

SOUTH DUBLIN COUNTY COUNCIL
Traffic Management Centre
Roads (Traffic and Transportation) Department



TECHNICAL SPECIFICATION 2
SDCC-TS-02
INDUCTIVE LOOPS & ABOVE GROUND DETECTION
REQUIREMENTS FOR THE DESIGN AND INSTALLATION OF
TRAFFIC CONTROL EQUIPMENT
FOR SOUTH DUBLIN COUNTY COUNCIL

Issue 5.0
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TRAFFIC MANAGEMENT CENTRE
ROADS (TRAFFIC AND TRANSPORTATION) DEPARTMENT
SOUTH DUBLIN COUNTY COUNCIL
COUNTY HALL
TALLAGHT
DUBLIN 24

1. INDUCTIVE LOOPS

Inductive loop Detectors

- 1.1 Inductive loop detectors shall be approved to the appropriate UK DETR/HA standard specification for self tuning detectors. Quad detector packs shall be used. A separate detector channel shall be used for each detector (whether loop or above ground) unless otherwise confirmed in writing by the Council.

Installation of inductive loops

- 1.2 All loops shall be installed in accordance with the appropriate UK DETR/HA specification.
- 1.3 The Contractor shall be deemed to have inspected the site and satisfied himself on all matters relating thereto, particularly with regard to presence of sub-surface ferrous objects, and he shall be expected to liaise with the Council to identify these.
- 1.4 Feeder cables shall run under footpaths/verges in ducts. In exceptional circumstances they may, with the prior written agreement of the Council be run along the crown of the carriageway but not near the kerb.
- 1.5 Joints between loop tails and feeder cables shall normally be in a 300 x 300mm chamber.
- 1.6 Loop tails shall be as short as possible and only exceptionally shall a joint between feeder cable and loop be more than 4 metres from the loop.
- 1.7 Where loop tail or feeder cables enter a footpath either of the following procedures will be acceptable. Slotting of the kerb for this purpose will not be accepted.
- a) a small area of carriageway is to be excavated and a high impact resistant PVC or other approved non-metallic duct about 30mm diameter and 800 mm long laid through or under the kerb for each cable. The end of the slot shall be widened and deepened so that the duct lies neatly in the slot for at least 100 mm;
 - b) the excavated area shall be backfilled with fine aggregate concrete. The cables shall then be backfilled with compacted fine cold asphalt and hot oxidised bitumen. The kerb stone shall be reinstated with a foundation sufficient to bear weight of heavy vehicles mounting the kerb without settlement being caused to the kerb. The Contractor shall ensure that cables entering the footpath are adequately protected from any abrasive action;
 - c) at a point not less than 500mm from the face of the kerb a hole shall be drilled to at least 100mm below the roadway and through or under the kerb. A high impact resistant PVC or other approved non-metallic tight fitting duct about 30mm diameter and 800mm long shall be passed through the hole. The damaged part of the carriageway shall then be backfilled with compacted fine cold asphalt and hot oxidised bitumen.
- 1.8 Chambers shall be installed where joints between loop tails and feeder cables are in footpaths or verges. All chambers shall be 300 x 300mm, Cooper Clarke or equivalent, as agreed with the Council.

- 1.9** Where, with the prior written agreement of the Council, loop and feeder have to be jointed in the carriageway, this joint shall be positioned where it is subject to a minimum of stress exerted by wheels of vehicles such as at the crown of the road or where there is chevron marking but not near the kerb or at wheel tracks.

Loop Cable Laying

- 1.10** The loop cable shall be to the following specification: 1.5 mm² 30/0.25 tinned annealed copper conductor, insulated with EPR/CSP insulated. Overall diameter minimum 4.0 mm.
- 1.11** Prior to installation in slots, cable shall be dry.
- 1.12** The Contractor shall ensure that the cable lies evenly in the bottom of the slot, and shall secure the cable in such a position if necessary.
- 1.13** Sharp implements shall not be used to seat the cable in the slot.

Loop Feeder Cable

- 1.14** The installed feeder cable shall not exceed 300 metres in length from the equipment housing to the loop or 100 metres for bus loops.
- 1.15** If armoured feeder cable is used it shall be terminated in the equipment housing using cable connectors approved by the Council, and each connector shall be bonded to the earth point using 2.5 mm² flexible earthing cable terminated with crimped connection tags. The Contractor shall ensure that no other earth connection exists along the length of the cable.
- 1.16** When installing feeder cables the Contractor shall exercise the utmost care in storing, running-off, drawing into ducts, bending and other processes involved ensuring that the cable is not damaged in any way.
- 1.17** Cables shall not be bent to a radius of less than 12 times their diameter or less than a radius recommended by the manufacturer whichever is the greater.
- 1.18** Feeder cables beneath footpaths are to be laid in approved ducts.

Loop Cable Jointing

- 1.19** The Council shall approve the cable joint prior to use.
- 1.20** Feeder cables shall be electrically connected to the loop tails with heated insulated crimp connectors using a ratchet type of crimping tool. The Contractor shall ensure that the cable conductor has been correctly crimped by visually checking the cable and also by applying a vigorous pull test to that cable on either side of the joint.
- 1.21** The electrical connectors shall be encased in a joint approved by the Council and the Contractor shall ensure that the connectors are staggered to avoid the possibility of any short circuits.
- 1.22** The Contractor shall ensure that any instructions issued by the cable joint manufacturer are provided in writing to his installation and supervisory staff. These instructions shall form part of this specification.

