Waverley Council

Lighting and Electrical Technical Specification

SEP 2025 – Rev2

WAVERLEY
COUNCIL

Contents

Key Acronyms

EV	Electric Vehicle
MFP	Multi Function Pole
MSB	Main Switch Board
PUMS	Permanently Unmetered Supply
RCD	Residual current device

1. SCOPE

This specification sets out the Lighting & Electrical design brief, technical requirement and installation requirements for carrying out designs for the Public Domain Lighting including shared pathways and main roads throughout Waverley Council's LGA. For Public Domain lighting located within front-line coastal conditions, or in any of Waverley Council's Parks, Playgrounds or Reserves, please contact Waverley Council's Representative for additional requirements.

Waverley Council provides street lighting within many streets over and above those provided by the electricity authority Ausgrid.
Waverley Council owned Public Domain Lighting systems comprise the following elements:

- Connection from local electricity supply authority
- Main switchboard(s)
- Luminaires
- Light poles
- Conduit and pit systems
- Circuiting cabling & circuit protection switchgear including earthing and bonding
- Lighting controls
- Provisions for electric vehicle (EV) charging

For the purposes of design and installation the switchgear within streetlight poles shall be treated as a distribution board and RCD protection to final circuits for elements fed from the poles be located within streetlight poles. RCD protection to park pathway lighting circuits may be placed at park switchboards.

1.1 STANDARDS AND GUIDELINES

Unless stated otherwise in the Technical Specification, the approved drawings or elsewhere in the construction documents, all work shall comply with the current and relevant Australian Standards and/or TfNSW Standards.

Any variations or ambiguity between the Technical Specification, other construction documents and Australian Standards shall be referred to Waverley Council's Representative for direction before proceeding with the work.

The following list indicates the Australian Standards and/or TfNSW Standards applicable to this section. This list is not exhaustive and may not include all standards that may apply to the work to be undertaken. It is the responsibility of the Service Provider to ensure that all relevant standards are met.

Australian Standards:

- *AS 1049.1 Telecommunications cables – Insulation, sheath and jacket materials*
- *AS 1052 Electromagnetic interference - Measuring apparatus and measurement methods. Part 2 – Equipment for the frequency range of .015 MHz to 1000 MHz.*
- *AS/NS 1158 Lighting for roads and public spaces, Parts 1 to 6*

- *AS 1822 Earth and bonding clamps*
- *AS/NS 3000 Electrical Installations "Wiring Rules"*
- *AS/NZS 3080 Information Technology – Generic cabling for customer premises*
- *AS/NZS 61439 Low-voltage switchgear and controlgear assemblies, Parts 0 to 5*

Service Provider Requirements:

- *TfNSW Specification R151 Street Lighting*
- *Traffic Signal Design Section 9 Posts*
- *Service and Installation Rules of New South Wales*
- *Ausgrid local service and installation rules and Network Standards*

Waverley Council Strategies + Planning Documents:

- Creative Lighting Strategy 2018-2028
- Creative Lighting Strategy – Concept Design Guidelines
- Waverley's Street Design Manual

2. DESIGN SUBMISSIONS

A design package shall be prepared and submitted to Waverley Council for approval. The package shall have include:

- *Lighting compliance calculation drawings to applicable V & P (PP, PR, and PX) categories*
- *A legend of symbols*
- *Drawing list*
- *Key plan*
- *Layout drawings*
- *Pole elevations & details*
- *Single line diagrams*
- *Switchboard elevations*
- *Pole wiring details*
- *Pit to pole conduit details*

3. MATERIAL REQUIREMENTS

3.1 LIGHT POLES, MASTS AND ATTACHMENTS

Waverley Council is supporting the use of Multi-Function poles (MFPs) as the preferred solution to customize the street lighting system within the council. These tubular structures reduce the number of street assets as they can host street lights, traffic lights, power outlets, telecommunications, CCTV surveillance cameras, EV charging devices/systems, signage, bicycle rings from a cost, flexibility, sustainability and longevity point of view.

Where new public roadworks and private developments are being constructed, the applicant shall underground the electrical and communications infrastructure and install Waverley Council owned MFPs. Ausgrid streetlighting for the subject area is to be removed.

The Multi-Function Poles can come with several attachment options including:

- *Street light (with outreach arms if required)*
- *Traffic lights (with outreach arms if required)*
- *Traffic signals*
- *Signage*
- *Labelling for asset identification*
- *Banners*
- *Wi-Fi wireless access points*
- *Hanging baskets*

- *CCTV cameras*
- *Power socket outlets*
- *1x10Amp 230V IP56 power outlet at top of poles for X-mas decoration*
- *Provision of bike hoop*
- *Built in EV chargers*
- *Remote NEMA cell base for decorative feature lighting in streetscapes (underseat lighting/in-ground uplights etc.)*

A schedule for MFPs listing the type of pole and accessories for each pole is to be provided as part of the design package.

