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SPECIAL PROVISIONS

DIVISION “SS”

Standard Supplemental Specifications for the Construction of Public Infrastructure in the City of Minneapolis

SS-1 (2565) TRAFFIC CONTROL SIGNALS

- A. This work shall consist of revision, removal, and salvage and reinstall of portions of in place traffic signal control systems as well as furnishing and installing all materials and electrical equipment to provide revised loop detector locations and/or conduit for future audible pedestrian signals (APS) for traffic control signal system from the following locations:

System A – Osseo Road (CSAH 152) & Victory Memorial Parkway

System B – Osseo Road (CSAH 152) & 47th Avenue N

System C – Washington Avenue N (CSAH 152) & Dowling Avenue N

System D – Lyndale Avenue N & 41st Avenue N

- B. The Contractor shall notify the “City of Minneapolis” at least thirty (30) working days before the above work needs to be completed.

This work shall be done in accordance with the applicable Minnesota Department of Transportation “Standard Specifications for Construction,” 2005 Edition.

SS-1.1 GENERAL

- A. All applicable provisions of the current edition of the National Electrical Code shall apply in constructing the traffic control signal systems.
- B. Reference to “the City” or “the City of Minneapolis” in these Special Provisions shall be interpreted to mean “the City of Minneapolis Traffic and Parking Services” or its designated representative.
- C. The City shall approve all foundation and loop detector locations before construction is commenced.
- D. The Contractor for this contract shall be responsible for locating all Contractor installed underground facilities within or outside the project limits until acceptance of the completed project by the City.
- E. The City shall review and approve all work performed by the Contractor prior to the Contractor requesting acceptance by the Engineer.

- F. The Contractor's attention is specifically directed to the requirements of 2565.2A5 regarding the required in service warranty period for workmanship and materials.

SS-1.2

MATERIALS

A. Non-Metallic Conduit

Non-metallic conduit (N.M.C.) and conduit fittings shall be Type II heavy-wall rigid PVC Schedule 40 plastic conduit and conduit fittings per Mn/DOT 3803.

B. Hand-holes

All hand-holes shall be Minneapolis Electrical Hand-holes which have high density polymer concrete frames and covers as shown in Minneapolis Std Plate TRAF-1725 and TRAF-1730 in the Plans and shall conform to the City of Minneapolis standards. Frame & Cover shall meet Tier 22 rating requirements (ANSI/SCTE 77-2007). A drain field shall be provided with each hand-hole. Concrete for supporting the high density polymer concrete frame and cover shall be Mix No. 3A32 or equal.

Hand-holes rings and covers shall be constructed from polymer concrete with a City of Minneapolis approved Green Exterior coloring additive.

C. Anchor Rods

The Contractor shall furnish all required anchor rods, nuts, and washers in traffic signal pedestal concrete foundations.

Traffic Signal Pedestals: Anchor rods, nuts, and washers in each traffic signal pedestal concrete foundation shall conform to the City of Minneapolis standards; shall be galvanized at least the top 28 inches of each anchor rod in accordance with the provisions of Mn/DOT 3392; and shall be three (3) sets in quantity (anchor rod, nut, and washer) of the dimensions and configurations in accordance with the "Minneapolis Signal Base Anchor Rod" detail in the Plans. All anchor rods required in each traffic signal pedestal concrete foundation shall be size 5/8 inches diameter by 40 inches long before bending. See Minneapolis Standard Plate No. TRAF-1140-R1.

Rust Inhibitor: Threaded portions of all anchor rods above the concrete foundations shall be coated with an approved rust inhibitor before installation of the mast arm pole standards, and traffic signal pedestals on the anchor rods.

D. Traffic Signal Electrical Cables And Conductors

The provisions for electric cables and conductors of Mn/DOT 2565.3J and Mn/DOT 3815 are modified as follows. The required electrical cables to Xcel's feed points shall be furnished and installed by the Contractor and shall be the size as required by the power company.

Detector Lead-in Cable: Detector lead-in cable shall meet the requirements of the International Municipal Signal Association (IMSA) Specifications 50-2, latest revision thereof for polyethylene insulated, polyethylene jacketed loop detector lead-in cable. All conductors shall be #14 A.W.G. unless otherwise specified on the Plans.

Signal Control Cable: The multiple conductor control cables for traffic control signals shall meet the following specification. This specification describes multi-conductor Type TC Tray Cable insulated with FR-XLP flame-retardant cross-linked polyethylene and PVC jacketed overall, for use on circuits rated 600 volts at 90 degrees C maximum continuous conductor temperature in wet or dry locations. The cables shall be approved for installation in cable trays in accordance with Article 340 of the NEC and also for use in Class 1 remote control and signaling circuits per Article 725-11(b) of the Code. Cable shall be approved for installation in open air, in ducts or conduits, in tray or trough, and be suitable for direct burial.

