# Traffic Counting Stations

DIPL Roadworks Master – May 2019

## Cross References

PROVISION FOR TRAFFIC

EARTHWORKS

DUCTING AND CONDUITS

## Standards and Publications

Conform to the following Standards and Publications unless specified otherwise.

### Australian Standards

AS 1012 Methods of testing concrete.

AS 1160 Bitumen emulsions for the construction and maintenance of pavements.

AS /NZS 1252 High strength steel bolts with associated nuts and washers for structural engineering.

AS 1397 Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium

AS /NZS 2053(set) Conduits and fittings for electrical installations.

AS/NZS 2276(set) Cables for traffic signal installations.

AS 2700 Colour standards for general purposes.

AS 2703 Vehicle loop detector sensors.

AS /NZS 3000 Electrical installations (Australian/New Zealand Wiring Rules).

AS /NZS 3191 Electric flexible cords.

AS 3600 Concrete structures.

AS/NZS 4671 Steel reinforcing materials

AS/NZS 5000.1 Electric cables – Polymetric insulated – For working voltages up to and including 0.6/1 (1.2) kV

### Civil Standard Drawings

CS 1550 Standard traffic counting station Post mounted Detector loop and pit details

CS 1551 Standard traffic counting station Post mounted Detector loop layout

CS 1552 Standard traffic counting station Post mounted Piezo tube layout

CS 1553 Standard traffic counting station Post mounted Foundation details

CS 1554 Standard traffic counting station Post mounted Cabinet wiring diagram

CS 1555 Standard traffic counting station Post mounted Post assembly

### Materials Testing

NTMTM NT Materials Testing Manual accessible via <https://transport.nt.gov.au/infrastructure/technical-standards-guidelines-and-specifications/materials-testing-manual>

NTTM NT Test Methods

## Cabinets

Cabinets will be provided by the Principal.

[Preliminaries need to be adjusted]

Install as specified.

Refer to CS 1554.

Cabinets to open away from, and be aligned square to, the road.

### Terminal Blocks

Provide two terminal blocks for the termination of loop detector feeder cables similar to Clipsal 543.

Mount the terminal blocks on the front edge of the cabinet lower shelf.

Supply two copies of drawing showing labelled loop layout and terminal blocks.

### Switchboard for Solar Power Site

Provide and connect a 10 amp on‑off switch with the up position as off and clear marks for on and off.

Provide a four terminal strip similar to Clipsal 543.

Mount and connect voltage regulator as specified.

Refer to CS 1554.

Clearly label terminal strip '+' and '-'.

Wire solar panel to terminal strip via switch and regulator.

Mount the switch regulator and terminal strip on a non‑hygroscopic, non‑inflammable base 6 mm Bramite or similar.

Separate the switch and strip a minimum of 100 mm.

## Cabling

Provide detector loop cable of 30/025 V105 type or similar.

Twist loop feeder cable one turn every 20 cm between each loop and junction in the detector pit.

Provide loop detector feeder cable of Telcon B3102 CS/NJ/PVC type or similar.

Provide Piezo detector feeder cable of 75 ohm co‑axial cable type RG59.

Provide solar power feed cable of 30/025 V105 type or similar, red and black.

Join cables by soldering.

Insulate and seal against ingress of water by using mastic filled heatshrink Sigmaform SST 12‑04 or similar.

Ensure heatshrink covers at least 25 mm of insulation beyond the join.

## Conduit

Provide and lay 50 mm HD PVC conduit and one P20 white PVC conduit as specified.

Allow 25 mm clearance between adjacent conduits.

Provide sand cover minimum 100 mm above conduit.

Provide electrical marker tape 150 mm below natural surface in conduit trenches. Refer to **Cable Installation** and **Cable Marker Tapes** in STREET LIGHTING.

Terminate the conduits 25 mm inside detector pit, and 100 mm above natural surface within pole assembly as specified.

Refer to CS 1550 and CS 1553.

Ensure minimum cover of 450 mm over conduits.

## Pole Assembly

The pole assembly including solar panel will be provided by the Principal.

[Preliminaries need to be adjusted]

Provide opening in solar panel backing plate to allow passage of wires inside the post as specified.

Refer to CS 1555.

## Installation - General

Installation shall include the following civil works:

* Excavation.
* Backfilling.
* Reinstatement.
* Directional (Thrust) boring.

Provide for the safety of traffic in accordance with the PROVISION FOR TRAFFIC Section.

### Excavation

Excavate roadways to a maximum of 100 mm wide.

Saw cut excavations through paved footways.

Cut excavation vertically.

Provide bridging of excavations to maintain vehicular access at all times.

### Backfilling

Backfill all excavations.

Remove all rubbish and foreign material from the excavation prior to backfilling.

Backfill with select fill and compact to 95% relative compaction, in accordance with the EARTHWORKS Section.

### Concrete Foundation for Pole Assembly

Compact the bottom of excavation prior to pouring foundation.

Align rag bolts to ensure cabinet is square to the road.

Use Class N20 concrete for the foundation.

Reinstate by compacting surrounding soil to match existing.

Refer to CS 1553.

### Detector Pits

Provide pits for detector terminations as specified.

Refer to CS 1550 and CS 1551.

## Installation - Vehicle Detection

### Detector Loop - Witness Point

Install cable for loop in saw cut in pavement surface.

