum Sign Post System in Soft Surface 12-Foot, Item SPV.0060.283.

A Description

Work under this item consists of furnishing and installing sign post, post anchor and sign mounting hardware at the locations shown on the plans. All sign posts shall be round tubular aluminum and installed as shown in the plans.

B Materials

Furnish a round aluminum 2” Schedule 40 6061-T6 Extruded Aluminum post with a length of 12 feet, a V-loc Soft-Soil 30” with cleanout bar post anchor for 2 3/8” round post (TAPCO SKU 034-00085, Traffic Safety Supply Company SKU DP00239, Custom Products Corporation Item RPORZVRB23VR2B or approved equal), 5/16” x 1 ¼” Stainless Steel Fender Washers and one- or two-sided sign mounting Z-brackets that fit 2 3/8 inch post or approved equal, as shown in plans.

C Construction

Install Round Aluminum Sign Post System in Soft Surface as shown in plans.

D Measurement

The department will measure the Round Aluminum Sign Post System in Soft Surface by each unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.283	Round Aluminum Sign Post System in Soft Surface 12-Foot	EACH

Payment is full compensation for furnishing and placing the Round Aluminum Sign Post System in Soft Surface 12-Foot.

58. Round Aluminum Sign Post System in Concrete Surface 10-Foot, Item SPV.0060.285.

A Description

Work under this item consists of furnishing and installing sign post, post anchor, anchoring cement and sign mounting hardware at the locations shown on the plans. All sign posts shall be round tubular aluminum and installed as shown in the plans:

B Materials

Furnish a round aluminum 2-inch Schedule 40 6061-T6 Extruded Aluminum post with a length of 10 feet, a V-loc Concrete 8-inch post anchor for 2 3/8-inch round post (TAPCO SKU 037-00012B, Traffic Safety Supply Company SKU DP00241, Custom Products Corporation Item RPORZVR12382OR or approved equal), 5/16-inch x 1 ¼-inch Stainless Steel Fender Washers, one- or two-sided sign mounting Z-brackets that fit 2 3/8-inch post and pourable hydraulic cement for setting of concrete post anchor, as shown in plans.

C Construction

Install Round Aluminum Sign Post System in Concrete Surface as shown in plans.

D Measurement

The department will measure the Round Aluminum Sign Post System in Concrete Surface by each 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.0060.285	Round Aluminum Sign Post System in Concrete Surface 10-Foot	EACH

Payment is full compensation for furnishing and placing the Round Aluminum Sign Post System in Concrete Surface 10-Foot.

59. Street Name Sign Mounting Hardware on Mast Arm, Item SPV.0060.291.

A Description

Work under this item consists of furnishing and installing Mounting Hardware on Mast Arm with current City of Milwaukee practices.

B Materials

201 Stainless Steel Banding ¾” x 0.20., Stainless Steel Flared Leg Sign Mount Bracket for ¾” banding, 201 Stainless Steel Wing Seal (buckle) for ¾” banding, 5/16” x 1-¼” Stainless Steel Fender Washers, 5/16”-18 x 3/4” Stainless Steel Hex Head Bolt.

C Construction

Install and orient Mounting Hardware on Mast Arm as shown on the plans.

D Measurement

The department will measure the Installing Street Name Sign Mounting Hardware on Mast Arm by each unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT

SPV.0060.291	Street Name Sign Mounting Hardware on Mast Arm	EACH

Payment is full compensation for furnishing and installing the hardware.

60. 24”X 24” Blankout Sign “No Turn on Red”, Item SPV.0060.292.

A Description

Furnish and install a Blankout Sign “No Turn on Red”

B Materials

Furnish an electronic sign, 24 inches by 24 inches in size, with the ability to display one or more messages compliant with the Manual on Uniform Traffic Control Devices, as indicated on the plans, to be controlled by the traffic signal controller or other approved controllers. The electronic sign shall also have the ability to be dark, in which no message is seen.

C Construction

Install blank out sign as shown in plans.

D Measurement

The department will measure 24” X 24” Blankout Sign “No Turn On Red” by each 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.0060.292	24”x24” Blankout Sign “No Turn on Red”	EACH

Payment is full compensation for furnishing and installing Blankout Sign “No Turn on Red”.

61. Removing Sign Post Assembly and Type II Signage, Item SPV.0060.293.

A Description

Work under this item consists of removing 2 3/8” round post, sign post anchor and Type II signage according to the plans.

B (Vacant)

C Construction

Remove 2 3/8” sign post, sign post anchor and signage as shown on the plans. Signage should remain fixed to poles and delivered to City of Milwaukee Sign Shop at 1540 West Canal Street Milwaukee, Wi.

D Measurement

The department will measure Removing Sign Post Assembly and Type II Signage as each individual sign post assembly, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.293	Removing Sign Post Assembly and Type II Signage	EACH

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

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

A Description

This special provision describes providing and installing Pull Boxes which are a fiberglass/polymer concrete at the locations shown on the plans according to standard spec 653.

B Materials

Pull Box (Fiberglass/polymer concrete) 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. Cover shall be Tier 15 Rating (15,000 lb. Design Load) & (22,500 lb. Test Load), bolted cover with logo “Street Lighting” and use Penta bolts to secure cover. The pull box 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 installation covers the excavation, 12-inches of crushed stone, end bell connectors for conduit connection, backfilling and for disposing of surplus material. Rigid nonmetallic PVC bell end connectors are to be use when connecting conduit to the pull box.

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 providing and installing the Pull boxes 13-Inch x 24-Inch x 24-Inch (fiberglass/polymer concrete) for labor, tools, equipment, transporting, coordination and all materials and incidentals necessary to complete the work, such as end bells, crushed aggregate, excavation, backfilling, and for disposing of surplus material.

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

A Description

This special provision describes providing and installing Pull Boxes which are a fiberglass/polymer concrete at the locations shown on the plans according to standard spec 653.

B Materials

Pull Box (Fiberglass/polymer concrete) 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. Cover shall be Tier 15 Rating (15,000 lb. Design Load) & (22,500 lb. Test Load), bolted cover with logo “Street Lighting” and use Penta bolts to secure cover. The pull box 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 installation covers the excavation, 12-inches of crushed stone, end bell connectors for conduit connection, backfilling and for disposing of surplus material. Rigid nonmetallic PVC bell end connectors are to be use when connecting conduit to the pull box.

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 providing and installing the Pull boxes 17-Inch x 30-Inch x 24-Inch (fiberglass/polymer concrete) for labor, tools, equipment, transporting, coordination and all materials and

incidentals necessary to complete the work, such as end bells, crushed aggregate, excavation, backfilling, and for disposing of surplus material.

64. Poles Type 22-AL, Item SPV.0060.00.315.

A Description

The minimum requirements for a 22 ft. direct bury 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 according to standard spec 651.

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.

The direct bury 22 ft. aluminum street lighting pole assembly shall be according to this specification and City of Milwaukee (DPW-Infrastructure Services Division) Drawing #B-86-31

A revised date 03-13-12.

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.

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

B Materials

B.1.1 Pole

The 22 ft. aluminum pole shaft shall be tapered from the top of the pole to the ground line. Horizontal and vertical stability shall be obtained by welding a 4" channel across the bottom of the shaft in line with the cable entrance holes. The channel is to extend 1" past the shaft wall. Dimensions from the pole top to the bracket mounting plate and the ground line to the top of the pole shall be rigidly adhered to.

Cable entrance holes shall be provided on both sides of the pole and shall be 2" diameter (minimum) shall be located 12" below ground line and shall have grommets installed to prevent damage to the cable. They shall be 90 degrees from the mounting brackets.

The pole cap may be either cast, stamped, spun, etc., and have provisions to affix the cap firmly to the shaft.

The base coating shall be painted, sprayed or dipped. Both the inside and outside of the shaft shall be coated from the bottom of the shaft to a point 2" ± above the ground line. The base coating shall be a Polyamide Epoxy Pittsburgh Aquapon or equal, applied un-thinned and shall be applied before installing the grommets in the cable entrance holes. The channel welded to the bottom of the shaft must be coated with the same material as above.

The hand hole shall be 4" x 6" nominal. A ¼”-20 tapped hole and ¼"-20 NC by ¾" long 18-8 stainless steel button head Torx T27H tamper proof screw shall be provided in the shaft opposite the hand hole for grounding purposes. Hand hole cover shall be secured to the pole using ¼"-20 NC by ¾" long 18-8 stainless steel button head Torx T27H tamper proof screws. The hand hole is to be 90 degrees from the bracket arms and in the same plane with the cable entrance holes.

The 22 ft. aluminum pole 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. The pole design shall meet the latest revision of the AASHTO specifications for this pole as defined in the 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.

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.

All Welding shall be according to the latest applicable A.S.M.E. Standards.

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.

A plaque with the pole number as shown on the plans shall be affixed onto the pole shaft.

B.2 Pea Gravel

Passing No.8 sieve	0% to 5%

Each unit will require approximately 0.25 cubic yard of pea gravel.

The pea gravel must consist of particles from natural gravel deposits and shall be composed of clean, hard, tough, durable pebbles free from adherent coatings, soft, flat, or elongated particles, and organic or other deteriorative matter. The following limits apply to deteriorative substances in the pea gravel.

Chert	not over 4% by weight
Coal	not over ½% by weight
Clay lump and friable particles	not over ½% by weight
Soft fragments	not over 1% by weight
Any combination of the above	not over 4% by weight
Flat, elongated or laminated pcs. (Flat and elongated particles are those having a length more than five times the average thickness)	Not over 10% by weight

Grading requirements of the pea gravel are as follows:

Passing 3/8-inch sieve	95% to 100%
Passing No.4 sieve	25% to 50%

B.3 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 shall be 30 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

The direct bury pole is to be set as illustrated in the plans. The holes are to be 12 or 14 inches in diameter and to a depth of 5 feet. The holes can be bored, hydrovac, or hand dug but all shall be cylindrical. If any part of the hole is within 3 feet of a buried utility, the holes must be hand dug or hydrovac. No other method of setting poles is acceptable. The poles should be parallel and perpendicular to the horizon once set.

In some cases, the poles are to be installed in areas of concrete walk. Prior to concrete removal, the concrete should be saw cut to allow adequate room for pole and cable installation. Saw cutting for removal should be square or rectangular in shape. The contractor shall be responsible for disposing all debris from excavation and removed from site.

There is to be a minimum 6-inch bed of tamped pea gravel for the pole to set on. Then pea gravel is to be backfill around the pole and be tamped every 12 inches and filled to within 3 inches of finished grade.

In areas where concrete walk was removed, felt paper is to be installed around the base of pole and 3 inches of concrete installed. Concrete shall be the standard 5 bag mix, and the finished surface should

Grass areas that were disturbed during construction shall be filled with 3 inches of topsoil and sod to match the adjacent finished grade. Addresses are to be stenciled to the pole as shown on the plan.

D Measurement

The department will measure Poles Type 22-AL by each 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.0060.00.315	Poles Type 22-AL	EACH

Payment is full compensation for the pole, riser cables, pea gravel, and all connections.

65. Poles Type 26-AL, Item SPV.0060.316.

A Description

The minimum requirements for a 26 ft. direct bury 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 according to standard spec 651.

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.

The direct bury 26 ft. aluminum street lighting pole assembly shall be according to this specification and City of Milwaukee (DPW-Infrastructure Services Division) Drawing #B-86-32 dated 10-27-86

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.