Applicable Standards

- a. The following standards shall form a part of this specification to the extent specified herein:
 - Underwriters Laboratories Standard 1277 for Type TC Power and Control Tray Cables.
 - Underwriters Laboratories Standard 44 for Rubber Insulated Wires and Cables. ICEA Pub. No. S-66-524, NEMA Pub. No. WC7, Cross-linked-polyethylene-insulated Wire and Cable.
 - ICEA Pub. No. S-73-532, NEMA Pub. No. WC57, Control Cables
 - IEEE Standard 1202 - Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies.
- b. Conductors
Conductors shall be Class B stranded uncoated soft copper conforming to Part 2 of ICEA. Conductor sizes shall be 12 AWG. A non-hygroscopic separator may be used over the conductors at the option of the manufacturer.
- c. Insulation
 - Compound: Each conductor shall be insulated with FR-XLP flame-retardant chemically cross-linked polyethylene, meeting the requirements of ICEA S-66-524, Par. 3.6, ICEA S-73-532, Table 3-2 (Type I-XLPE) and Type XHHW-2, VW-1 requirements of Underwriter's Laboratories.
 - Thickness: The average thickness of insulation shall be 30 mils. The minimum thickness at any point shall be not less than 90 percent of the specified average thickness.

d. Circuit Identification

Circuit identification shall consist of Method 1 color coding for National Electrical Code applications in accordance with ICEA S-73-532, Appendix E, Table E-2. Cables shall contain the following color coding for individual conductors: 1-Black, 2-White, 3-Green, 4-Red, 5-Blue, 6-Orange, 7-Yellow, 8-Red w/Black tracer, 9-Blue w/Black tracer, 10-Orange w/Black tracer, 11-Yellow w/Black tracer, 12-Black w/White tracer. Tracers shall be either spiral bands or hash marks on opposite sides of each conductor.

e. Assembly

The insulated color-coded conductors shall be cabled together with non-hygroscopic fillers, when necessary to make round. The cable assembly shall be covered with a suitable tape applied with a 10 percent minimum lap.

f. Overall Jacket

Compound: Each cable shall have a PVC protective jacket applied over the assembly. The jacket shall meet the requirements of Part 4 of ICEA S-73-532, Table 4-2, and the Sunlight Resistant requirements of UL Standard 1277.

Thickness: The average jacket thickness shall be in accordance with UL Standard 1277. The minimum thickness at any point shall be not less than 80 percent of the specified average thickness.

g. Surface Marking

Cables shall be clearly identified by means of surface ink printing indicating: Manufacturer, Type TC, (UL), 600V, 12 conductors, #12, XHHW-2 (or 90 degrees C) Conductors, Sunlight Resistant, Direct Burial, E57349, and have length markings approximately every meter.

h. Tests

- Individual conductors and completed cables shall be tested in accordance with UL requirements for Type TC Power and Control Tray Cables having XHHW-2 VW1 insulated conductors.
- Cables shall be capable of passing the ribbon burner cable tray flame test requirements of UL and IEEE Standard 1202.

Signal Head Wire: All circuit wiring from the signal base or transformer base to the traffic signal vehicle and pedestrian indications in pedestal and mast arm poles shall be 1/C#14 AWG solid copper wires with XHHW rating. The conductors shall have insulation color

coded in accordance with Minneapolis Detail No's. 3738A, 3738B, 3738C and 3738D.

Loop Wire: Wire used for inductive loops shall be single conductor No. 14 AWG standard copper insulated with filled chemically cross-linked polyethylene (XLP) and be constructed in accordance with IMSA Specification 511 with a polyvinyl chloride tube.

Roadway loop detector conductors shall be one of the following or approved equal.

- Model DSI-116S Loop Detector Wire as manufactured by Detector Systems, Inc., 11650 Seaboard Circle, Stanton, California 90680;
- Model 1419-XLP-TUBE as manufactured by Kris-Tech Wire Co., Inc. 921 Seneca Street, P.O. Box 4377, Rome, New York 13440-4377;
- Model 320095 Power Loop as manufactured by Tamaqua Cable Products Corporation, P.O. Box 347, Schuylkill Haven, Pennsylvania 17972.

The roadway loop detector conductors shall be approved by the Engineer before procurement.

