

1021 - LOOP DETECTOR

1021.1 DESCRIPTION

The work provided for in these Specifications shall consist of furnishing all labor, materials and equipment and performing all work necessary to accomplish Traffic Signal Loop Replacement on existing asphalt street surfaces, together with other incidental and related work including all detector loop wire to the nearest junction box and hookup to existing detector home run cable. These loops are replacements for loops that could be damaged during the construction as indicated in the plans.

The term "inductive loop detector" applies to a complete installation consisting of a conductor loop or group of loops installed in the roadway, lead-in cable, and a sensor unit with power supply installed in a traffic signal controller cabinet.

1021.2 MATERIALS

All materials used in the fabrication or assembly of the items listed below shall comply with the applicable parts of Section 1703, "Electric Lighting and Traffic Signal Equipment" of the "Standard Specifications" with the additions as stated herein. Unless specifically noted otherwise, all equipment shall be new and similar to the best grade of this type of equipment, and shall be approved by the Engineer.

The Contractor shall install all of the equipment and wiring necessary as indicated on the plan and in accordance with this specification. The loop detector shall be complete, and the Contractor shall furnish and install all equipment necessary for the satisfactory operation whether specifically mentioned or not.

a. Approved Materials List

All material for loop detector used by the Contractor shall be from the City's approved list of vendors. It is important that users be completely knowledgeable of all application requirements and procedures prior to product application. It is the responsibility of the installer to contact the supplier of all materials if questions regarding application procedures or conditions arise.

Manufacturers interested in pre-qualifying material under this specification shall submit a sample of the material along with a complete materials specification for each item to be considered. The sample will be reviewed for compliance with all requirements of this specification. No material shall be used unless the material has been pre-qualified. A complete list of pre-qualified materials is maintained by the Traffic Services Engineering Division of the Department of Public Works.

b. Detector Loop Wire

The detector loop wire shall be #14 A.W.G., stranded, type THHN, 1-conductor cable housed in PVC tubing. The PVC tubing shall be ULFR-1 rated 105 degrees C with a .031" wall thickness plus or minus .003"; and .182" minimum to .198" maximum inside diameter.

c. Detector Lead-In Cable

The detector lead-in cable, if specified, shall be #14 A.W.G., 2-conductor, stranded and shielded cable. The conductor and drain wires shall be tinned copper wires, with conductors shielded by a layer of aluminum bonded to polyester film. All wires shall be insulated with cross linked polypropylene or polyethylene and provided a vinyl jacket.

d. Connectors

All electrical connections of loop detector wire to existing detector lead-in cable shall be made watertight by an approved connectors on the City of Overland Park Approved Materials List.

e. Detector Card Unit

Detector card units mounted in the controller cabinet will be considered as part of the fully operating loop. Sensor units shall be solid state digital, providing two or four detection channels as indicated in the plans, with an inductance range of 0 to 2000 microhenries. Power failure shall result in a continuous call indication.

1021.3 CONSTRUCTION REQUIREMENTS

The contractor shall only use qualified laborers who are well trained to perform functions related to detector loops, including familiarity with applicable sections of the National Electric Code. The "Standard Specifications" shall be amended by the addition of the following:

a. Saw Cutting

All saw cuts shall be performed with a single blade of suitable thickness to achieve a 3/8" wide cut. Saw cut shall be smooth and straight. The minimum depth of the slot shall be in accordance with the Standard Details. Saw cuts for loop wires shall be made with a self-propelled, water cooled power saw. The water is used to cool and lubricate the blade and eliminate blowing saw dust. All jagged edges or sharp corners and protrusions shall be removed using a small chisel and hammer. The saw cut shall be cleaned of cutting dust, grit, oil and other contaminants. The saw cut shall be flushed clean with water and dried with compressed dry air immediately after cutting. Care shall be taken during the cutting and cleaning operation to avoid blowing debris at passing pedestrians and vehicles or onto private property.

b. Loop Cable Installation

Installation shall conform to the details and notes shown on the plans. Loop wire shall be one continuous wire with each partial loop to be in the configuration detailed on the plans. All loop conductors shall be wound in the same direction with the start and end clearly marked on the conductors at the junction or service box. Conductors of all loops to be operated shall be run continuous to the nearest junction or service box. The loop conductors for each loop shall be spliced in the junction or service box to a detector lead-in cable running from the box to a sensor unit mounted in the controller cabinet. Existing stop bar loops and advance loops that are being replaced are shown on the plan. The location is approximate, the exact location will be determined in the field. If an existing junction or service box is not present, a new box shall be installed as shown on the plans at the contract unit price per each. High density polyethylene (HDPE) or polyvinyl chloride (PVC) conduit shall be installed in the existing curb as shown on the plans and connected to the junction or service box. Loop configurations shall either be 5-diamond, 4-diamond or 1-diamond according to what is indicated in the plans.

c. Sealing of Saw Cut

Inspection shall be made on all loop installations prior to the sealant operation. Conductors shall be placed at the bottom of the saw cut. After conductors are installed in the slots and inspected, the slots shall be filled with an approved sealant. Gray sealant shall be used for concrete, and black shall be used on asphalt or a bituminous surface, to within 1/8 inch of the pavement surface. The sealant shall be between 2 inches and 3 inches thick above the top conductor in the saw cut as determined by the saw cut depth and as indicated in the plans. Before setting, surplus sealant shall be removed from the adjacent road surfaces without the use of solvents. Sand or other absorbent material shall be spread over the sealant if traffic is allowed over the loop before the sealant is completely set.

d. Work Day Limitations

Loop detector replacement shall be completed prior to the installation of the surface course of asphalt, unless the loops are being installed in existing pavement outside the limits of milling and paving operations. Loops should be installed after completion of other construction that might necessitate replacement of any loop more than once. All loops necessary to be replaced shall be located and marked in the field by the Engineer, or his representative. All loops installed shall be tested and approved prior to overlaying. Loop construction shall not obstruct or close a traffic lane during the times indicated on the plans. A minimum of one lane in each direction shall be maintained open to traffic at all times.

1021.4 MEASUREMENT AND PAYMENT

a. Unit Bid Prices

The Engineer will measure each traffic loop detector of the various size based on the number of diamonds (1-diamond, 4-diamond and 5-diamond). Each detector card unit shall be measured per each based on the number of channels (2 or 4 channel).

Payment for “Detector Loop (Size)” and “Detector Card (No. of Channels)” at the contract unit price bid is full compensation for the specified work, including all sawing, placement, connections, sealing, and materials required.