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

B Materials

B.1 Pole

The 26 ft. aluminum pole shaft shall be tapered from the top of the pole to the ground line. Horizontal and vertical stability shall be obtained by welding a 4" channel across the bottom of the shaft in line with the cable entrance holes. The channel is to extend 1" past the shaft wall. Dimensions from the pole top to the bracket mounting plate and the ground line to the top of the pole shall be rigidly adhered to.

Cable entrance holes shall be provided on both sides of the pole and shall be 2” diameter (minimum) shall be located 12” below ground line and shall have grommets installed to prevent damage to the cable. They shall be 90 degrees from the mounting brackets.

The pole cap may be either cast, stamped, spun, etc., and have provisions to affix the cap firmly to the shaft.

The base coating shall be painted, sprayed or dipped. Both the inside and outside of the shaft shall be coated from the bottom of the shaft to a point 2" ± above the ground line.

The base coating shall be a Polyamide Epoxy Pittsburgh Aquapon or equal, applied un-thinned and shall be applied before installing the grommets in the cable entrance holes. The channel welded to the bottom of the shaft must be coated with the same material as above.

The hand hole shall be 4" x 6" nominal. A ¼”-20 tapped hole and ¼"-20 NC by ¾" long 18-8 stainless steel button head Torx T27H tamper proof screw shall be provided in the shaft opposite the hand hole for grounding purposes. Hand hole cover shall be secured to the pole using ¼"-20 NC by ¾" long 18-8 stainless steel button head Torx T27H tamper proof screws. The hand hole is to be 90 degrees from the bracket arms and in the same plane with the cable entrance holes.

The 26 ft. aluminum pole 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. The pole design shall

meet the latest revision of the AASHTO specifications for this pole as defined in the 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.

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.

All Welding shall be according to the latest applicable A.S.M.E. Standards.

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.

A plaque with the pole number as shown on the plans shall be affixed onto the pole shaft.

B.2 Pea Gravel

The pea gravel must consist of particles from natural gravel deposits and shall be composed of clean, hard, tough, durable pebbles free from adherent coatings, soft, flat, or elongated particles, and organic or other deteriorative matter. The following limits apply to deteriorative substances in the pea gravel.

Chert	not over 4% by weight
Coal	not over ½% by weight
Clay lump and friable particles	not over ½% by weight
Soft fragments	not over 1% by weight
Any combination of the above	not over 4% by weight
Flat, elongated or laminated pcs. (Flat and elongated particles are those having a length more than five times the average thickness)	Not over 10% by weight

Grading requirements of the pea gravel are as follows:

Passing 3/8-inch sieve	95% to 100%
Passing No.4 sieve	25% to 50%
Passing No.8 sieve	0% to 5%

Each unit will require approximately 0.25 cubic yard of pea gravel.

B.3 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 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

The direct bury pole is to be set as illustrated in the plans. The holes are to be 12 or 14 inches in diameter and to a depth of 5 feet 6 inches. The holes can be bored, hydrovac, or hand dug but all shall be cylindrical. If any part of the hole is within three feet of a buried utility, the holes must be hand dug or hydrovac. No other method of setting poles is acceptable. The poles should be parallel and perpendicular to the horizon once set.

In some cases, the poles are to be installed in areas of concrete walk. Prior to concrete removal, the concrete should be saw cut to allow adequate room for pole and cable installation. Saw cutting for

removal should be square or rectangular in shape. The contractor shall be responsible for disposing all debris from excavation and removed from site.

There is to be a minimum 6-inch bed of tamped pea gravel for the pole to set on. Then pea gravel is to be backfill around the pole and be tamped every 12 inches and filled to within 3 inches of finished grade.

In areas where concrete walk was removed, felt paper is to be installed around the base of pole and 3 inches of concrete installed. Concrete shall be the standard 5 bag mix, and the finished surface should match adjacent grades.

Grass areas that were disturbed during construction shall be filled with 3 inches of topsoil and sod to match the adjacent finished grade. Addresses are to be stenciled to the pole as shown on the plan.

D Measurement

The department will measure Poles Type 26-AL 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.0060.316	Poles Type 26-AL	EACH

Payment is full compensation for the pole, riser cables, pea gravel, and all connections.

66. Poles Type 25-AL-BD, Item SPV.0060.320.

A Description

The minimum requirements for a 25’-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 according to standard spec 651.

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.

The bolt down 25’-0” aluminum street lighting pole assembly shall be according to this specification and City of Milwaukee (DPW-Infrastructure Services Division) Drawing #B-14-13.

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

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

B Materials

B.1 Pole

The 25’-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.

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.

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

The pole cap is to be cast aluminum and be secured to the pole by three equally spaced ¼”-20 hex head stainless steel screws.

B.2 Hand Hole & Grounding

The hand hole shall be 4" x 6" nominal. A ¼”-20 NC taped 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 ¼"-20 NC by ¾" 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.3 Loading and Stability

The 25’-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.

All Welding shall be according to the latest applicable A.S.M.E. Standards.

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.

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.4 Riser Cable

Pole is to be wired as noted 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 to be green. The cable shall conform to NEC Article 340. The riser cable shall be continuous without splices.

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 Poles Type 25-AL-BD by each 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.0060.320	Poles Type 25-AL-BD	EACH

Payment is full compensation for the pole, riser cable(s), and all connections.

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

A Description

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 according to standard spec 651.

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.

The bolt down 30’-0” aluminum street lighting pole assembly shall be according to this specification and City of Milwaukee (DPW-Infrastructure Services Division) Drawing #B-14-14.

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.

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

B Materials

B.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.

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.

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

The pole cap is to be cast aluminum and be secured to the pole by three equally spaced ¼”-20 hex head stainless steel screws.

B.2 Hand Hole & Grounding

The hand hole shall be 4" x 6" nominal. A ¼”-20 NC taped 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 ¼"-20 NC by ¾" 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.

B3 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.

All Welding shall be according to the latest applicable A.S.M.E. Standards.

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.

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.4 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 to be 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 Poles Type 30-AL-BD by each 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.0060.321	Poles Type 30-AL-BD	EACH

Payment is full compensation for the pole, riser cable(s), and all connections.

68. 35-FT. Wood Pole, Item SPV.0060.323.

A Description

This work shall consist of furnishing and installing wood poles for temporary lighting at the locations shown on the plans and according to requirements of the plans, specifications and contract, and all necessary miscellaneous hardware needed to complete the installation of the poles. The poles will be utilizing to provide temporary lighting in the respective area. All work shall be according to standard spec 651.

B Materials

B.1 Wood Pole

The poles shall be Western Red Cedar poles which comply in every detail with the American Standards Association's Specifications 05.2-1979 "Specifications for Dimensions for Wood Poles", or the latest version thereof.

B.1.1 Shaving

All poles shall be machine shaved the entire length.

B.1.2.Gaining and Drilling

Poles shall be slab gained from the top of the pole to a point 48" below the top of the pole. 1st and 2nd gains are to be drilled with a 11/16 "diameter drill. 1st gain 8" from the top of the pole and 2nd gain 24" below 1st gain.

B.1.3 Incising

All poles shall be incised throughout that portion of the pole surface terminating one foot above and two feet below the standard ground line per A.W.P.A. Specifications #C8-73.

B.1.4 Treatment

All poles shall be butt treated by the thermal process per A.W.P.A. specifications #C7-73. The treatment shall be water borne preservative, CHROMATED COPPER ARSENATE "CCA" Type "C" per A.W.P.A. specifications #P5-83. Only Oxide formulated chemicals can be used.

B.1.5 Inspection and Acceptance

An independent inspection agency shall inspect the poles per A.W.P.A. Specifications #M2-83. A certified copy of the test report must be delivered with each load shipped.

B.1.6 A.W.P.A. Designations

Reference to A.W.P.A. designation shall mean the latest revision of the particular A.W.P.A. specification and/or test procedure in effect at time this bid is let for the item/product described herein.

B.2 Pea Gravel

The pea gravel must consist of particles from natural gravel deposits and shall be composed of clean, hard, tough, durable pebbles free from adherent coatings, soft, flat, or elongated particles, and organic or other deteriorative matter. The following limits apply to deteriorative substances in the pea gravel.

Chert	not over 4% by weight
Coal	not over ½% by weight
Clay lump and friable particles	not over ½% by weight
Soft fragments	not over 1% by weight
Any combination of the above	not over 4% by weight
Flat, elongated or laminated pcs. (Flat and elongated particles are those having a length more than five times the average thickness)	Not over 10% by weight

Grading requirements of the pea gravel are as follows:

Passing 3/8-inch sieve	95% to 100%
Passing No.4 sieve	25% to 50%
Passing No.8 sieve	0% to 5%

Each unit will require approximately 0.25 cubic yard of pea gravel.

B.3 Grounding Electrode and Conductor

Furnish and install an approved 5/8-Inch diameter x 8-foot-long copper clad grounding electrode per NEC, WSEC, and local utility codes. Run a single unbroken length of stranded bare #6 copper wire from the grounding electrode to the top of wood pole leaving a 2-foot coil. Make the electrical connection between the grounding electrode conductor and grounding electrode by the exothermic weld method.

C Construction

Wood Poles shall be installed to an embedment depth of 6 foot for a 35 ft. pole, 6 foot 6 inches for a 40 ft. pole, 7 foot for a 45 ft. pole, and according to plan details. The holes can be bored, hydrovac, or hand dug but all shall be cylindrical. If any part of the hole is within three feet of a buried utility, the holes must be hand dug or hydrovac. No other method of setting poles is acceptable. The poles should be blocked and or raked as noted on the construction drawings.

In some cases, the poles are to be installed in areas of concrete walk. Prior to concrete removal, the concrete is to be saw cut to such size to allow for adequate room for pole and cable installation. Saw cutting for removal should be rectangular in shape. The contractor will be responsible for disposing all debris from excavation and sidewalk removal. The spoils are not to be used as backfill.

There is to be a minimum of a 6 inch bed of tamped pea gravel as a base for the pole. The area around the pole is to be backfilled with pea gravel and be tamped every 12 inches and filled to finished grade.

D Measurement

The department will measure Wood Poles by each 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.0060.323	35 FT. Wood Pole	EACH

Payment is full compensation for shipping to the site, excavating for base, and placement of pole.

69. City Furnished High Pressure Sodium Ballasts 1HSX – Single Coil, Item SPV.0060.337; City Furnished High Pressure Sodium Ballasts 11HSX – Double Coil, Item SPV.0060.338.

A Description

The work under this item is for installing two (2) 100watt ballasts types, one being a 1HSX single coil ballast for one lamp and a 11HSX double coil ballast for two lamps. All work shall be according to standard spec 651.

B Materials

The city furnished ballasts 1HSX Single Coil and 11HSX Double Coil shall be for the high-pressure sodium vapor lamps, which are made to the "American Standard Physical and Electrical Characteristics of Electric Discharge Lamps" as listed.

100-watt (55 volt)	C78.1354-90

Type: The series high pressure sodium ballast shall be of 60 Hz, single phase design, suitable for thermo-vacuum impregnation.

General Requirements: The ballast shall consist of a primary winding, a secondary winding and core; suitable for use on 6.6 ampere constant current circuit where the normal operating primary voltage will not exceed 4,000 volts. The secondary winding shall deliver the necessary voltage and current to start the lamps at -20°F.

Power Factor: When operating on a 60-cycle sine wave alternating current of normal effective value with the normal effective value with the normal secondary load, the power factor shall be within limits specified in the schedule, Paragraph "F", for each respective size of transformers.

Secondary Voltage: The secondary voltage, switch normal primary current of 6.6 amperes, shall be of such values as to assure proper starting and normal operation of the lamps. The open circuit secondary voltages shall not exceed the values listed in paragraph "F".