Single Conductor Wires: The single conductor feeder wires, and control wires shall have Class B stranded annealed uncoated copper conductors and be listed by UL as Type RHW-2/USE-2, 90 degree C, cross-linked polyethylene insulation rated 600 volts in accordance with Article 338 of the National Electrical Code. Cable shall meet the requirements of ICEA Publication No. S-66-524, NEMA Pub. No. WC7 for Cross-linked Polyethylene-Insulated Wire and Cable, and UL Standard 854 for Service Entrance Cables. Wires shall bear UL label for Type USE2, have footage markings approximately every meter, and surface marking indicating manufacturer's ID, conductor size and metal, voltage rating, UL symbol and type designations. **The insulation on each conductor shall be colored red, black, green, or white in accordance with the color-coding shown in the construction plan and/or details.**

E. Install Pedestal Pole

The provisions of Mn/DOT 3832 are modified as follows:

The revised traffic signal pedestal pole shall consist of a pedestal base with access door opening; pedestal shaft; three tie rods; and a pedestal Bumper Post Collar with signal bracketing and pipe fittings in accordance with City of Minneapolis standards. Each pedestal Bumper Post Collar shall have four (4) 1.5 inches diameter threaded side openings spaced 90 degrees apart with unused openings plugged with gasketed, threaded caps (See Plans for detail). The overall length of each installed traffic signal pedestal shall be 10 feet. For assembly

information for the City of Minneapolis traffic signal pedestal, see Minneapolis Standard Plate Nos. TRAF-1076, 1140-R1 and 1217 in the Plans.

F. Terminal Blocks

The provisions for terminal blocks of Mn/DOT 2565.3J5 are modified as follows. The referenced terminal block terminals and screws shall be **nickel-plated brass** and be Kulka 603 series or equivalent.

G. Concrete Foundations/Bases

Concrete for all foundations shall be Mix No. 3Y43 free of chloride additives, placed and consolidated using vibratory equipment and be finished all in accordance with the provisions of Mn/DOT 2565.3F except that edges **shall not** be chamfered or beveled, but shall be neat and straight. Concrete shall be allowed to cure for a minimum of seven (7) days before being placed into use unless otherwise permitted by the Engineer.

SS-1.3 CONSTRUCTION REQUIREMENTS

A. Staging

The Contractor shall review the roadway construction plan and shall plan his work accordingly.

B. Conduit Placement

Where N.M.C. conduits are required to be placed underground below roadway surface areas that are to be reconstructed with bituminous or concrete pavement, the N.M.C. conduit shall be placed and backfilled (if trenching method used) and compacted to the satisfaction of the Engineer before any new pavement is placed.

Exposing existing utilities and surface restoration shall be considered incidental to the work required to provide a complete conduit system installation.

The Contractor shall install red City of Minneapolis Traffic and Parking Services marking tape for marking underground transportation utilities at a distance of 6 inches above all new conduit placed by the trenching method. The required marking tape shall be purchased by the Contractor at the City of Minneapolis Traffic and Parking Services Office, 300 Border Avenue North. Provision and installation of the marking tape by the Contractor shall be considered incidental work to furnishing and installing the conduit.

Existing conduit to be reused as part of a revised permanent signal system (as shown in the Plans) shall be reused in accordance with the provisions of Mn/DOT 2565.3D5.

Extension of Conduits: The Contractor shall provide a continuous length of conduit of size and type noted on the Plans between the specified terminal points.

Installation of Conduit into Hand-hole: Conduits shall be installed into hand-holes by use of a hole saw to cut through the hand-hole wall. Areas surrounding conduit entrances shall be sealed by filling them with mortar. Conduits shall be installed entering hand-holes through the sidewalls of the hand-holes, not through the bottom gravel foundation. Conduits shall extend a minimum of 2 inches and no more than 3 inches into the hand-hole.

Connection to Existing Conduits: The Contractor shall locate the ends of existing conduit as shown on the Plans and extend the conduit to hand-hole, signal base, etc., which is to be built by the Contractor. Existing conduit shall be cut perpendicular to conduit and exterior surface cleaned to form secure connection to extension.

Installation of Conduits: The conduits shall be installed a maximum of 12 inches from the back of the curb, as shown in the Plans or as directed by the Engineer. Except as required to bypass foundations, the base on which the curb is placed shall not be disturbed. All conduits installed across newly surfaced streets shall be installed at a minimum depth of 24 inches or as directed by the Engineer.

Where existing sidewalks, pavement, or streets are opened, the opening shall be refilled to the original thickness using material equal to that removed, and the surface restored. In sidewalk areas whole panels shall be removed and replaced unless a utility joint exists in which case only the portion of the walk above the installation up to the joint need be removed and replaced.