Minimum depth of cut to be 30 mm, except in zone where axle sensors are to be fitted when minimum depth of cut to be 80 mm as specified.

Width of cut to be 6 mm (+ or - 2 mm).

Provide diagonal cut across each right angled corner as specified.

Provide additional cut from one side of loop to detector pit.

Clean the cuts with compressed air.

Install one loop comprising four turns per cut as specified.

Press the cable to the bottom of the cut using a piece of softwood or similar material.

Ensure the insulation of the cable is not damaged.

Backfill around the cable to the pavement surface with bitumen emulsion such as Pabkote Bitumen Emulsion Type 3 or similar. Backfilling to be undertaken immediately after laying the cable and prior to allowing vehicular traffic. Remove all loose material from the opening immediately prior to backfilling.

Ensure minimum cover of backfill of 20 mm over top of cable, except where axle sensors are to be fitted where minimum cover of filling compound to be 70 mm over top of cable.

Remove excess compound from road surface.

House loop wires in conduit between road and detector pit.

Install and connect loop detector feeder cable between each loop and terminal block in the cabinet.

Ensure one metre of cable is available in the cabinet.

Terminate each loop detector feeder cable to a terminating block.

**Witness Point -**Provide 24 hours notice to the Superintendent prior to installation of vehicle detector loops.

Refer to CS 1550 and CS 1551 and CS 1552.

### Piezo Axle Sensors

Axle sensors and guides will be supplied by the Principal.

[Preliminaries need to be adjusted]

AXLE SENSOR GUIDE INSTALLATION

Refer to CS 1552.

Cut two slots across the carriageway 60 mm wide (+ or - 2 mm) 50 mm deep (+ 5 mm) with centres of each slot 1.0 m (+ or ‑ 5 mm) apart.

Cut feeder cable slots from the centre line of each slot to the carriageway edge 6 mm wide (+ or ‑ 2 mm) and 25 mm (+ 5 mm) deep.

Prevent ingress of adhesive during installation by covering guide ends, securing screw holes and area between the guide and feeder cable slots with plasticine or similar material.

Cover upper surface of the guides with masking tape or other material to prevent ingress of adhesive.

Insert ten 65 mm square by 10 mm thick foam polystyrene packing pieces into each slot.

Place guides temporarily into slots pressing down until top of guide is flush with road surface.

Remove the guides after polystyrene has deformed leaving the compressed polystyrene in the slots.

Fill the slot to a depth of 20 mm with "Hermetite" epoxy resin or "Epirez 214" or similar.

If the carriageway surface is not level, this may be performed in stages.

Fit the guide into the slot with securing screws downstream of the traffic flow.

Push the guide down to allow the epoxy to flow up the sides of the slot.

Remove excess epoxy from the guide or road surface before it hardens.

Fill any gaps with epoxy.

Place weights on guide to hold it in proper position during curing process.

Install countersunk 'dynabolt' fixings in base of guide after curing is complete.

Space the fixing 0.25 m from each end and 0.5 m spacing along the guide.

Drill 10 mm hole through base of guide and 100 mm into road pavement for each fixing.

Countersink and clear each hole.

Pour epoxy into holes and insert 100 x 10 mm 'dynabolt' fixings.

Retighten the dynabolts after the epoxy has hardened.

Tighten the batten fixing after epoxy has hardened.

AXLE SENSOR INSTALLATION

Do not flex the Piezo detectors about the x axis shown on drawing CS 1552.

Do not remove Piezo detector after installation.

Remove plasticine or similar from guide ends and securing screw holes.

Undo securing screws sufficient to clear the inside of the guide slot.

Clean the guide slot of all foreign material.

Wipe each sensor with liquid soap to ease the sensor into the slot.

Insert sensor tapered side down.

Tap sensor into slot with large faced rubber mallet starting from both ends working to the middle.

Tighten securing screws after sensor has been firmly inserted into slot.

House sensor "tails" in conduit between carriageway and detector pit.

Install and connect Piezo detector feeder cable between each sensor tail and terminal block in the cabinet.

Ensure one metre of cable is available in cabinet.

Fill all cable slots flush with carriageway surface using a bituminous emulsion such as Pabkote Bitumen Emulsion No. 3 or similar.

Remove excess compound from carriageway surface.

## Solar Power Supply

Provide stand off sleeves 16 mm LD electrical conduit or similar.

Mount the solar panel on the sleeves in the tray.

Provide 50 mm clearance from the back of the solar panel to the mounting plate.

Use stainless steel metal thread screws to secure solar panel to mounting plate.

Provide electrical wiring from the solar panel to the cabinet consisting of two wires, one red and one black. Wires to be protected using 16 mm flexible conduit and adaptors between solar panel junction box and solar panel tray.

Wires to be supported to minimise loading on terminals.

Run the wires internal of the post and enter the cabinet through the access hole provided.

Seal the access hole with silicon sealant.

Erect solar panel facing north.

## Testing And Inspection

### General – Witness Point

**Witness Point** - Test the installation in the presence of the Superintendent.

### Detector Loops

Ensure detector loops and loop feeder cables have a minimum insulation resistance of 200 Mohm between the conductors and earth.

### Inspection – Witness Point

**Witness point** - Provide 24 hours notice to the Superintendent for inspection of excavations for foundations and conduits.