Core Construction: The core is laminated and held together by means of bolts, clamps, or other industry devices.

Leads and Terminations: The primary winding is extended 8" beyond the coil, with the final five inches of each lead tinned. The secondary winding is terminated with leads, consisting of one black and one white #12 A.W.G., 7 strand, 600 volt insulation wires, which are suitable for wet locations, and be 18" in length. The white wire is connected to the start of the secondary winding (closest to the core) and is connected to the core assembly. The black wire is connected to end of the secondary winding. These leads are permanently fixed to the secondary windings in a manner to eliminate flexing of the secondary winding wire.

Windings: The primary and secondary windings are wound with properly sized copper wire with approved insulation.

Insulation: The insulation used between the core and primary winding, core and secondary winding, and primary to secondary windings is moisture-proof, non-deteriorating from normal operating heat, poured compound, or epoxy resins. The core and coil assembly is wax free. The insulation is capable of withstanding all test voltages.

Rated Circuit Voltage: The series ballast is designed to operate with its primary winding at the rated circuit voltage; this being the maximum output voltage of a 20 KW 6.6 ampere secondary street lighting regulator. The rated voltage of the ballast is 10.5 kilovolts.

Corona Level: The ballasts furnished is corona free at 4 KV.

Ballast Regulation: With primary current at designed value (6.6 amps) the ballast will have a load characteristic (voltage-wattage curve) such that the characteristic curve passes through the diagram of the lamp operating limits (trapezoidal) as given on the relevant data sheet of the lamp standards in the ANSI C78.1300 series. The ballast curve within its designated range of primary current shall intersect both of the lamp-voltage limit lines between the wattage limits lines throughout the full range of lamp voltage.

Lamp Dropout: At constant primary current, a ballast will have a load characteristic (voltage-wattage curve) such that the point of lamp dropout shall not be at a lamp voltage less than the maximum voltage line of the diagram of the lamp operating limits (trapezoidal) as given in the applicable lamp standards in the ANSI C78.1300 series.

Primary Schedule	**Secondary Schedule**
100 W – Lamp Size	55 – Nominal Volts (Min. 42), (Max. 63)
27.5 – Nominal Volts	3.2 – Starting Amps (Max.)
6.6 – Amps	2.1 – Operating Amps (Lamp Current RMS)
145 – Nominal Watts	Open Circuit Voltage (Min. 110), Max. 400)
80 % - Nominal P.F.	

Voltage and Current are RMS

These values are measured when the lamp is operated with rated primary voltage impressed on the circuit and at an ambient temperature of 25°C., 30 minutes after the circuit is energized.

Contractor responsible to contact Street Lighting Shop Yard Contact Person Shop four working days before with the exact number of materials needed. The advance notice will allow the shop to gather the requested items for the contractor to pick up and sign for taking possession of the materials.

The contractor will be responsible for the materials that they take possession of and for the returning any unused materials back to the shop in good condition. If any materials come back damaged or broken the contractor will be responsible for replacing the broken or damaged item.

Street Lighting Shop Yard Contact Person:

Neal Karweik – (414) 286-5943 office / (414) 708-4245 cell

All the materials must be picked up all at one time.

The Street Lighting Shop Yard hours for picking up materials is from 8:00 AM to 2:00 PM Monday through Friday.

Contractor must be out of the shop yard by 2:00 PM

C Construction

The ballasts shall be attached to the pole using the appropriate banding and hardware. Perform all splices and water proof connections required for the ignitor and ballasts to fire and energize the luminaire.

D Measurement

The department will measure City Furnished High Pressure Sodium Ballasts (type) by each 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.0060.337	City Furnished High Pressure Sodium Ballasts 1HSX – Single Coil	EACH
SPV.0060.338	City Furnished High Pressure Sodium Ballasts 11HSX – Double Coil	EACH

Payment is full compensation for installing City Furnished High Pressure Sodium Ballasts 1HSX Single Coil and 11HSX Double Coil; for attaching and securing to poles, making all water proof connections; and for all testing..

70. Submersible Multitap 3-Port Pre-Insulated Connector, Item SPV.0060.342; Submersible Multitap 4-Port Pre-Insulated Connector, Item SPV.0060.343.

A Description

The work under this item is for furnishing and installation of the submersible pre-insulated connector for 2/0—14AWG wire, as shown in plans and special details.

B Materials

The connector shall be fabricated from high strength 6060-T6 aluminum alloy and encapsulated in rubber with ≥125 mils with high dielectric strength.

The connector shall be abrasion, chemical and UV resistant and not combustible.

The connector shall be submersible to 6’ of damp/wet location.

The connector shall meet UL486D and ANSI C119.4 Class A specification.

The connector shall be AL9CU dual rated for aluminum and copper cables, operating at 600V at temperature between -45℃ and 90 ℃.

The connector color shall be in black.

The connector shall be 3.65” (L) X 2.65” (W) X 2.1”(H) for 4 ports, 2.79”(L) X 2.65” (W) X 2.1”(H) for 3 ports. Variation in dimension will be considered.

C Construction

Install Submersible Multitap Pre-Insulated Connector as shown within the pull box according to current City of Milwaukee standards and manufacturer's installation instruction for wire splicing and waterproofing. The connector shall be kept on top of the wire coils within the pull box.

D Measurement

The department will measure Submersible (number) Multitap Pre-Insulated Connector by each 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.0060.342	Submersible Multitap 3-Port Pre-insulated Connector	EACH
SPV.0060.343	Submersible Multitap 4-Port Pre-insulated Connector	EACH

Payment is full compensation for furnishing and installing.

71. Luminaire Arms Single Member 6-Ft. (Special) 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 according to the following. All work shall be according to standard spec 651.

B Materials

City of Milwaukee per City Spec. and drawing C-87-76. Bracket arm material is Aluminum Alloy, with a satin finish.

- Bracket arm is 2" schedule 80 (2.375" O.D. x .218" wall) Aluminum pipe arm (6061-T6 Alloy).
- Bracket arm has a 7'-3" radius bend, with a 9-inch straight piece at the end of the arm for mounting the luminaire.
- Mounting plate is ½" thick Aluminum (6061-T6 Alloy).
- ¾" I.D. rubber grommet inserted in 1 1/16" Diameter hole located 8 inches from mounting plate.
- 1-inch I.D. rubber grommet for use in pole shaft.

C Construction

The bracket shall be attached to the pole with two ½" x 13 NC x 1 ½" long stainless-steel hex bolts, two 1 ¼" O.D. stainless steel flat washers and two ½" stainless steel lock washers. Anti-seize needs to be applied to the threads of the bolts before assembly.

D Measurement

The department will measure Luminaire Arms Single Member 6-Ft. (Special), by each 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.0060.345	Luminaire Arms Single Member 6-Ft. (Special)	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.

72. Luminaire Arms Single Member 6-Ft (WP Mount); Item SPV.0060.346.

A Description

The work under this item is for furnishing and installation of the following material as shown in plans and according to the following. All work shall be according to standard spec 651.

B Materials

6 ft. Aluminum Upsweep Wood Pole Mounting Bracket – The aluminum bracket shall be fabricated from 2” schedule 40 aluminum pipe. It shall have a minimum 27” rise, and a minimum of 9” straight end section that is suited for use with a slip-fit luminaire. The wire shall be copper 2#12 UF with ground wire. One wire shall be black, the other shall be white. The ground wire shall be grounded to fixture. The cable shall conform to NEC Article 339.

C Construction

Mounting height-The height to light center shall be 26’ unless otherwise specified on the drawing or indicated in the field by the engineer. The bracket shall be attached to the wood pole with two 3/8”x 3” long) galvanized wood lag bolts, and one 5/8”x (10” to 12” long) galvanized through bolt with galvanized washers and nut.

D Measurement

The department will measure Luminaires Arms Single Member 6-Ft (WP Mount) by each 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.0060.346	Luminaire Arms Single Member 6-Ft (WP Mount)	EACH

Payment is full compensation for the bracket arm, and all connections.

73. Luminaire Arms Single Member 8-Ft. (Special), Item SPV.0060.347.

A Description

The work under this item is for furnishing and installation of the following material as shown in plans and according to the following. All work shall be according to standard spec 651.

B Materials

Fabricated for the City of Milwaukee per City Spec. see plan set for detail drawing sheet 5 of 5.

Bracket Arm Base Coat – Hot Dip Galvanized to ASTM A123

Bracket arm is 2” schedule 80 (2.375” O.D. tubing (0.218” wall)

A501, A513, A618 ASTM Designation, 36 Min. yield (KSI)

Length of arm shaft = 8’-5.19” and curved to City Spec’s.

Mounting plate is Simplex plate, A36 ASTM Designation, 36 Min. yield (KSI)

C Construction

The bracket shall be attached to the pole with two ½” x 13 NC x 1 ½” long stainless steel hex bolts with two 1 ¼” O.D. stainless steel flat washers, two ½” stainless steel split lock washers. Anti-seize needs to be applied to the threads of the bolts before assembly.

Apply a thin layer of dielectric grease to the back of the mounting plate of the bracket arm and to the mounting hardware to repel moisture and protects connections against corrosion.

D Measurement

The department will measure this item Luminaire Arms Single Member 8-Ft. by each 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.0060.347	Luminaire Arms Single Member 8-Ft. (Special)	EACH

Payment is full compensation for the bracket arm, and all connections.

74. Luminaire Arms Single Member 8-Ft (WP Mount); Item SPV.0060.348.

A Description

The work under this item is for furnishing and installation of the following material as shown in plans and according to the following. All work shall be according to standard spec 651.

B Materials

8 ft. Aluminum Upsweep Wood Pole Mounting Bracket – The aluminum bracket shall be fabricated from 2” schedule 40 aluminum pipe. It shall have a minimum 27” rise, and a minimum of 9” straight end section that is suited for use with a slip-fit luminaire. The wire shall be copper 2#12 UF with ground wire. One wire shall be black, the other shall be white. The ground wire shall be grounded to fixture. The cable shall conform to NEC Article 339.

C Construction

Mounting height-The height to light center shall be 26’ unless otherwise specified on the drawing or indicated in the field by the engineer. The bracket shall be attached to the wood pole with two 3/8”x 3” long) galvanized wood lag bolts, and one 5/8”x (10” to 12” long) galvanized through bolt with galvanized washers and nut.

D Measurement

The department will measure Luminaire Arms Single Member 8-Ft (WP Mount) by each 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.0060.348	Luminaire Arms Single Member 8-Ft (WP Mount)	EACH

Payment is full compensation for the bracket arm, and all connections.

75. City Furnished High Pressure Sodium Ballasts 2HSX – Single Coil, Item SPV.0060.360; City Furnished High Pressure Sodium Ballasts 22HSX – Double Coil, Item SPV.0060.361

A Description

The work under this item is for installing two 150watt ballasts types, one being a 2HSX single coil ballast for one lamp and a 22HSX double coil ballast for two lamps. All work shall be according to standard spec 651.

B Materials

The city furnished ballasts 2HSX Single Coil and 22HSX Double Coil shall be for the high-pressure sodium vapor lamps, which are made to the "American Standard Physical and Electrical Characteristics of Electric Discharge Lamps" as listed.

150-watt (55 volt) C78.1355-89

Type: The series high pressure sodium ballast shall be of 60 Hz, single phase design, suitable for thermo-vacuum impregnation.

General Requirements: The ballast shall consist of a primary winding, a secondary winding and core; suitable for use on 6.6 ampere constant current circuit where the normal operating primary voltage will not exceed 4,000 volts. The secondary winding shall deliver the necessary voltage and current to start the lamps at -20°F.