In general, all conduits shall be straight and true, and all offsets and bends shall be uniform and symmetrical. Field bends of conduit shall only be accomplished with the use of an approved conduit heating/bending mechanism designed for that purpose. The Contractor shall adjust the elevations of the conduit assembly for its full length to approximately the same gradient as the finished roadway, and shall furnish and install, in the trench such suitable spacers and framing as may be necessary to maintain the correct grade and alignment. The cover material shall be firmly tamped into place in 6-inch lifts to minimize uneven settlement above or below the conduit

Installation of Conduits Under Driving Surface and Sidewalk: All conduits that are to be placed under driveways, streets and sidewalk that are not scheduled for removal shall be directional bored, or installed by another method approved by Engineer that will not damage or disturb the integrity of the driveway, street or sidewalk. All conduits that are to be placed under driveways, alleys, streets, or sidewalk that are scheduled for removal must be placed during the time between the removal of the existing surface and the commencement of

pavement operations. The Contractor is responsible for coordination with the paving Contractor.

Installation of Conduits Under Driving Surface and Sidewalk Outside Paving Limits: All conduits that are placed under driveways, streets and sidewalk that are not scheduled for removal as part of the street or sidewalk paving shall be placed either by directional boring, surface removal or other approved methods. Any required surface removal and restoration shall be considered incidental to the work required to provide a complete conduit system installation. Damage to pavement or sidewalk shall be remedied at the Contractor's expense.

Conduit Attached to Wood Poles (Service): All conduits terminating near the top of a wood pole shall utilize a metal weatherhead service entrance type fitting with knockouts (knockouts shall not be opened if not used). Conduit shall be attached to a wood pole by galvanized RSC straps spaced 3 feet apart, or as directed by the Engineer.

Duct Seal: Duct seal or other Engineer approved material shall be furnished and installed to seal all controller cabinet and service cabinet conduit entrances as necessary in accordance with Mn/DOT 2565.3D2b.

Conduit Ends in Hand-holes: All ends of non-metallic conduit entering a hand-hole shall be trimmed by the Contractor, on the inside and outside of cut ends to remove rough edges. Conduits shall extend a minimum of 2 inches and no more than 3 inches into the hand-hole.

C. Hand-holes

Frames and covers shall be set in a bed of mortar and leveled to the finished surrounding grade. High density polymer concrete frame and covers constructed in accordance with City of Minneapolis Standard Plate No. Traf-1725 shall be furnished and installed by the Contractor. Hand-hole shall be constructed in accordance with Minneapolis Standard Plate No. Traf-1730. A drain field shall be provided with each hand-hole.

Conduits shall be installed by the use of a hole saw to cut through the hand-hole wall. The area surrounding the conduit entrance shall be sealed with a mortar filling. Conduits shall extend a minimum of 2 inches and not more than 3 inches into the hand-hole.

Signal interconnect conduit runs passing through hand-holes shall have both entering conduits placed in direct horizontal alignment.

The Contractor shall remove to the bottom of the hand-hole, any excess material inside of hand-holes that are to be reused.

The Contractor shall salvage in place hand-holes not reused as part of a revised permanent signal system.

D. Loop Detector Installation

Revised detector locations identified shall be constructed using standard loop detector installation procedures.

All loop detectors shall be saw cut.

The loop detector roadway conductors and the loop detector lead-in cable conductors shall be properly prepared and cleaned before splicing.

Prior to installing the approved loop detector splice kit, the Contractor shall solder the ends of the loop detector lead-in conductors to the roadway loop detector conductors, and shall furnish and install an appropriate sized wire nut to the soldered ends prior to installation of the splice kit.

Splice kits shall be installed in hand-holes in such a manner as to ensure that each splice kit is suspended and/or secured near the top of the hand-hole to the satisfaction of the Engineer (placing splice kits on top of the electrical cables and conductors is NOT acceptable).

Saw cut loops shall be saw cut in the roadway in accordance with City of Minneapolis Detail No. 3707; with the Plans; with the provisions of Mn/DOT 2565.3G as directed by the Engineer and the following:

- Loops shall be installed by saw cutting a slot in the pavement, installing the loop wires in the saw cut, sealing the wires and filling the saw cut with loop sealant and extending the wires under the curb into a hand-hole in accordance with City of Minneapolis Detail No. 3707.
- The saw shall be equipped with a depth gauge and horizontal guide to assure proper depth and alignment of the slot. The blade used for the saw cut shall provide a clean, straight, well-defined 0.4-inch wide saw cut without damage to adjacent areas. The depth of the saw cut shall be a minimum of 2 inches, and deep enough to provide 1.5 inches of cover above the conductors. Where the loop changes direction, the saw cuts shall be overlapped to provide full depth at all corners. Corners shall be drilled with a 1-3/4-inch diameter drill, and drilled to a depth of 1/4 inch deeper than the saw cut.
- Before installing the loop wire, the saw cuts shall be checked for the presence of jagged edges or protrusions. Should these exist, they must be removed. The slots must be cleaned and dried to remove cutting dust, grit, oil, moisture or other contaminants. Cleaning shall be achieved by flushing clean with a stream of water under pressure, and following this, the slots shall be cleared of water and dried using oil free compressed air.
- Loop detector conductors shall be installed using a 1/5 inch to 1/4-inch thick wood paddle. If the wire does not lie close to the

bottom of the saw cut, it shall be held down by means of a material such as tape or Styrofoam.