Where MFPs are not required, Ausgrid standard light poles are acceptable. Details to be submitted to Waverley Council for review and approval prior to commencement of works.

3.1.1 STANDARD DIMENSION

MFPs shall be of the following general dimensions unless site conditions require otherwise:

- Streetlight luminaire mounting height – 9m
- Outreach arm – 3m

3.1.2 STREET LAYOUT

MFP's are to be installed with the face of each pole 400-600mm behind the face of the kerb unless directed by Waverley Council. Note that MFP bolts are to be installed below ground level with 100mm from the finished ground surface to the top of the pole baseplate.

MFP's for street light arrangements are to be spaced evenly along the dimensions of a block; nominally at:

- 27m spacings (staggered spacing for poles on opposites sides of the street) as defined by AS1158.2 figure 5.1
- 10m from face of kerb at intersections/corners

Spacing of streetlight poles is to be determined from the applicable V category (carriageway, no less than V3) & P category (pedestrian paths, no less than PP3, pedestrian crossings PX1/PX2). Lighting categories are to be confirmed with Waverley Council's Representative prior to any lighting calculations.

MFP layouts at signalised intersections is to follow TfNSW requirements and the TCS design requirements, these requirements will dictate some or all of the pole locations at intersections. TCS provisions on the Council owned MFP network shall meet all TfNSW requirements and specifications.

MFP's for banners and other uses are to be located according to specific requirements.

Pits are required adjacent to every MFP with a minimum of 2 x 63 mm LV and 2 x 50 mm Comms conduits turned up into the adjacent pole. At intersections with MFPs in close proximity two poles may have conduits reticulated to the same pit.

MFP circuits shall be on a three-phase cable and be connected to alternating phases for poles along the cable route. Connections to phases within poles will alternate along a circuit, i.e., Pole 1 will have the streetlight on A phase, Pole 2 will have the street light on B phase, and Pole 3 on C phase and so

on. The size of protection to MFP circuits shall be typically 40A, in cases where fault loop impedance drives circuiting to sizes above 25mm² 32A circuit protection can utilised.

All redundant light poles shall be removed by the Service Provider and deposited to Ausgrid's or Waverley Council's storage as required in a manner that is ethical, efficient, and where practicable maximises a value outcome for Waverley Council.

The Service Provider is to prioritise re-use and recycling ahead of disposal to landfill, which is considered an undesirable outcome. The Service Provider must remove all Waverley Council visual identifiers such as logos and labels from any unwanted items before disposing of items.

Design & installation certification from a structural engineer that the footings are in accordance with Waverley Council Standards and have been designed to meet Australian Standards for all loading types and site conditions.

3.1.3 MANUFACTURE

Multifunction poles shall be manufactured by an approved firm. The following manufacturers are currently approved by Waverley Council:

- Goldspar

3.2 CONDUITS

Conduits and conduit fittings for all cabling must be in accordance with relevant standards and manufacturer's recommendations.

Electrical conduits and conduit fittings for all cabling must be category A orange heavy duty rigid uPVC manufactured in accordance with *AS/NZS 2053 Conduits and fittings for electrical installations* and have solvent welded joints.

Communications conduits and conduit fittings for must be in compliance with AS/CA S009.

All the conduits must be of the sizes shown on the drawings.

Conduits shall:

- *Be installed using the loop in and loop out system*
- *Be free from conduit fittings other than bends or couplings*
- *Be of a minimum diameter as noted on the drawings; oval conduits are unacceptable*
- *Be provided with a 3mm diameter minimum nylon cord draw rope for future wiring or wiring for other trades for all conduits with end left secured within pits/poles*
- *Be non-metallic*

Flexible conduits shall:

- *Be heavy duty uPVC (note: approved alternative materials are encouraged with lower energy impact, greater recycled content and easier recycling at end of life)*
- *Be fitted with brass or nylon terminators*
- *Be connected to a concealed fixed conduit via a flush mounted junction box with a terminator secured by locknuts to the cover plate*

- *Not be used in concrete slabs unless otherwise approved by Waverley Council's Representative*

Heavy Duty (HD) conduits shall be used in applications considered impact probable or underground. HD conduits shall be identified as light orange in colour and be:

- *Fitted with corrosion resistant fittings*
- *Fitted with bell-mouths at each respective end within pits*
- *Installed over approved routes coordinated with existing in-ground services*
- *Maintain for the duration of the conduit, appropriate clearance to all other services and easements*
- *Ensure installed in accordance with standards in rulings on depth of cover and identification*

Conduit for underground wiring shall:

- *Comprise heavy duty rigid uPVC conduit*
- *Only have joints at purpose made couplings to bends or the next conduit length*
- *Joints are to have solvent welded joints*
- *Be installed over approved routes*