Power Factor: When operating on a 60-cycle sine wave alternating current of normal effective value with the normal effective value with the normal secondary load, the power factor shall be within limits specified in the schedule, Paragraph "F", for each respective size of transformers.

Secondary Voltage: The secondary voltage, switch normal primary current of 6.6 amperes, shall be of such values as to assure proper starting and normal operation of the lamps. The open circuit secondary voltages shall not exceed the values listed in paragraph "F".

Core Construction: The core is laminated and held together by means of bolts, clamps, or other industry devices.

Leads and Terminations: The primary winding is extended 8" beyond the coil, with the final five inches of each lead tinned. The secondary winding is terminated with leads, consisting of one black and one white #12 A.W.G., 7 strand, 600 volt insulation wires, which are suitable for wet locations, and be 18" in length. The white wire is connected to the start of the secondary winding (closest to the core) and is connected to the core assembly. The black wire is connected to end of the secondary winding. These leads are permanently fixed to the secondary windings in a manner to eliminate flexing of the secondary winding wire.

Windings: The primary and secondary windings are wound with properly sized copper wire with approved insulation.

Insulation: The insulation used between the core and primary winding, core and secondary winding, and primary to secondary windings is moisture-proof, non-deteriorating from normal operating heat, poured compound, or epoxy resins. The core and coil assembly is wax free. The insulation is capable of withstanding all test voltages.

Rated Circuit Voltage: The series ballast is designed to operate with its primary winding at the rated circuit voltage; this being the maximum output voltage of a 20 KW 6.6 ampere secondary street lighting regulator. The rated voltage of the ballast is 10.5 kilovolts.

Corona Level: The ballasts furnished is corona free at 4 KV.

Ballast Regulation: With primary current at designed value (6.6 amps) the ballast will have a load characteristic (voltage-wattage curve) such that the characteristic curve passes through the diagram of the lamp operating limits (trapezoidal) as given on the relevant data sheet of the lamp standards in the ANSI C78.1300 series. The ballast curve within its designated range of primary current shall intersect both of the lamp-voltage limit lines between the wattage limits lines throughout the full range of lamp voltage.

Lamp Dropout: At constant primary current, a ballast will have a load characteristic (voltage-wattage curve) such that the point of lamp dropout shall not be at a lamp voltage less than the maximum voltage line of the diagram of the lamp operating limits (trapezoidal) as given in the applicable lamp standards in the ANSI C78.1300 series.

Primary Schedule	**Secondary Schedule**
150 W – Lamp Size	55 – Nominal Volts (Min. 452), (Max. 64)
36 – Nominal Volts	4.8 – Starting Amps (Max.)
6.6 – Amps	3.2 – Operating Amps (Lamp Current RMS)
195 – Nominal Watts	Open Circuit Voltage (Min. 110), Max. 400)
82 % - Nominal P.F.	

Voltage and Current are RMS

These values are measured when the lamp is operated with rated primary voltage impressed on the circuit and at an ambient temperature of 25°C., 30 minutes after the circuit is energized.

Contractor responsible to contact Street Lighting Shop Yard Contact Person Shop four working days before with the exact number of materials needed. The advance notice will allow the shop to gather the requested items for the contractor to pick up and sign for taking possession of the materials.

The contractor will be responsible for the materials that they take possession of and for the returning any unused materials back to the shop in good condition. If any materials come back damaged or broken the contractor will be responsible for replacing the broken or damaged item.

Street Lighting Shop Yard Contact Person:

Neal Karweik – (414) 286-5943 office / (414) 708-4245 cell

All the materials must be picked up all at one time.

The Street Lighting Shop Yard hours for picking up materials is from 8:00 AM to 2:00 PM Monday through Friday.

Contractor must be out of the shop yard by 2:00 PM NO LATER.

C Construction

The ballasts shall be attached to the pole using the appropriate banding and hardware. Perform all splices and water proof connections required for the ignitor and ballasts to fire and energize the luminaire.

D Measurement

The department will measure City Furnished High Pressure Sodium Ballasts (type) by each 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.0060.360	City Furnished High Pressure Sodium Ballasts 2HSX – Single Coil	EACH
SPV.0060.361	City Furnished High Pressure Sodium Ballasts 22HSX – Double Coil	EACH

Payment is full compensation for installing City Furnished High Pressure Sodium Ballasts 2HSX Single Coil and 22HSX Double Coil; for attaching and securing to poles, making all water proof connections; and for all testing.

76. City Furnished Luminaire Utility HPS 2 Multiple, Item SPV.0060.366; City Furnished Luminaire Utility HPS 3 Multiple, Item SPV.0060.367.

A Description

The work under this item is for installing possibly two different wattages of High-Pressure Sodium (HPS) luminaires with type 2 light distribution. All work shall be according to standard spec 651.

B Materials

Descriptions of the installing City-Furnished Luminaire Utility HPS types **2S2, 3S2**

Luminaire Utility HPS 2 Multiple

2 – 150watt

S – High Pressure Sodium Lamp

2 – Type 2 refractor

Luminaire Utility HPS 3 Multiple

3 – 250watt

S- High Pressure Sodium Lamp

2 – Type 2 refractor

Casting. Rugged die-cast aluminum that is powder-coated for durability and corrosion resistance. All casting shall be free from pits, blowholes, or other irregularities.

Paint. Fixture shall be cleaned prior to application of primer coat and standard gray paint

Mounting. Require four-bolt mast arm mounting.

Fasteners. All hardware (screws, hinge pins, springs, and etc.) shall be stainless steel

Terminal block. 3 wire operation.

Wattage/Source. 150 & 250-watt, High Pressure Sodium

Voltage. 240 volt

Ballast. Reactor High Power Factor

Starter. Encapsulated Plug-in

Lamp. 150 & 250-watt clear high-pressure sodium with E39 mogul base.

Reflectors. Anodized aluminum with drop glass prismatic refractor

Refractor. Roadway Type II

Contractor responsible to contact Street Lighting Shop Yard Contact Person Shop four (4) working days before with the exact number of materials needed. The advance notice will allow the shop to gather the requested items for the contractor to pick up and sign for taking possession of the materials.

The contractor will be responsible for the materials that they take possession of and for the returning any unused materials back to the shop in good condition. If any materials come back damaged or broken the contractor will be responsible for replacing the broken or damaged item.

Street Lighting Shop Yard Contact Person:

Neal Karweik – (414) 286-5943 office / (414) 708-4245 cell

All the materials must be picked up all at one time.

The Street Lighting Shop Yard hours for picking up materials is from 8:00 AM to 2:00 PM Monday through Friday.

Contractor must be out of the shop yard by 2:00 PM NO LATER.

C Construction

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

Use Anti-Seize Lubricant on all the bolt threads.

D Measurement

The department will measure City Furnished Luminaire Utility HPS (type) Multiple by each 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.0060.366	City Furnished Luminaire Utility HPS 2 Multiple	EACH
SPV.0060.367	City Furnished Luminaire Utility HPS 3 Multiple	EACH

Payment is full compensation for installing City Furnished Luminaires Utility HPS 2 & 3; for making all connections; and for all testing.

77. City Furnished Luminaire Utility HPS 2 Series, Item SPV.0060.368; City Furnished Luminaire Utility HPS 3 Series, Item SPV.0060.369.

A Description

The work under this item is for installing possibly two (2) different wattages of High-Pressure Sodium (HPS) luminaires with type 2 light distribution. All work shall be according to standard spec 651.

B Materials

Descriptions of the installing City-Furnished Luminaire Utility HPS types 2S2, 3S2

Luminaire Utility HPS 2 Series
2 – 150watt
S – High Pressure Sodium Lamp
2 – Type 2 refractor

Luminaire Utility HPS 3 Series
3 – 250watt
S - High Pressure Sodium Lamp
2 – Type 2 refractor

Casting. Rugged die-cast aluminum that is powder-coated for durability and corrosion resistance. All casting shall be free from pits, blowholes, or other irregularities.

Paint. Fixture shall be cleaned prior to application of primer coat and standard gray paint

Mounting. Require four-bolt mast arm mounting.

Fasteners. All hardware (screws, hinge pins, springs, and etc.) shall be stainless steel

Terminal block. 3 wire operation.

Wattage/Source. 150 & 250-watt, High Pressure Sodium

Voltage.

Ballast. None

Starter. None

Capacitor None

Ignitor – **55-volt** for 150watt, and **100-volt** for 250watt

Lamp. 150 & 250-watt clear high-pressure sodium with E39 mogul base.

Reflectors. Anodized aluminum with drop glass prismatic refractor

Refractor. Roadway Type II

Contractor responsible to contact Street Lighting Shop Yard Contact Person Shop four working days before with the exact number of materials needed. The advance notice will allow the shop to gather the requested items for the contractor to pick up and sign for taking possession of the materials.

The contractor will be responsible for the materials that they take possession of and for the returning any unused materials back to the shop in good condition. If any materials come back damaged or broken the contractor will be responsible for replacing the broken or damaged item.

Street Lighting Shop Yard Contact Person:

Neal Karweik – 414-286-5943 (office) 414-708-4245 (Cell)

All the materials must be picked up all at one time.

The Street Lighting Shop Yard hours for picking up materials is from 8am to 2pm Monday through Friday.

Contractor must be out of the shop yard by 2pm NO LATER.

C Construction

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

Use Anti-Seize Lubricant on all the bolt threads.

D Measurement

The department will measure City Furnished Luminaire Utility HPS (type) Series by each 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.0060.368	City Furnished Luminaire Utility HPS 2 Series	EACH
SPV.0060.369	City Furnished Luminaire Utility HPS 3 Series	EACH

Payment is full compensation for installing City Furnished Luminaires; for making all connections; and for all testing..

78. City Furnished High Pressure Sodium Ballasts 3HSX – Single Coil, Item SPV.0060.370; City Furnished High Pressure Sodium Ballasts 33HSX – Double Coil, Item SPV.0060.371.

A Description

The work under this item is for installing two 250watt ballasts types, one being a 3HSX single coil ballast for one lamp and a 33HSX double coil ballast for two lamps. All work shall be according to standard spec 651.

B Materials

The city furnished ballasts 3HSX Single Coil and 33HSX Double Coil shall be for the high-pressure sodium vapor lamps, which are made to the "American Standard Physical and Electrical Characteristics of Electric Discharge Lamps" as listed.

250-watt (100 volt) C78.1351-90

Type: The series high pressure sodium ballast shall be of 60 Hz, single phase design, suitable for thermo-vacuum impregnation.

General Requirements: The ballast shall consist of a primary winding, a secondary winding and core; suitable for use on 6.6 ampere constant current circuit where the normal operating primary voltage will not exceed 4,000 volts. The secondary winding shall deliver the necessary voltage and current to start the lamps at -20°F.

Power Factor: When operating on a 60-cycle sine wave alternating current of normal effective value with the normal effective value with the normal secondary load, the power factor shall be within limits specified in the schedule, Paragraph "F", for each respective size of transformers.

Secondary Voltage: The secondary voltage, switch normal primary current of 6.6 amperes, shall be of such values as to assure proper starting and normal operation of the lamps. The open circuit secondary voltages shall not exceed the values listed in paragraph "F".

Core Construction: The core is laminated and held together by means of bolts, clamps, or other industry devices.

Leads and Terminations: The primary winding is extended 8" beyond the coil, with the final 5 inches of each lead tinned. The secondary winding is terminated with leads, consisting of one black and one white #12 A.W.G., 7 strand, 600 volt insulation wires, which are suitable for wet locations, and be 18" in length. The white wire is connected to the start of the secondary winding (closest to the core) and is connected to the core assembly. The black wire is connected to end of the secondary winding. These leads are permanently fixed to the secondary windings in a manner to eliminate flexing of the secondary winding wire.