- Each loop shall have its wire coiled clockwise and the beginning conductor banded in the terminating hand-hole with a symbol to denote start of conductor. Each loop shall be further identified by number with durable tags, or as directed by the Engineer.
- The field loop conductors installed in the pavement shall run continuously with no splices permitted.
- After obtaining satisfactory test results, the loop shall be sealed with a flexible embedding sealer. The sealer shall be used strictly in accordance with the manufacturer's instructions. The sealer shall be poured into the slot to half depth. When both the loop and lead-in slots are half filled, check for air bubbles, for material pile-up, and then proceed to fill the slots to roadway level. Excess sealant shall be removed by means of the "squeegee." In all cases, there shall be neither a trough nor a mound formed. The sealer, when poured into a saw-cut, should completely surround the wires, displace all air therein and completely fill the area of the slot, except for that portion filled with the wire hold down material. Allow sufficient time for the sealer to harden in accordance with manufacturer's instructions before allowing traffic to move over the area.
- After completion of the sealing, the loop shall be final tested, as described. The completed sealed loop must pass frequency, inductance, and resistance tests prior to being accepted.
- All lengths of loop wires that are not imbedded in the pavement shall be twisted with at least five (5) turns per foot, including lengths in conduits and hand-holes.
- Each loop shall terminate individually in the hand-hole and shall be taped to exclude moisture.
- The saw cut configuration, depth, width, number of turns and labeling of wire ends shall be done in conformance with the City of Minneapolis Detail No. 3707.
- The City will mark with spray paint the location and orientation of each loop to be installed on the pavement. The location of the hand-hole will also be identified.
- Each loop detector of size 6 ft. x 6 ft. shall have 3 turns of wire.
- Loop sealant shall be the black colored Detector Loop Sealant manufactured by 3M, Traffic Control Devices Safety and Security Systems Division, St. Paul, Minnesota. Material, which has exceeded the label expiration date, shall not be used.

- Slack loop detector lead-in cable, 10-feet in length, shall be left in each hand-hole through which a run of cable passes. All other applicable provisions for wiring in accordance with Mn/DOT 2565.3J shall apply.

E. Loop Detector Splice:

The following splice procedure shall be utilized in connecting the loop lead and the lead-in conductors. This connection shall be made only in a detector hand-hole, signal base, or cabinet as shown on the Plans.

The electrical splice between the lead-in cable to the controller and the loop wire shall be soldered using resin core solder and provided with a watertight protective covering which covers the spliced wire, the shielding on the loop lead-ins and the end of the tubing containing the loop wires. The use of open flame to heat the wire connection will not be permitted. The Contractor shall use a soldering iron, gun, or torch equipped with a soldering tip. The splice shall be made by the following method:

- Remove all lead-in coverings leaving 4 inches of insulated wire exposed.
- Remove the insulation from each conductor of a pair of lead-in cable conductors and scrape both copper conductors with knife until bright.
- Remove the insulation from the loop wires and scrape both copper conductors with knife until bright.
- The conductors shall be connected by a soldered pigtail-type splice, wrapped with waterproof tape, and encapsulated in a splice encapsulation kit.
- The Contractor shall use a 3M Company DBR 6 Kit for splices.
- Splices in hand-holes shall have the splice kit suspended vertically and secured near the top of the hand-hole with loop and lead-in conductors at the lower end of the kit. Splicing and placement shall be to the satisfaction of the Engineer.

Conductors for inductive loop installations shall be individually identified and banded in pairs by lane, in the hand-hole adjacent to the loops. The loop detector lead in conductors shall be similarly identified at the cabinet.

F. Loop Detector Test Report

The Contractor shall furnish to the Engineer, in triplicate, a signed and dated "Loop Detector Test Report" for each loop detector and lead in cable system furnished and installed as part of this Contract with the following information:

- Project Numbers and Intersection location.