- 1.23** The Contractor shall ensure that the joint is waterproof prior to backfilling.
- 1.24** With the exception of cable joints between loop and feeder cables, no other joint shall be permitted in the loop/feeder configuration.
- 1.25** Cables shall be terminated in the controller or detector housing using terminal connection blocks which are adequate in size for the diameter of conductors used. Screws shall not bear directly on to conductors; either a protective leaf in the terminal or a crimped pin on the end of the conductor shall be used.

Slot Cutting for Inductive Loops

- 1.26** The road shall be inspected before the loop laying operation commences. The layout of the loop configuration shall avoid areas of poor reinstatement in the road surface caused by other roadworks etc. Slots shall be cut at least 1 metre from any such disturbance.
- 1.27** In the event that a carriageway is too weak to ensure future reliability of a loop, the carriageway shall be excavated and strengthened with a new pad laid where the loop is to be cut. In the case of a roadway being totally unsuitable for the installation of loops, the Council's Council may request an alternative method of detection to be agreed with the Contractor, and priced in accordance with the schedule of rates.
- 1.28** Slots shall be cut at least 1 metre from any ferrous objects such as manhole covers etc.
- 1.29** In concrete road surfaces slots shall not be cut less than 1.5 metres from transverse joints between adjacent concrete sections.
- 1.30** Slots for loop cables shall exceed the maximum diameter of the loop cable or cable pair by at least 2.0 mm. All slot cutting shall be a minimum of 65mm deep.
- 1.31** On all slots a minimum of 50 mm cover shall be maintained above the loop cable (40 mm in concrete).
- 1.32** The depth of each slot shall be checked with a depth gauge along the whole length of the slot and this shall conform to the requirements of this specification. The Contractor shall ensure that there are no irregularities in the base of the slot.
- 1.33** Each loop shall be separated from adjacent loops by a minimum of 300 mm.
- 1.34** All debris shall be cleared from the base of the slot. The slot shall be cleared out with compressed air and be completely dry before wires and resin are inserted.

Backfilling of slots for Inductive Loops

- 1.35** Loop slots shall be backfilled with hot oxidised Bitumen approved by the Council, to give a minimum of 50mm cover above the uppermost cable.
- 1.36** The Bitumen shall be heated to the manufacturers specified temperature

- 1.37** The Contractor shall satisfy the Council before slot cutting operations commence, that the on-site equipment is able to raise and maintain the hot oxidised Bitumen to the temperature necessary to achieve the specified viscosity.
- 1.38** Slot cutting of loop feeder cables in the path or roadway will not be accepted under any circumstances.
- 1.39** Bitumen filler in slots shall be finished off level with the road surface. All excess bitumen on the road surface at edges of slots shall be removed with a heater implement.

Commissioning of Inductive Loops

- 1.40** Each feeder cable shall be labelled at its point of entry to the controller with PVC cable markers secured around the cable with cable ties.
- 1.41** Each loop and feeder configuration shall be tested at the controller as follows and the results submitted to the Council as a test certificate for the loop installation.
- 1.42** The dc series resistance of the loop feeder, with the detector disconnected, shall be measured at a current 10A dc or greater. The resistance shall not exceed 3 ohms.
- 1.43** With the loop circuit disconnected from the detector, the impedance to earth of the two loop and feeder conductors shall be measured at a test voltage of 500V dc applied for at least one minute. This shall not be less than 10 megohms. The two ends of the loop circuit shall be connected together for this test.
- 1.44** Where armoured feeder cable is used, the armouring shall be disconnected from the earth point, and the impedance to earth of the armouring shall be measured at a test voltage of 500V dc applied for one minute. This shall not be less than 10 megohms.
- 1.45** Where armoured feeder cable is used with the armouring connected to the earth point of the equipment housing, the impedance to earth of the armouring shall be measured. This impedance shall not be greater than 0.5 ohms.
- 1.46** The inductance of the loop and feeder circuit shall be measured. This shall be comparable with the theoretical value.
- 1.47** The frequency of operation of each configuration shall be measured. Where two loop circuits share a common feeder cable their frequency of operation shall be separated by at least 5 kilohertz.
- 1.48** The Contractor shall adjust the sensitivity and presence time of each detector to the requirements specified by the Council. The Contractor shall demonstrate correct operation of the detector at the sensitivity specified.
- 1.49** The Contractor shall ensure that an inductance change caused by vehicles in one loop shall not induce spurious detections in any adjacent loop system.
- 1.50** The Contractor at his own expense shall replace any loop or feeder which fails these tests.

1.51 Where inductive loop detectors are specified two full days prior to the loop laying and jointing operation the Contractor shall obtain agreement to this from the Council to enable the Council to be present. The Contractor shall conduct loop commissioning tests in the presence of Council staff.

2 ABOVE GROUND DETECTION

2.1 All above ground detection shall be approved to the appropriate UK Highways Agency standard/specification.

2.2 All above ground detection shall comply with the requirements and guidelines issued by the Commission for Communication Regulation (ComReg).

3 ADDITIONAL INFORMATION

3.1 Additional information or clarification may be obtained from:

Traffic Management Centre
Land Use, Planning and Transportation Department
South Dublin County Council
County Hall,
Town Centre,
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Dublin 24

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