Windings: The primary and secondary windings are wound with properly sized copper wire with approved insulation.

Insulation: The insulation used between the core and primary winding, core and secondary winding, and primary to secondary windings is moisture-proof, non-deteriorating from normal operating heat, poured compound, or epoxy resins. The core and coil assembly is wax free. The insulation is capable of withstanding all test voltages.

Rated Circuit Voltage: The series ballast is designed to operate with its primary winding at the rated circuit voltage; this being the maximum output voltage of a 20 KW 6.6 ampere secondary street lighting regulator. The rated voltage of the ballast is 10.5 kilovolts.

Corona Level: The ballasts furnished is corona free at 4 KV.

Ballast Regulation: With primary current at designed value (6.6 amps) the ballast will have a load characteristic (voltage-wattage curve) such that the characteristic curve passes through the diagram of the lamp operating limits (trapezoidal) as given on the relevant data sheet of the lamp standards in the ANSI C78.1300 series. The ballast curve within its designated range of primary current shall intersect both of the lamp-voltage limit lines between the wattage limits lines throughout the full range of lamp voltage.

Lamp Dropout: At constant primary current, a ballast will have a load characteristic (voltage-wattage curve) such that the point of lamp dropout shall not be at a lamp voltage less than the maximum voltage line of the diagram of the lamp operating limits (trapezoidal) as given in the applicable lamp standards in the ANSI C78.1300 series.

Primary Schedule	**Secondary Schedule**
250 W – Lamp Size	100 – Nominal Volts (Min. 95), (Max. 115)

60 – Nominal Volts	4.5 – Starting Amps (Max.)
6.6 – Amps	3.0 – Operating Amps (Lamp Current RMS)
315 – Nominal Watts	Open Circuit Voltage (Min. 195), Max. 400)
80 % - Nominal P.F.	

Voltage and Current are RMS

These values are measured when the lamp is operated with rated primary voltage impressed on the circuit and at an ambient temperature of 25°C., 30 minutes after the circuit is energized.

Contractor responsible to contact Street Lighting Shop Yard Contact Person Shop four (4) working days before with the exact number of materials needed. The advance notice will allow the shop to gather the requested items for the contractor to pick up and sign for taking possession of the materials.

The contractor will be responsible for the materials that they take possession of and for the returning any unused materials back to the shop in good condition. If any materials come back damaged or broken the contractor will be responsible for replacing the broken or damaged item.

Street Lighting Shop Yard Contact Person:
Neal Karweik – 414-286-5943 (office) 414-708-4245 (Cell)
All the materials must be picked up all at one time.
The Street Lighting Shop Yard hours for picking up materials is from 8am to 2pm Monday through Friday.
Contractor must be out of the shop yard by 2pm NO LATER.

C Construction

The ballasts shall be attached to the pole using the appropriate banding and hardware. Perform all splices and water proof connections required for the ignitor and ballasts to fire and energize the luminaire.

D Measurement

The department will measure City Furnished High Pressure Sodium Ballasts (type) Coil y each 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.0060.370	City Furnished High Pressure Sodium Ballasts 3HSX – Single Coil	EACH
SPV.0060.371	City Furnished High Pressure Sodium Ballasts 33HSX – Double Coil	EACH

Payment is full compensation for installing City Furnished High Pressure Sodium Ballasts 3HSX Single Coil and 33HSX Double Coil; for attaching and securing to poles, making all water proof connections; and for all testing

79. Luminaire Utility 1LED2, Item SPV.0060.374; Luminaire Utility 2LED2, Item SPV.0060.375; Luminaire Utility 3LED2, Item SPV.0060.376; Luminaire Utility 2LED3, Item SPV.0060.377; Luminaire Utility 3LED3, Item SPV.0060.379.

A Description

Furnish and install street lighting fixture according to current City of Milwaukee Electrical methods as shown in Typical Installation section and National Electrical Code standards. All work shall be according to standard spec 651 and latest City of Milwaukee specifications.

B Materials

Table 1A Luminaire Utility Specification

	Luminaire 1LED (Type II and Type V light distribution)	Luminaire 90W LED (Type II, III distribution)	Luminaire 135W LED (Type II and III light distribution)	Luminaire 90W LED (Type V distribution)
Factory set input power (Watt)	50 ± 1%	90 ± 1%	135 ± 1%	90 ± 1%
# of LED	≥ 32	≥ 40	≥ 40	≥ 40
NEMA Label	**1LED2(for Type II)** 1LED5 (for Type V)	**2LED2 (for Type II) 2LED3 (for Type III)**	**3LED2 (for Type II) 3LED3 (for Type III)**	2LED5 (Type V)
Max. Dimension	22.75" (W) * 4.38" (H) *8.38"(D)	23.25" (D) * 4.38" (H) *11"(W)	23.25" (D) * 4.38" (H) *11"(D)	23.25" (D) * 4.38" (H) *11"(D)
EPA (sq. ft.)	≤ 0.52	≤ 0.53	≤ 0.53	≤ 0.53
Weight	≤ 9.4 lbs	≤ 12.2 lbs	≤ 12.2 lbs	≤ 12.2 lbs
BUG Rating	B2-U0-G2	B3-U0-G3	B3-U0-G3	B4-U0-G2
Min. Efficacy (lumen/Watt)	121	117	112	134
Min. Delivered Lumens	6,178	10,618	14,250	10,370

- Technical Specifications: All features below shall be incorporated into the equipment and all items shall be furnished and installed into a complete unit ready for operation.

- Type: The luminaires shall be designed so it can efficiently produce uniform illumination according to I.E.S. Type II, III and V light distribution according to the lighting plan and Table 1A.

- Housing: The housing and door shall be rugged, high quality, cast aluminum for maximum strength, durability and lasting beauty. All castings shall be free from pits, blowholes, or other irregularities. All edges are to be free from burrs. The housing shall have an integral leveling pad or other suitable means for quick, easy and proper positioning of the luminaire.

- Door: The door shall be hinged and easily opened for routine maintenance. All component parts shall be easily accessible with the lower housing opened. Tool-less entry is required.

- Leveling: A Bubble level is to be located inside the electrical compartment for easy leveling at installation.

- Hinges: Hinges shall be so constructed and designed to accurately position the door and assure a positive locking with the housing. The hinges shall be provided with a safety catch to prevent the accidental disengagement of the door during servicing.

- Finish: The entire housing shall be polyester powder-coated for durability and corrosion resistance. Rigorous five-stage pre-treating and painting process shall yield a finish that achieves a scribe creepage rating of 8 (per ASTM D1654) after over 5000 hours exposure to salt fog chamber (operated per ASTM B117).

- Color: The luminaire shall be grey in color unless otherwise specified.

- Label: There shall be a NEMA label (see Table 1A) clearly visible at 30 feet height attached to the door of the luminaire. In addition, the luminaire complete model number and manufacturing date shall be indicated inside the housing.

- Smart Inventory and Maintenance Each luminaire should be uniquely identifiable by having a QR Code on each luminaire for app scanning to access the luminaire specification and configuration, in addition to the geographical location at point of installation. The app should be free of charge to purchaser for the lifetime of the luminaire.

- Sensor Ready The luminaire is to be equipped with D4i driver and Zhaga socket in protective cap for future sensor installation.

A. LED/OPTICAL ASSEMBLY:
The LED module is to be enclosed and sealed with a borosilicate Prismatic Glass optical assembly. The combination shall be NEMA IP66 rated for dust and water resistant. The L_{70}, per IES TM-21, must be greater or equal to 60,000 hours of operation time at 25°C. The color temperature is to be 3,000K CCT.

B. POWER SUPPLY:

- The Electronic driver must have an expected life of 60,000 hours at a 25°C ambient.
  It is to be rated at 240 volts, 60Hz. A driver with multiple input voltages can be supplied as long as it can operate at 240 volts.

- The luminaire is to be equipped with a field adjustable output wattage selector and dimmable driver for output dimming. The field adjustable wattage chart shall be attached on the inside of the door opening

- ENERGY EFFICIENCY: The luminaire is to be DLC certified for energy efficiency.

C. SURGE PROTECTION
A surge protector which provides a minimum of 20kV/10 kA protection as per IEEE/ANSI C62.41 Category C is to be included. There shall be a visual indicator showing the surge protector is operational.

D. TERMINAL BLOCK: A heavy duty terminal block shall be provided which will accept wire sizes up to #6 A.W.G. The terminal block shall be compatible with either aluminum or copper wire.

E. MOUNTING: Mast arm mount is adjustable for arms from 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) diameter. Provide 2 bolts clamping mechanism with 3G vibration rating per ANSI C136.

F. HARDWARE: All nuts, bolts, latches, etc. furnished with the luminaire shall be fabricated from stainless steel or non-ferrous materials.

G. PHOTOCONTROL: Luminaire shall be supplied with 7-pin NEMA socket and shorting cap.

WARRANTY: The contractor and/or the manufacturer warrants that goods sold hereunder will be merchantable quality, will conform to applicable specifications, drawings designs, samples or descriptions, will be free from defects in material and workmanship and will be fit for the particular purpose intended by City of Milwaukee.

i. This warranty will remain in effect for 10 years from date of acceptance.

ii. Under this provision, the manufacturer agrees to repair or replace within a reasonable time, any part, feature or product found to be defective during the warranty period at no cost to the city.

C Construction

Install lighting fixture on the six-foot or eight-foot mounting bracket on the pole according to current City of Milwaukee standards. The lighting fixture is to be installed at 0 degree to the horizon. Contractor is responsible to scan the QR code of each fixture with mobile cellphone with the Signify app at point of installation. Details will be provided by Street Lighting field office.

D Measurement

The department will measure Luminaire Utility (type) by each unit, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.374	Luminaire Utility 1LED2	EACH
SPV.0060.375	Luminaire Utility 2LED2	EACH
SPV.0060.376	Luminaire Utility 3LED2	EACH
SPV.0060.377	Luminaire Utility 2LED3	EACH
SPV.0060.379	Luminaire Utility 3LED3	EACH

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

80. Remove Luminaire; Item SPV.0060.387.

A Description

This work shall consist of the removal of existing street lighting luminaire complete as shown in the plans.

B (Vacant)

C Construction

The contractor is responsible to disconnect all cables and wiring that is mounted on or in the poles and carefully remove luminaire complete from street light pole.

Contractor is responsible to protect and deliver the removed street lighting equipment to 1540 West Canal Street, Milwaukee, Wisconsin. The contractor will need to coordinate with the Street Lighting Shop Yard contact person for the delivery of this material.

Street Lighting Shop Yard Contact Person:

Neal Karweik – (414) 286-5943 office / (414) 708-4245 cell

All the materials must be dropped off at one time.

The Street Lighting Shop Yard hours for dropping off materials is from 8:00 AM to 2:00 PM Monday through Friday.

Contractor must be out of the shop yard by 2:00 PM NO LATER.

D Measurement

The department will measure the Remove Luminaire per pole as each individual, acceptably completed unit.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.387	Remove Luminaire	EACH

Payment is full compensation for removal and delivery of luminaires.

81. 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 according to 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 standard spec 519. 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 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 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 each 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.0060.400.	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. 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.

82. 4' Diameter Manhole Type CUC, Item SPV.0060.401.

A Description

The work under this special provision consists of a 4'-0" round precast concrete manhole for the City of Milwaukee Underground Conduit Section at locations shown in the plans, according to standard spec 301, 611 and 501, and as hereinafter provided.