- Loop Detector Number (as shown in the Plans) Dimensions of Loop Detector (Length and Width in feet) as installed, and Number of Turns of wire in Loop Detector as installed.
- Continuity Test: Each loop detector circuit shall be tested for continuity at two (2) locations: (1) Loop detector at the hand-hole prior to splicing with the loop detector lead-in cable (shall have a value less than 0.5 ohms), and (2) Loop detector and lead-in cable system at the traffic signal cabinet after splicing in the hand-hole (shall have a value less than 5 ohms). The continuity test ohm reading at the traffic signal cabinet shall be greater than the ohm reading measured at the loop detector adjacent hand-hole.
- Inductance Test: Each loop detector and lead-in cable system shall have an inductance test measured at the traffic signal cabinet. The inductance shall be in the range of from 50 to 200 microhenries, depending upon loop size, number of turns, lead-in length, etc. Field-measured inductance readings shall not vary by more than ± 20 percent from theoretical calculated inductance.
- Insulation Resistance Test: An insulation resistance test at 500 volts direct current shall be made at the traffic signal cabinet between one loop detector lead-in conductor and the "Equipment Ground Buss" in the cabinet. The insulation resistance shall have a value of not less than 100 megohms.
- Resonant Frequency Test: The resonant frequency of the loop shall be determined by the use of a loop frequency tester. The resonant frequency shall remain stable when there is no vehicle activity in the area and shall not drift more than plus or minus one hertz per minute.

NOTE: The Continuity Test, Inductance Test, Insulation Resistance Test, and Resonant Frequency Test to be conducted at the traffic signal cabinet shall be performed before the loop detector lead-in conductors are terminated on the terminal facilities provided in the cabinet. The tests shall be performed in the presence of the Engineer and a designated City of Minneapolis Traffic and Parking Services representative.

All loop detector tests shall be made by the Contractor, at his own expense, to demonstrate that the materials and installation of each loop detector and lead-in cable system are in accordance with the requirements of the Plans and these Special Provisions. The tests shall be conducted in the presence of and to the satisfaction of the Engineer. The Contractor shall provide such electrical instruments, apparatus, tools, and labor as may be necessary to make the required loop detector tests on each loop detector and lead-in cable system. Such electrical instruments, apparatus, and tools shall remain the property of the Contractor after the tests are completed.

In the event that a loop detector and/or lead-in cable system “fails,” any one of the above-mentioned loop detector tests, the Engineer may direct the Contractor to replace any part of or the entire loop detector and lead-in cable system at the Contractor’s own expense. No Supplemental Agreement will be written for replacing any part of or the entire loop detector and lead-in cable system. All of the above-mentioned loop detector tests shall be repeated and recorded for the “revised” loop detector and lead-in cable system.

Each loop detector and lead-in cable system furnished and installed as part of this Contract shall “pass” the above-mentioned loop detector tests.

--- S A M P L E ---

LOOP DETECTOR TEST REPORT

STATE PROJECT NO. S.A.P. 27-681-11; 27-681-12; S.A.P. 141-020-098; 141-020-102

INTERSECTION West Broadway at Penn Avenue North

LOCATION I.D. Minneapolis

NOTES: 1. No. 3, 4, 5, and 6 in the above sample report, are an example of a single loop detector and lead-in cable system.

2. Nos. 1 and 2, in the above sample report, are an example of a multiple loop detector and lead-in cable system.

Project Engineer shall distribute the three (3) final loop detector test reports as follows:

(01) Original report to the official project file

(02) Copy to the traffic signal cabinet

(03) Copy to the City of Minneapolis

G. Signal Out Requirements

During the period when each existing signal system is de-energized, traffic signs will be required to inform motorists that the signal indications are not operating. The Contractor shall furnish, erect, and maintain “Stop Ahead” and “Stop” signs and barricades. The quantity and size of the temporary signs and barricades as well as their placement in the field shall be as directed by the Engineer. The Contractor shall furnish and install materials to keep these signs upright and stationary. The signs, barricades, etc., shall remain the property of the Contractor. The Contractor shall notify the Engineer five (5) days in advance of de-energizing the system. The Engineer shall approve the day and time and duration of these events. All signal out signage is incidental.

H. Placing Traffic Control Signals In Operation

All vehicle signal faces and pedestrian indications shall be bagged or turned away from traffic immediately after erection to clearly indicate that the signal is not in operation. All bagging shall be gunnysacks or other like material approved by the Engineer and shall be maintained by the Contractor to the satisfaction of the Engineer. Bagging shall be of a grey or light brown color so as to clearly indicate that the signal face is not in use. Orange, red, or black bagging will not be permitted. When the signal system is to be placed in operation, all vehicle signal faces and pedestrian indications shall be unbagged and aimed as directed by the Engineer.

I. Control Cable Installation

At each system, before cabinet installation by the City, the Contractor for this Contract shall terminate all new electrical cables and conductors extending above the cabinet concrete foundation as follows:

Cables:

- Shall be cut 6.5 to 10 feet above the cabinet concrete foundations, and,
- Shall have the ends taped, and
- Shall be labeled with the cable number as per the field wiring diagram - (label shall be applied 12 inches above the cabinet concrete foundation), and
- Shall be coiled, tie wrapped, and left in a neat manner.

J. Completed Intersection Installation Testing

After successful installation of all items required in the Plans and Special Provisions, the City shall inspect and test each intersection prior to acceptance of the completed installation.

