# Street Lighting

DIPL Roads Master – November 2019

## Outline Description

Supply, install, test and commission new street lighting as specified herein and as shown on the drawings.

Modify and replace existing street lighting as specified herein and as shown on the drawings.

## CROSS REFERENCES

EARTHWORKS for excavation and trenching.

MISCELLANEOUS CONCRETE WORKS for pole footings.

## Standards and Publications

Conform to the following Standards and Publications unless specified otherwise:

AS/NZS 1158(set) Lighting for roads and public places.

AS/NZS 1158.1.1 -Vehicular traffic (Category V) lighting – Performance and design requirements

AS/NZS 1158.1.2 - Vehicular traffic (Category V) lighting – Guide to design, installation, operation and maintenance

AS 1742(set) Manual of uniform traffic control devices.

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

Power and Water Corporation Power Networks Design and Construction Guidelines.

Power and Water Corporation Power Supply Volumes, Volume 3, Street Lighting Manual.

## Materials

### Columns

Requirement: Provide columns in accordance with Power and Water Corporation Street Lighting Manual, standard drawings, to suit the individual street lighting design requirements.

Erection: Upon erection ensure columns stand vertically, in all directions, under final loading conditions

### Foundations and Ragbolt Assemblies

Construct column concrete footings and ragbolt assemblies in accordance with the Power and Water Corporation Street Lighting Manual.

### Terrain Category

Columns footings and ragbolt assemblies shall be suitable for the terrain category cyclonic conditions of the area in which they are to be installed.

### Luminaires

Provide street light luminaires of the types specified on the drawings.

Install lamps in all luminaires to the sizes and types specified on the drawings.

### Control Equipment

Control Panels: Control luminaires via time switch controllers located in nominated substations in underground areas or in distribution pillars or pole mounted control panels in overhead areas.

Control Packs: Provide control switch pack in the base of each pole

In each control pack provide a terminal strip for terminating the active, neutral and earthing conductors, and an automatic circuit breaker, and surge protection for LED lighting.

Size each termination on the terminal strip to readily accommodate three street lighting conductors without undue bunching.

Protect the street lighting cables with a 10 Amp single pole miniature DIN type automatic circuit breaker with a rated interrupting capacity of 9 kA at 240V AC symmetrical.

Residual Current Device (RCD) to be installed at the RODP at the point of supply.

Multiple Earth Neutral (MEN) to AS/NZS 3000 at the RODP.

[Edit this clause to suit the particular project or delete if not required]

## Excavation

### General

Excavate for footings and trenches as shown on the drawings.

**Column footings**

Vertically excavate all column footing holes.

Excavate footing holes 150 mm greater than the maximum dimension of the footing. Avoid larger than necessary excavations.

Where necessary carry out pumping to remove ground, storm and /or surface water.

If for any reason, the final hole is larger than required backfill with concrete to the undisturbed soil.

In areas where unrippable rock is encountered, and the use of explosives becomes necessary, the depth of excavation may be reduced, subject to acceptance by the Superintendent.

Advise the Superintendent immediately rock is encountered.

### Trenches – Witness Point

Nominal trench width: 300 mm.

Nominal trench depth: 1000 mm.

**Witness point** – Notify the Superintendent when trench excavation is complete and before backfilling has commenced.

### Existing Services

Excavate with care when crossing existing underground services. Increase the trench depth to provide a minimum of 150 mm clearance between the lowest part of the service and the first layer of marking tape.

Ramp the trench back from the obstruction.

## Footings

### Concrete

Supply and place concrete in accordance with the MISCELLANEOUS CONCRETE WORKS Section.

## Backfilling

### Material

Backfill with select fill as specified in the EARTHWORKS Section.

Bedding sand: Clean washed river sand.

Provide samples of bedding sand and select fill if requested by the Superintendent.

### Cable Installation

Carry out backfilling of the trenches in accordance with the following:

* All underground power cables to be enclosed in suitably sized heavy duty orange uPVC underground conduit
* Cover the bottom of the trench with a 50 mm tamped sand bed.
* Lay conduits and earth conductor on the sand bed.
* Top up with sand to form a layer 150 mm minimum over cables.
* Lay the first marker tape.
* Complete the backfilling of the trench with a second marker tape at a depth of 300 mm below finished ground level.

### Cable Marker Tapes

Lay two cable marker tape strips as follows:

Strip 1: Directly on top of the150 mm sand layer covering the conduit.

Strip 2: 300 mm below the finished ground level.

Lay marker tapes with a 600 mm minimum overlap at joins.

### Placing Backfill

Place backfill in 150 mm maximum layers and compact to 95% MMDD (Maximum Modified Dry Density).

## Installation Of Light Columns

Install light columns, outreaches, lanterns and fittings in accordance with the Power and Water Corporation standard drawings.

## Connection

Connect service cables between new street lighting poles in accordance with the design drawings.

Arrange with Power and Water to connect the new street lighting installation to the existing Power and Water Corporation network and pay all associated costs.

## Existing Street Lighting

### Disconnection and removal

Make safe, disconnect and remove existing wiring.

Dismantle existing street lighting installations, taking care to avoid damage to items during dismantling operations and transport.

[Ensure the salvaged items clause in the Preliminaries Section is included]

Deliver the salvaged materials to a storage shed to be nominated by the Superintendent

[Alter the delivery point if required]

Excavate and remove from the site all traces of abandoned concrete footings, hold down bolts and cabling.

### Temporary Lighting - Hold Point

Provide temporary lighting in accordance with Power and Water Corporation standards at intersections during periods of construction if existing street lighting is removed before new street lighting is installed.

Provide temporary lighting to Category V3 of AS/NZS 1158.1.1 and AS/NZS 1158.1.2.

**Hold point** – Submit plans of the proposed temporary street lighting to the Superintendent for approval prior to removal of existing street lights.

## Testing And Commissioning

TESTING: Measure and record in Megohms the insulation resistance between each conductor and earth.

Check continuity of each cable installed.

Check correct phasings of all active cables of the low voltage distribution system.

Check polarity at each street lighting column to ensure that neutral and active cables are not inadvertently interchanged. Incorrect polarity at a street lighting column would result in a live column.

COMMISSIONING: After all the above test results are found satisfactory, arrange for Power and Water Corporation to carry out the commissioning work to energise the newly installed low voltage distribution system.

## Reinstatement

Reinstate any damage to roads, footpaths, verges, drainage structures and vehicle driveways to their original condition.