B Materials

Concrete and steel reinforcement shall conform to ASTM specification: C478 (latest edition), except that the single cage circumferential reinforcement in all vertical walls shall consist of lines of #6 steel wire spaced 3" horizontally and lines of #10 steel wire spaced 8" vertically located in the center of the wall.

Two lifting inserts for 1-1/2” diameter lifting eyes in the wall of the base and all other riser sections except the top cap section.

Up to four 7/8” diameter galvanized steel 1-11/16” pulling-in eyes in the wall of the base section directly across from each duct entrance.

Four 5/8” diameter plastic threaded cable rack bolt inserts in the wall of the riser section.

A continuous circumferential Butyl Rubber gasket on the wall joint of the base and riser section when manhole is being assembled at job site.

The number of pulling-in eyes and/or cable rack bolt inserts may vary. Additionally, the size, location, shape and number of duct entrances and/or knock-out area may vary. Unit price of manhole shall not vary for number of openings, pulling-in eyes and/or rack bolt inserts.

The city will supply a frame and lid for the manhole. Contractor shall contact Mr. Ricardo Lopez, Inventory Clerk at (414) 286-6123 prior to obtaining the frame and lid from the DPW Headquarters at 3850 N. 35th St. Contractor must have the “Casting Requisition Form” which shall be supplied by the city.

To obtain the “Casting Requisition Form” and/or for any questions on materials, contact Ms. Karen Rogney at (414) 286-3243.

C Construction

4’ Diameter Manholes Type CUC shall be installed according to standard spec 611.3.

Install the top of the roof deck at a standard depth of 18” below finished grade where possible. A minimum depth of 12” from finished grade to the top of the roof deck must be maintained.

D Measurement

The department will measure 4’ Diameter Manhole Type CUC by each individual manhole, 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.0060.401.	4’ Diameter Manhole Type CUC	EACH

Payment is full compensation for all excavation work and disposal of material; for, furnishing and installing all materials, including bricks, and coarse aggregate, bedding and backfilling, concrete forms, concrete placement, appurtenances, and backfilling.

83. 5’ Diameter “Doghouse” Manhole Type CUC, Installed over Conduit, Item SPV.0060.413.

A Description

The work under this item consists of a 5’-0” diameter precast concrete “doghouse” manhole for the City of Milwaukee Underground Conduit Section at locations shown in the plans, according to standard spec 301, 611 and 501, and as hereinafter provided. This work includes providing and placing PVC pipe and associated fittings, cement encasement, and other appurtenances to extend existing conduit as required to provide a complete and fully functional communications manhole unit.

B Materials

B.1 Manhole

Furnish and install a 5’ diameter precast concrete “doghouse” manhole. Concrete and steel reinforcement shall conform to ASTM specification: C478 (latest edition), except that the two cages of circumferential reinforcement in all vertical walls shall consist of lines of #6 steel wire spaced 3” horizontally and lines of #10 steel wire spaced 8” vertically both located in the center of the wall, and #6 hoop rebar centered in the wall 3” above the window knock-outs.

Two lifting inserts for 1-1/2” diameter lifting eyes shall be cast in the wall of the base and all other riser sections except the top cap section.

Up to four 7/8” diameter galvanized steel 1-11/16” pulling-in eyes shall be cast in the wall of the base section directly across from each duct entrance.

Four 5/8” diameter plastic threaded cable rack bolt inserts shall be cast in the wall of the riser section.

A continuous circumferential Butyl Rubber gasket shall be supplied, to be laid on the wall joint of the base and riser section when manhole is being assembled at job site.

The number of pulling-in eyes and/or cable rack bolt inserts may vary. Additionally, the size, location, shape and number of duct entrances and/or knock-out area may vary. Unit price of manhole shall not vary for number of openings, pulling-in eyes and/or rack bolt inserts.

Field verify window depth and locations prior to ordering manhole.

The city will supply a frame and lid for the manhole. Contractor shall contact Mr. Ricardo Lopez, Inventory Clerk at (414) 286-6123 prior to obtaining the frame and lid from the DPW Headquarters at 3850 N. 35th St. Contractor must have the “Casting Requisition Form” which shall be supplied by the city.

B.2 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.

Manufacturers of PVC Conduit DB-60 shall request evaluation and approval of their products by filing with the department’s Research Supervisor, Bureau of Highway Construction, a certificate setting forth the name or brand of pipe to be furnished, the specified type, category, grade and PVC plastic cell classifications. The certificate shall have attached a certified test report from an approved independent testing laboratory showing specific results of tests performed on each diameter conduit to be furnished conforming to all requirements of these specifications. The conduit tested shall be randomly selected for test by the independent testing laboratory as being representative of that manufacturer’s conduit. The manufacturer of the conduit shall also submit with the certification, a guarantee that all conduit furnished be of the same quality and composition and conform to the specification requirements as tested by the independent laboratory, as long as the manufacturer continues to furnish materials for WISDOT projects.

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.3 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.4 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 with water to inundate the aggregate sufficiently to provide an approximate 3 inch slump. Deposit the mix directly from a concrete transit mix truck.

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

C Construction

C.1 Conduit Alterations

Excavate to expose existing conduit. Break back by hand sections of cement encased conduit to facilitate excavation for the new proposed structure. Hand chip concrete away for the existing pipes. Carefully remove pipes from around the cables. Hand chip enough concrete away from the pipes to allow for the coupling of split ducts on to the ends of the pipes. Protect exposed pipe ends and existing cables from damage.

C.2 Manhole

Install the bottom section of the manhole shall be installed while avoiding damage to the live active cables. The excavation may need to be widened to slide the bottom under the existing cables. After the bottom section of the manhole has been set, the existing cables need to be placed within the window openings, splice cases and/or coils placed back into the manhole.

Exercise extreme care in the handling of working cables within the excavation. When cables need to be moved, particularly lead sheathed cables, move cables slowly and gradually. Avoid sharp kinks that may damage the inner core of the cables and the sheath.

Complete the “doghouse” manhole installation without any damage or service disruption to the existing cables.

Install 5’ Diameter “Doghouse” Manholes Type CUC Installed over Conduit according to standard spec 611.3.

Install the top of the roof deck at a standard depth of 18” below finished grade where possible. A minimum depth of 12” from finished grade to the top of the roof deck must be maintained.

Install manhole cover to proposed grade using concrete rings and/or bricks. **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.

C.3 Placing Duct

All ducts shall be inspected before placing to see that the bores are clean and free from mud, sand, etc. Only ducts with a smooth bore, free from burrs, rough projections etc. shall be used. Where burrs or other rough areas likely to damage cable are found in the duct, they shall be smoothed off by rasping or scraping.

All existing ducts shall be extended into the new manhole structure unless otherwise noted on the plan. Split PVC duct should be used on ducts containing cables. The split duct shall be installed per manufactures recommendations using tape and reinforced with plastic straps to produce a rigid, stable unit.

All ducts shall terminate on the inside wall of the manhole. A standard end bell fitting shall be installed on all duct access points into the manhole.

Where trace wires are present, reconnect and extend trace with #10 copper wire extended 2 feet past the inside wall of the manhole.

C.4 Concreting

Begin concreting after conduit has been laid and the trench and duct have been inspected. The minimum concrete encasement of the ducts is 3 inches on the top, 2 inches on the sides, and 3 inches on the bottom. After placing, the concrete shall be puddled with a splicing bar or similar tool so that complete duct encasement is accomplished. Wood braces used to keep the conduit from floating shall be removed 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.5 Slurry Backfill

Commence backfilling 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 all concrete encased conduit. The trench shall be slurry 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’ Diameter “Doghouse” Manholes Type CUC Installed over Conduit by each individual manhole, acceptably completed.

Notify Ms. Rogney three working days in advance of completion of each manhole, for inspection and acceptance of work performed. The contractor will receive no payment until the above work is approved by City Underground Conduit.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.413.	5’ Diameter “Doghouse” Manholes Type CUC Installed over Conduit	EACH

Payment is full compensation for all excavation work and disposal of material; for adjusting manhole frame to final grade, for furnishing and installing all materials, including precast manhole, conduit, conduit fittings, end bells, bricks, and coarse aggregate, bedding, concrete forms, concrete placement, appurtenances, and backfilling.

84. 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 according to 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 inspection.

85. 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-ducts 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 re-saw at the contractor’s expense.

D Measurement

The department will measure Sawing Concrete-Encased Duct Package by each unit, acceptably completed. 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
SPV.0060.426.	Sawing Concrete Encased Duct Package	EACH

Payment is full compensation for sawing concrete encased duct packages full depth.

86. Sawing and Removal of Concrete Encased Duct Package, Item SPV.0060.427.

A Description

The work under this provision consists of full depth sawing and removal of cement encased multiple duct conduit below grade and plugging each conduit with a PVC plugs. (See Item SPV.0090.422).

B (Vacant)

C Construction

1. Equipment

   Use ring saw or concrete cutting chainsaw for all full-depth cuts. Use diamond blades. If the contractor requests, the engineer (City of Milwaukee) may approve the use of a high speed 16” construction saw on conduit systems with less than 4-ducts.

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.

3. Conduit Removal

   Remove a minimum of 2 feet of the abandoned conduit from the saw cut back to create a gap.

4. Plug Duct Ends

   Use PVC plugs to plug the end of each duct.

D Measurement

The department will measure Sawing and Removal of Concrete-Encased Duct Package by each unit, acceptably completed. Up to 4 conduits per cement encasement will be considered a single unit.

Encasements in excess of 4 conduits 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.0060.427	Sawing and Removing Concrete Encased Duct Package	EACH

Payment is full compensation for sawing full depth, removal and plugging of concrete encased duct packages.

87. Concrete Curb & Gutter Integral 19-Inch, Item SPV.0090.001.

A Description

Construct Integral Curb & Gutter 19-Inch according to the requirements in standard spec 415, 601, 716 and standard spec 415.3.15 and 501.3.1 and as shown in the plans.

B (Vacant)

C Construction

Construct Integral Curb & Gutter 19-Inch according to the requirements in standard spec 601.3, and as shown on the plans.

All curb and gutter shall have a flange thickness of 8.0 inches.

D Measurement

The department will measure Concrete Curb & Gutter Integral 19-Inch by the linear foot of curb and gutter, 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.0090.002	Concrete Curb & Gutter Integral 19-Inch	LF

Payment is full compensation for providing Concrete Curb & Gutter Integral 19-Inch.

88. Electrical Cable Type 3 #4/ 1#8 XLP, Item SPV.0090.240.

A Description

This special provision describes furnishing and installing XLP electrical service cable.

B Materials

The furnished cable shall comply with manufacture and test requirements for ICEA Specification N. S-61-402, NEMA WC5, latest revision. The conductors shall be of soft round annealed uncoated stranded copper per ASTM B-3, ASTM B-8 Class B, and UL Standard UL-44.

The insulation shall be XLPE thermosetting crosslinked polyethylene insulation according to industry standard ICEA Pub. No S-95-658/Nema WC-70 (2009), with a nominal thickness of 60mils; at no point should the thickness be less than 90% of the thickness specified in the schedule. The insulation shall be rated for 600 volts. The insulation compound shall be color coded, the individual cables shall be black, white and red for the #4 conductors, and green for the #8 conductor.

Identification for each conductor must be provided with colors according to IMSA standards. The outer insulation shall be marked with the following at minimum: conductor size (AWG), 600V, XLPE, USE-2, manufacturer name, date of manufacture. All markings must be a minimum of 1/8” in height. Marking shall be at 2 foot intervals. A sequential footage marking must be located on the opposite side of the jacket. All markings must be legible and in permanent ink.