Each completed intersection installation shall function to the satisfaction of the Engineer and in accordance with the intent of the Plans and Special Provisions.

K. Operation Of Traffic Signals

Continuous Operation: The Contractor shall ensure that a traffic control signal system is in operation at all times at those intersections with loop detector and future APS conduit installation only, except as may be otherwise directed by the Engineer.

L. Painting

The Contractor shall furnish all paint required after verification of the exact paints and colors with the City of Minneapolis Traffic and Parking Services.

At the specified items below, all painting shall be in accordance with the provisions of Mn/DOT 2565.3T, except that finish coat paint for all traffic signal system items shall be two (2) manufacturers shop coats as modified below.

- Hand-hole frames and covers shall be finish painted with Exterior Enamel, Signal Green, conforming to the City of Minneapolis Specifications.
- Hand-hole rings and covers shall be primed with a red oxide primer and finished with a City-approved Green Exterior Enamel. If field painting is required, it shall be approved in advance and be accepted by approval of the Engineer.

SS-1.4 REMOVING, SALVAGING, AND STOCKPILING EXISTING MATERIALS AND ELECTRICAL EQUIPMENT

This work shall consist of the removal of all or portions of existing traffic signal control systems.

A. Revising Existing Systems

When directed by the Engineer, the Contractor shall remove and salvage for the City plan detailed items of the specified existing traffic control signal systems, signal equipment, foundations, hand-holes, service equipment, and signs in accordance with the applicable provisions of Mn/DOT 2104; with the applicable provisions of Mn/DOT 2565.3U; and the following:

1. Underground conduit and if specified in the plan hand-holes shall be removed, unless otherwise directed by the Engineer.
2. Loop detector wire deemed non-salvageable by the Engineer of each existing traffic control signal system shall be removed and disposed of outside the right-of-way in any manner that the Contractor may elect subject to the provisions of Mn/DOT 2104.3C3 and as noted elsewhere in these Special Provisions.
3. Non-reinstalled salvaged items shall be disassembled as directed by the Engineer and shall be delivered to the City of Minneapolis Traffic and Parking Services Division at 300 Border Avenue North, Minneapolis.

The Contractor shall contact the City Traffic and Parking Services office 24 hours in advance of delivery as follows:

Traffic Stores: 612-673-5750 or

Dave Prehall: 612-673-5759, cell 612-221-5322

4. Non-reinstalled salvaged items shall be disassembled before being delivered to the City of Minneapolis as follows:
 - All signal and communication cables and conductors salvaged shall be neatly coiled and tagged with correct footage.

- Pedestal slipfitter collars shall be removed.
 - All other non-reinstalled salvable items shall be removed and disassembled as directed by the Engineer.
 - Existing hand-hole frames and covers that are not to be reused shall be salvaged and delivered to the City.
5. Plan specified pole foundations, conduit, and items deemed non-salvageable by the Engineer of each existing traffic control signal system shall be removed and disposed of outside the right-of-way in any manner that the Contractor may elect subject to the provisions of Mn/DOT 2104.3C3 and as noted elsewhere in these Special Provisions.
 6. Pole foundations and the underground signal conduits may include asbestos containing electrical conduits (Transite). The 3' x 18" vertical pipe in hand-holes may also contain asbestos, Transite pipe. Underground signal conduits that contain asbestos will have been encased in concrete at the time of installation. For the procedure for handling and disposal of these asbestos-containing materials See the "Technical Specifications for the Excavation of Asbestos-Containing Electrical Conduit" located in the appendix of these Special Provisions.
 7. The removal of traffic signal hand-holes and foundations containing asbestos is incidental. Refer to the Appendix for information regarding this removal.
 8. The City will remove and salvage the protective signal pedestal base located in the southeast corner of the intersection of Washington Avenue N and Dowling Avenue North. This base will be removed once the contractor has de-energized the signal and salvaged the in place pedestal located in the same corner. The Contractor shall contact the City Traffic and Parking Services office 24 hours in advance of salvaging the specified pedestal to coordinate the removal of the protective pedestal:
Dave Prehall: 612-673-5759, cell 612-221-5322
 9. All removal, disposal, and salvaging of materials of the existing traffic control signal systems, as required by the Plans and Special Provisions shall be paid for in accordance with the "Method of Measurement and Payment" included in a separate section.

SS-1.5 METHOD OF MEASUREMENT AND PAYMENT

A. Purpose

This section shall define the bid items and the manner in which payment will be made to the Contractor.

B. Miscellaneous Work, Equipment, and Material

Items of miscellaneous work, equipment and material will be required to construct each system including such items as traffic cones, markers, flashers, barricades, bolts, nuts, washers, electrical wire, etc. In each case where these items or similar miscellaneous items are necessary to the completion of the project in a safe and reliable fashion, their provision, use and installation by the Contractor shall be considered included in the various associated items of work and no direct payment will be made therefore.

C. Measurement

Removing, salvaging, furnishing, and installing all materials and electrical equipment all to provide complete fully operational Revised Traffic Control Signal Systems "A", "B", "C", and "D" in Minneapolis as contained in these Special Provisions and in the Plans will be measured as an integral unit complete in place and operating.

D. Basis of Payment:

Payment for traffic control signal system installation items shall be in accordance with Mn/DOT 2104, 2545, & 2565. Payment shall be compensation in full for all costs of removing, salvaging, furnishing and installing signal equipment, conduit, hand-holes, cable, and all incidentals in accordance with the following schedule at the appropriate contract bid price for the specified unit of measure item cost.

Payment for removing and salvaging existing traffic control signal system cable and conduit and all incidentals conflicting with plan installation items is incidental.

ITEM NO.	DESCRIPTION	UNITS
2104.523	Remove Pedestal Foundation	Each
2104.523	Salvage Pedestal Pole	Each
2545.523	3" Non-Metallic Conduit (Directional Bore)..	Lineal Feet
2565.602	Pedestal Foundation	Each
2565.602	Anchor Rod Signal	Each
2565.602	Install Pedestal Pole.....	Each
2565.602	Bumper Post Collar	Each
2565.602	PVC Hand-hole and Cover.....	Each
2565.602	Splice Loop Detector	Each
2565.602	Saw Cut Loop Detector 6'x 6'	Each
2565.602	Saw Cut Loop Detector 6' x 10'.....	Each
2565.603	2" Non-Metallic Conduit.....	Lineal Feet
2565.603	1/C#8	Lineal Feet

2565.603 12/C#14Lineal Feet
2565.603 2/C#14 SH (Loop Detector)Lineal Feet
2565.603 2/C#14Lineal Feet

Payment for removing and disposing of conduit with asbestos containing electrical conduits (transite) is incidental.

APPENDIX A

City of Minneapolis

ASBESTOS ABATEMENT

Removal/Replacement of Concrete Pole Bases, Concrete Encased Conduit, and Hand-holes that Contain Asbestos

Some Minneapolis signal and streetlight bases, pipe contain asbestos-containing (Transite) electrical conduit which can be broken during the removal and replacement of a streetlight or signal pole foundation. Some Minneapolis style hand-holes also have asbestos pipe used in the vertical pipe section of the hand-hole. Asbestos release can be controlled by wetting the concrete base and Transite before and during removal and painting encapsulant on any broken Transite edges exposed during the foundation removal/replacement process.

Equipment needed:

- Garden sprayer filled with amended water(water/surfactant mixture – dish washing detergent can be used as a surfactant, use 1 oz./gallon of water)
- Bucket of Childers CP-11 mastic – available at plumbing supply stores
- Disposable paint brush

Training needed:

- OSHA requires that workers who disturb asbestos-containing materials must get Class III training. A four-hour session, which includes hands-on training, will meet this OSHA requirement.

Procedures:

After the base is excavated, look at the conduit to determine if it is Transite. Transite is a rock hard, gray, slate-like material. Gray PVC pipe was also used as conduit. The PVC pipe requires no special precautions.

When removing wiring, make sure system is completely de-energized. If Transite conduit is present, spray the inside of the conduit and wiring with amended water. Pull the wires out of the conduit. If wires are visibly contaminated, wipe down the wires with disposable wipes.

If the base will be hoisted out of the ground in one piece, paint the exposed Transite conduit with CP-11 and spray amended water inside the conduit. If the base breaks during removal and Transite is exposed, wet the broken areas with amended water. When the base is moved, paint any newly exposed Transite areas with CP-11.

If the base will be broken apart and partially removed, wet the exposed Transite and inside surfaces of conduit with amended water.

When base breaks, immediately spray the newly exposed Transite surfaces with amended water. Paint the exposed Transite surfaces on the removed portion of the base with CP-11.

For the portion which remains in the ground, wet all exposed Transite. It is very important to wet the portion of conduit where any PVC/Steel adapters will be inserted. Carefully set the adapter and paint the Transite and adjacent portions of the adapter with CP-11. Paint any other exposed portions of Transite with CP-11.

Carefully haul removed bases and portions of bases to an area where they can be stored and kept separate from any other concrete which could be recycled.

Asbestos-containing material must not be recycled because crushing this material will release asbestos fibers into the air and also introduce asbestos into the recycled concrete aggregate.

The material which contains Transite conduit must be disposed of at a landfill which accepts asbestos-containing materials. This material can be legally placed in a demolition landfill, but some landfills do not accept asbestos. Call to insure acceptance.