Each length of the individual conductors shall comply with all requirements of ICEA Standards S-61-402, with sampling and testing according to 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 shall also be submitted.

C Construction

The cable shall be installed in conduit as indicated on plans. Splices are not allowed in conduit or directly underground. Do not leave wire or cable ends uncovered or submerged in water. The cable length can be rejected by an engineer if it is observed to have exposed or submerged ends. Cover tape with a liberal coating of varnish or sealant providing protection from oil, moisture, and corrosion. Identify cable in each pullbox at the line side with a fade resistant tag.

D Measurement

The department will measure Electrical Cable Type 3 #4/ 1#8 XLP by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.240	Electrical Cable Type 3 #4/ 1#8 XLP	LF

Payment is full compensation for furnishing and installing Electrical Cable 3 #4/ 1#8 XLP.

89. City Furnished Electrical Cable Type 1#8 AWG 5kV Concentric, Item SPV.0090.300.

A Description

The work under this item is for installation of the following material as shown in plans and according to the following. All work shall be according to standard spec 651.

B Materials

Supplied by the City of Milwaukee per City Spec.

Contractor responsible to contact Street Lighting Shop Yard Contact Person Shop four working days before with the exact number or linear footage of materials needed. The advance notice will allow the shop to gather the requested items for the contractor to pick up and sign for taking possession of the materials.

The contractor will be responsible for the materials that they take possession of and for the returning any unused materials back to the shop in good condition. If any materials come back damaged or broken the contractor will be responsible for replacing the broken or damaged item.

Street Lighting Shop Yard Contact Person:

Neal Karweik – (414) 286-5943 office / (414) 708-4245 cell

All the materials must be picked up all at one time.

The Street Lighting Shop Yard hours for picking up materials is from 8:00 AM to 2:00 PM Monday through Friday.

Contractor must be out of the shop yard by 2:00 PM NO LATER.

C Construction

Installation of 1#8 Concentric cable for 2200V constant current circuit in buried conduit.

Termination of cable by City of Milwaukee Street Lighting.

D Measurement

The department will measure City Furnished Electrical Cable Type 1#8 AWG 5kV Concentric by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.300	City Furnished Electrical Cable Type 1#8 AWG 5kV Concentric	EACH

Payment is full compensation for installation.

90. City Furnished Electrical Cable Type 1#6 AWG 5kV; Item SPV.0090.301.

A Description

This special provision describes installing and connecting city furnished electrical cable type 1#6 AWG 5kV (1#6 Prim.) overhead series primary cable complete with all splicing, identifications, and terminations, and conforming to standard spec 651.

B Materials

Electrical Cable Type 1#6 AWG 5kV – overhead series primary cable shall conform to the City of Milwaukee specifications. The cable provided will be a high voltage #6 solid, WP, Copper and Poly, Black overhead cable.

Pick up the electrical cable type 1#6 AWG 5kV (1#6 Prim.) overhead series primary cable from the City of Milwaukee yard located at 1540 W. Canal Street. Contact person is Neal Karweik at our street lighting shop (414) 286-5943 office or (414) 708-4245 cell, to coordinate pick up. Call during normal business hours and this will require a minimum four working days' notice to gather materials.

C Construction

Install the city furnished electrical cable 1#6 AWG 5kV overhead series primary cable as shown on street lighting design plan. The overhead installation shall conform to standard spec 661.2.1.4 when attaching to wood poles.

Contractor to provide all necessary cable connector hardware, clevis, insulators, and splicing materials required to make water tight connections.

Temporary overhead cable and facilities as shown on temporary lighting plans will remain in place until after the permanent underground conduit, pull boxes, and cable have been installed and all circuitry has been inspected and energized and finally accepted by the City of Milwaukee Street Lighting Construction Supervisor.

D Measurement

The department will measure Installing City Furnished Electrical Cable Type 1#6 AWG 5kV by the linear foot, acceptably completed. Measurement will be made in a straight line between changes in direction and to the centers of poles. Sag of the aerial cable or vertical cable will not be measured for payment. The rewiring to facilitate relocation of the cable due to staging or other construction requirements will not be measured for payment.

E Payment

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

ITEM NUMBER	DESCRUIPTION	UNIT
SPV.0090.301	City Furnished Electrical Cable Type 1#6 AWG 5kV	LF

Payment is full compensation for labor, tools, equipment, transporting, coordination and all materials and incidentals necessary to complete the work including for making connections and testing installed cable system; and for disposing of surplus material.

91. Electrical Cable Type 3#6 AL, Item SPV.0090.302

A Description

Furnish and install service cable according to current City of Milwaukee Electrical methods and National Electrical Code standards. All work shall be according to standard spec 651, 655, and 659.

B Materials

#6 Triplex ASCR (Aluminum conductor steel reinforced)

#6 stranded aluminum wires with 3/64 polyethylene insulation 7 strands

1 #6 bare neutral, 6 strands of Aluminum conductors around a steel messenger, ASCR 6/1

Voltage of 600 volts phase-to-phase or less and at conductor temperatures not to exceed 75°C for polyethylene insulated conductors or 90°C for crosslinked polyethylene (XLP) insulated conductors.

Service drop cable meets or exceeds the following ASTM specifications:

- B-230 Aluminum Wire, 1350-H19 for Electrical Purposes.
- B-231 Aluminum Conductors, Concentric-Lay-Stranded.
- B-232 Aluminum Conductors, Concentric-Lay-Stranded, Coated Steel Reinforced (ACSR).
- B-399 Stranded 6201-T81 Aluminum Alloy Conductors.
- B-901 Compressed Round Stranded Aluminum Conductors Using Single Input Wire.

Conductors are concentrically stranded, compressed 1350-H19 aluminum. Insulated with either polyethylene or crosslinked polyethylene (XLP). Neutral messengers are concentrically stranded 6201, AAC, or ACSR. Cable meets or exceeds all applicable requirements of ANSI/ICEA S-76-474.

C Construction

The cable shall be installed to supply power, usually from a pole, to the user's service head where connection to the service entrance cable is made. All splices must be completed by the contractor unless otherwise designated on plans.

D Measurement

The department will measure

E Payment Electrical Cable Type 3#6 AL by the linear foot, acceptably completed.

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.302	Electrical Cable Type 3#6 AL	LF

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

92. Electrical Cable Type 2#2/1#4 AL., Item SPV.0090.304.

A Description

Furnish and install service cable according to current City of Milwaukee

Electrical methods and National Electrical Code standards. All work shall be according to standard spec 651.

B Materials

2#2/1#4 Triplex ASCR (Aluminum conductor steel reinforced)

Unless otherwise specified, the cable to be furnished shall comply with the manufacture and test requirements of the Insulated Cable Engineers Association (ICEA) specifications No S-61-402, NEMA WC5, and No S-66-524 NEMA WC7, latest revisions.

2 #2 stranded aluminum wires with 3/64 polyethylene insulation 7 strands

1 #4 bare neutral, 6 strands of Aluminum conductors around a steel messenger, ASCR 6/1

B.2 Voltage

Voltage of 600 volts phase-to-phase or less and at conductor temperatures not to exceed 75°C for polyethylene insulated conductors or 90°C for crosslinked polyethylene (XLP) insulated conductors.

B.3 Specifications

Service drop cable meets or exceeds the following ASTM specifications:

- B-230 Aluminum Wire, 1350-H19 for Electrical Purposes.
- B-231 Aluminum Conductors, Concentric-Lay-Stranded.

- B-232 Aluminum Conductors, Concentric-Lay-Stranded,

Coated Steel Reinforced (ACSR).

- B-399 Stranded 6201-T81 Aluminum Alloy Conductors.
- B-901 Compressed Round Stranded Aluminum Conductors Using Single Input Wire.

B.4 Insulated Conductors

All Aluminum conductors are concentrically stranded and shall be Class A or Class B 3% compressed 1350-H19 aluminum. Solid conductors shall be H16 temper.

B.5 Insulation

Shall be 600V either black extruded high molecular weight polyethylene (PE) or black extruded crosslinked polyethylene (XLP). Insulation shall be a nominal 45 mils thickness.

B.6 Bare Neutral Messenger

Neutral messengers are concentrically stranded 6201, AAC, or ACSR. Cable meets or exceeds all applicable requirements of ANSI/ICEA S-76-474. The direction of lay of the outer layer is right hand.

B.7 Protection of Ends

Before shipment, the ends of all wire and cable shall be carefully sealed to protect the insulation from moisture. Both ends of the wire and cable shall be accessible for testing, but shall be covered and protected from injury.

B.8 Lengths

Ten percent of the reels of any one item may be shipped in random length of not less 50% of the specified nominal length. This tolerance is permitted so that the cable manufacturers may avoid brazing together lengths of copper conductor. All conductors shall be free from brazes or splices.

B.9 Service Drop Cable Schedule

Triplex Service Drop 600 Volt PE or XLP ASCR reduced size neutral messenger.

CITY OF MILW P/N	CODE WORD	SIZE AWG	NO# WIRE	INSUL (INS)	BARE NTRL SIZE AWG	BARE NTRL NO# WIRE	REEL LNG (FT)	WGHT LBS/ 1000' ALUM	WEIGHT LBS/ 1000' CABLE
3400-032	Cockle 2	7	0.045	4	6/1	1800'	163	227	
3400-034	Strombus	4	7	0.045	6	6/1	1500'	103	154
3400-036	Voluta 6*	7	0.045	6	6/1	2200'	73	116	

* ACSR Full Size Neutral Messenger

C Construction

The cable shall be installed to supply power, usually from a pole-mounted transformer, to

the user's service head where connection to the service entrance cable is made. All splices must be completed by the contractor unless otherwise designated on plans.

D Measurement

The department will measure this item by the linear foot 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.0090.304	Electrical Cable Type 2#2/1#4 AL	LF

Payment is full compensation for furnishing and installing, debris removal, and restoration.

93. Electrical Cable Type 3#12 AWG with Ground, Item SPV.0090.309.

A Description

Furnish and install type AWG cable according to current City of Milwaukee Electrical methods and National Electrical Code standards. All work shall be according to standard spec 651.

B Materials

Furnish type UF cable with ground including the number and size of conductors as the plans show. Use cable conforming to ANSI/UL 493.

C Construction

Do not splice underground in pull boxes 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 18 inches beyond the pole. Provide 60 inches of cable wire to be pulled into cabinets and left for terminations.

For all cables entering each pull box, provide an extra loop, approximately 6 feet in length, to remain in each pull box. 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.

Under the Cable Type UF bid items, furnish and install the overhead or underground cable for lighting installations.

Strip the minimum length of jacket necessary to make terminations in a neat and technically proficient manner.

D Measurement

The department will measure Cable Type 3#12 AWG with Ground Electrical Cable Type 3#6 AL by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.309.	Cable Type 3#12 AWG with Ground	LF

Payment is full compensation for providing cable; for making all connections; for providing all connectors, including wire nuts, splices, tape, insulating varnish, or sealant; and for testing the circuits.

94. Liquidtight Flexible Nonmetallic Conduit 1 ½-Inch, Item SPV.0090.319

A Description

This special provision describes furnishing and installing Liquidtight flexible nonmetallic conduit for street lighting according to standard spec 652, and as shown in the plan details. All work shall be according to standard spec 651.

B Materials

The Liquidtight flexible nonmetallic conduit shall be Type LFNC-B. The conduit shall be nonconductive, noncorrosive to oil, acid, ozone, and alkaline. The conduit shall have a smooth inner surface with integral reinforcement within the conduit wall.

The flexible nonmetallic conduit shall be UL listed for use as indicated in Article 356 of the latest NEC, and for outdoor use and sunlight resistant.

The fittings and adapters shall be of the same manufacturer as the conduit.

C Construction

Install the fittings, adapters, and conduit in conjunction with traffic signals and street lighting. Install per the manufacturer's instructions and as shown on the plans.

D Measurement

The department will measure Liquidtight Flexible Nonmetallic Conduit (size) by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.319	Liquidtight Flexible Nonmetallic Conduit 1-1/2-Inch	LF

Payment is full compensation for furnishing and installing the conduit, including the connectors.

95. Electrical Cable Type 4#8/1#8 XLP, Item SPV.0090.321; Electrical Cable Type 4#6/1#8 XLP, Item SPV.0090.322; Electrical Cable Type 4#2/1#8 XLP, Item SPV.0090.324.

A Description

This special provision describes furnishing and installing service cable according to current City of Milwaukee Electrical methods and National Electrical Code standards. The service cable shall consist of four cross-linked polyethylene covered, stranded, copper conductors. All work shall be according to standard spec 651.

B Materials

B.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 according to 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 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 conductor insulation compound colors will be Black, Red, White, Gray and Green.

B.2.4 Marking

B.2.4.1

Identification for each conductor must be provided by colors according to 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, date of manufacture. All markings must be a minimum of one-eighth inch (1/8") in height. Marking shall be at approximately 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.2.5 Round Cable

B.2.5.1

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

B.2.5.2 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 according to 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

	4#2/1#8			
Size of Conductor	#2	#8		
Number of Conductors	4	1		
Number of Wires in Conductor	7	7		
Type of Insulation	4 Cross-Linked Polyethylene (XLPE)	Cross-Linked Polyethylene (XLPE)		
Insulation Thickness	60 mils	60 mils		
Insulation Voltage Rating	600 volt	600 volt		
Insulation Color Code	1-white 1-black 1-red 1. 1-gray	1-green		
Non-Hydroscopic Fill	None			

Moisture Resisting Sheath				
Jacket Thickness	None			
	4#6/1#8		4#8/1#8	
Size of Conductor	#6	#8	#8	#8
Number of Conductors	4	1	4	1
Number of Wires in Conductor	7	7	7	7
Type of Insulation	4 Cross-Linked Polyethylene (XLPE)	Cross-Linked Polyethylene (XLPE)	4 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-gray	1-green	1-white 1-black 1-red 1-gray	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 HDPE, PVC, and Liquidtight Flexible Non-Metallic 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 directly in underground 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 3 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 Electrical Cable Type (size) XLP by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.321	Electrical Cable Type 4#8/1#8 XLP	LF
SPV.0090.322	Electrical Cable Type 4#6/1#8 XLP	LF
SPV.0090.324	Electrical Cable Type 4#2/1#8 XLP	LF

Payment is full compensation for furnishing and installing, debris removal, and restoration.

96. 2-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.402.

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
½"	100
3/8"	90-100
No. 8	0-15
No. 30	0-3

Crushed Stone Screenings

Sieve Sizes	% Passing by Weight
½"	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 20 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 3 inches on the top, 2 inches on the sides, and 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

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 2-Duct Cement Encased, 4-Inch Rigid Non-Metallic Conduit DB-60 by the linear foot, acceptably completed. The measured quantity will equal the linear foot of encased duct, based on the distance along the centerline of duct between ends of conduit. City of Milwaukee will have final acceptance..

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.402	2-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, and for installing the conduit.

97. 4-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.404.

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
½"	100
3/8"	90-100
No. 8	0-15
No. 30	0-3

Crushed Stone Screenings

Sieve Sizes	% Passing by Weight
½"	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 20 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 2 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 3 inches on the top, 2 inches on the sides, and 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

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 4-Duct Cement Encased, 4-Inch Rigid Non-Metallic Conduit DB-60 by the linear foot, acceptably completed. The measured quantity will equal the linear foot of encased duct, based on the distance along the centerline of duct between ends of conduit. City of Milwaukee will have final acceptance.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.404.	4-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, and for installing the conduit.

98. 6-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.406.

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
½"	100
3/8"	90-100
No. 8	0-15
No. 30	0-3

Crushed Stone Screenings

Sieve Sizes	% Passing by Weight
½"	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 3 inches on the top, 2 inches on the sides, and 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

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 6-Duct Cement Encased, 4-Inch Rigid Non-Metallic Conduit DB-60 by the linear foot, acceptably completed. The measured quantity will equal the linear foot of encased duct, based on the distance along the centerline of duct between ends of conduit. City of Milwaukee will have final acceptance.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.406.	6-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, and for installing the conduit.

99. 8-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.408.

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
½"	100
3/8"	90-100
No. 8	0-15
No. 30	0-3

Crushed Stone Screenings

Sieve Sizes	% Passing by Weight
½"	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 20 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 3 inches on the top, 2 inches on the sides, and 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

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 8-Duct Cement Encased, 4-Inch Rigid Non-Metallic Conduit DB-60 by the linear foot, acceptably completed. The measured quantity will equal the linear foot of encased duct, based

on the distance along the centerline of duct between ends of conduit. City of Milwaukee will have final acceptance.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.408.	8-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, and for installing the conduit.

100. Duct Removal from Concrete Encased Duct Package, Item SPV.0090.422.

A Description

The work under this provision consists of the removal of one empty duct from a cement encased multiple duct conduit package for proposed alterations. (See Item SPV.0090.402).

B (Vacant)

C Construction

Excavate

Carefully excavate to expose the outside of the existing conduit package.

Concrete Encasement Removal

The contractor is to verify that the conduit line is free of all cabling. Break back sections of cement encased conduit by hand around the specified duct to facilitate the proposed conduit alteration. Use caution as not to expose or damage remaining ducts. Hand chip enough concrete from around the end of each pipe to allow for coupling the proposed PVC duct onto the pipes.

Conduit Removal

Remove the minimum amount of pipe to complete the alteration.

Conduit Alteration

Conduit alteration shall be paid for and installed under Item SPV.0090.402.

D Measurement

The department will measure Duct Removal from Concrete-Encased Multiple Duct Package by the linear foot, acceptably completed. City of Milwaukee will have final acceptance.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.422	Duct Removal from Concrete-Encased Multiple Duct Package	LF

Payment is full compensation for removal of concrete encasement and specified duct from concrete-encased multiple duct package.

101. Marking Crosswalk Epoxy Transverse Line 12-Inch, SPV.0090.704.

A Description

This special provision describes furnishing and installing Marking Crosswalk Epoxy Transverse Line 12-Inch White as directed by the engineer, as shown on the drawings and as hereinafter provided.

Perform work under these items according to the requirements of standard spec 646 and the details as shown on the plans, with the exception of the differences noted here within.

B Materials

Furnish epoxy pavement marking and glass bead material according to the standard spec 646.

C Construction

Construction of pavement markings shall be according to manufacturer application and installation procedures, standard spec 646, and engineer.

All pavement marking areas shall be laid out by the contractor and then reviewed by the engineer. Approval of the marking layout shall be approved by the engineer prior to placement of material.

The contractor shall protect the pavement markings from damage and allow them to fully cure prior to allowing traffic to drive over markings. Any damage shall be corrected by the contractor at the contractor's expense.

D Measurement

The department will measure Marking Crosswalk Epoxy Transverse Line 12-Inch White by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.703	Marking Crosswalk Epoxy Transverse Line 12-Inch	LF

Payment shall be in accordance with standard spec 646.5.

102. Marking Crosswalk Epoxy Block Style 12-inch, SPV.0090.705.

A Description

This special provision describes furnishing and installing Marking Crosswalk Epoxy Block Style 12-inch White as directed by the engineer, as shown on the drawings and as hereinafter provided.

Perform work under these items according to the requirements of standard spec 646 and the details as shown on the plans, with the exception of the differences noted here within.

B Materials

Furnish epoxy pavement marking and glass bead material according to the standard spec 646.

C Construction

Construction of pavement markings shall be according to manufacturer application and installation procedures, standard spec 646, and engineer.

All pavement marking areas shall be laid out by the contractor and then reviewed by the engineer. Approval of the marking layout shall be approved by the engineer prior to placement of material.

The contractor shall protect the pavement markings from damage and allow them to fully cure prior to allowing traffic to drive over markings. Any damage shall be corrected by the contractor at the contractor's expense.

D Measurement

The department will measure Marking Crosswalk Epoxy Block Style 12-inch White by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.705	Marking Crosswalk Epoxy Block Style 12-inch	LF

Payment shall be in accordance with standard spec 646.5.

103. Marking Stop Line Epoxy 24-Inch, SPV.0090.706.

A Description

This special provision describes furnishing and installing Marking Stop Line Epoxy 24-Inch White as directed by the engineer, as shown on the drawings and as hereinafter provided.

Perform work under these items according to the requirements of standard spec 646 and the details as shown on the plans, with the exception of the differences noted here within.

B Materials

Furnish epoxy pavement marking and glass bead material according to the standard spec 646.

C Construction

Construction of pavement markings shall be according to manufacturer application and installation procedures, standard spec 646, and the engineer.

All pavement marking areas shall be laid out by the contractor and then reviewed by the engineer. Approval of the marking layout shall be approved by the engineer prior to placement of material.

The contractor shall protect the pavement markings from damage and allow them to fully cure prior to allowing traffic to drive over markings. Any damage shall be corrected by the contractor at the contractor's expense.

D Measurement

The department will measure Marking Stop Line Epoxy 24-Inch White by the linear foot, acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.704	Marking Stop Line Epoxy 24-Inch	LF

Payment shall be in accordance with standard spec 646.5.

104. Joint Sealing, Item SPV.0180.001.

A Description

This special provision describes the minimum requirements for preparing the pavement joints or cracks and furnishing and installing the sealant. Seal all expansion, hand-formed, and sawed joints in the pavement. Also, seal all bond or construction joints.

B Materials

Furnish joint sealer that complies with the requirements of ASTM Designation D 3405. Joint sealer shall be composed of a mixture of materials that will form a resilient and adhesive compound capable of effectively sealing joints in concrete against the infiltration of moisture and foreign material throughout repeated cycles of expansion and contraction with temperature changes, and shall be of a mixture that will not flow from the joints or be picked up by vehicle tires at summer temperatures. The material must be capable of being brought to a uniform pouring consistency suitable for completely filling the joints without inclusion of large air holes or discontinuities.

The joint sealer shall be elastic type but poured, and it shall be melted by indirect heat in suitable equipment provided with positive temperature control and mechanical agitation. The material shall not be damaged when heated to the temperature required for satisfactory pouring.

C Construction

Prior to the installation of the joint sealer, clean the pavement joint or crack of all foreign material. Completely remove the slurry resulting from the sawing operations from the joint by blowing it clean with compressed air (using a minimum air pressure of 80 psi).

Only apply the joint sealer when the atmospheric and concrete temperatures are both above 40° F.

D Measurement

The department will measure Joint Sealing by square yards of area, 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.0180.001	Joint Sealing	SY

Payment is full compensation for furnishing and placing the joint sealant; and cleaning the pavement joints and cracks.

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UTILITY CONTACTS

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Addendum No. 01
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Revised Sheet 3
January 18, 2024

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STATE PROJECT NUMBER: 2395-05-71	HWY: E/W HOWARD AVE.	COUNTY: MILWAUKEE	UTILITY CONTACTS	SHEET: 3	E

FILE NAME : _____ PLOT DATE : _____ PLOT BY : _____ PLOT NAME : _____ PLOT SCALE : 1:1