Conduit diameters shall be as follows unless otherwise detailed in the drawings:

- *63 mm in diameter (1 utilised 2 spares = 3 total conduits) for main runs to pits serving MFPs*
- *63 mm in diameter for Consumers/Service mains cable*
- *63 mm in diameter (1 utilised 1 spares = 2 total conduits) for MFPs localised pit to pole*
- *50 mm in diameter (3 spares) for Communications main runs to pits serving MFPs*
- *50mm in diameter (2 spares) for Communications for MFPs localised pit to pole*
- *80 mm in diameter (1 utilised 3 spares = 4 total conduits) for electrical conduits for Road crossings & 50 mm in diameter (3 spare) for communications conduits for Road crossings*

Electrical conduits shall be laid at a depth of 600mm in footways with the communications conduits at a depth of 450mm and laid directly above. Electrical conduits under the road shall be laid to a minimum depth of 750mm with the communication conduits at a depth of 450mm and laid directly above.

Conduits should run parallel to kerbs and pathways and should be extended to the outer edge of adjacent properties or to the MFP and terminated at pits at each end for future expansion of the Council lighting network.

A separate trench with conduits shall be installed to accommodate the power supply to new street light columns. These should be placed under the footpath and not within the verge.

For any further questions or concerns, please contact the Assets Team at Assets@waverley.nsw.gov.au.

As-built details (drawings) shall be provided and submitted to Waverley Council's Executive Manager – Infrastructure Services (or delegate) showing the precise location and depth of burial of all conduits installed.

3.3 CABLE PITS

Standard requirements (in line with Waverley Council Public Domain Technical Manual):

- *Cable draw-in pits: Provide cable draw-in Pits ≤ 1200 x 1200 mm. Sizes given are internal dimensions*
- *Provide pit covers to suit external loads. Fit flush with the top of the pit. Covers to have infill to match surrounding paving in line with Waverley Council Public Domain Technical Manual and AS 3996*
- *Pavers are to weigh < 40 kg for any section of the cover*
- *Covers are supplied with lifting keyholes and plugs*
- *Covers allow for an infill depth of 75 mm*
- *All covers and frames manufactured from grade T220 iron (minimum) to conform to AS1830*
- *Units are coated in bituminous paint complying with BS3416 type II*
- *Class D load ratings are in accordance with AS3996*
- *Provide drainage from the bottom of cable pits, either to absorption trenches filled with rubble or to the stormwater drainage system*
- *Cable pits are to be **Non Gastight** type*

Waverley Council's preferred pit is Mascot Engineering Group's or ACO 600 mm x 600 mm x 800 mm pits with the paver infill covers in paved areas and standard covers in concrete areas.

Smaller pits are allowable where adequate space isn't available, to be approved on a case by case basis.

Cable pits shall be installed in the following situations:

- *Where indicated on electrical services drawings*
- *Wherever there is a change in the direction of cables to allow for pulling cables in the future*
- *On long straight runs exceeding 30 metres*
- *In locations as approved to offer greater management of reticulation of services*

3.4 ELECTRICAL CABLING

All cables shall:

- *Be installed through conduits routes which have been fully coordinated with other services*
- *Follow the basic routes as indicated on the street lighting plan drawings or as described herein*
- *Be identified at each end by approved labels, fixed to cable sheaths or conduit, and identifying the cable size, type, purpose and origin of supply (i.e. CB2 MSB-Bronte Road)*
- *Be connected to Waverley Council circuits originating from the main switchboard, except for cable serving items local to MFPs (streetlight, Xmas outlet etc)*

- *For MFP supply cables, be a minimum of 16mm² Cu XLPE/PVC, cables of 4C+E arrangement are preferred but where fault loop impedance requires larger earth sizes XLPE SDI cables shall be used. Refer to the street lighting single line diagram drawing for required cable sizes. The cable manufacturer shall be Olex or the equivalent.*
- *Separate electrical circuits shall be provided for power outlets in Multi-function poles. Cables for power outlets shall be minimum of 2C+E 2.5mm² Cu PVC/PVC*
- *Separate electrical circuits shall be provided for lights on Multi-function poles. Cables for lights shall be minimum of 2C+E 1mm² Cu circular flexible leads with length to run from luminaire to pole circuit breakers + 1m spare. This cable shall be provided pre-terminated to the luminaire to avoid access into the luminaire for the cable termination, removing risk of water ingress from incorrect sealing at cable entry from works on site*

3.5 IN POLE ELECTRICAL DISTRIBUTION

Within the pole base the electrical contractors shall supply and install:

- *Cable terminations for looping cables*
- *Cable terminations for earthing and bonding cables*
- *An enclosure to house RCBO circuit breakers, surge divertor and protection fuses, time switch & relay for decorative lights pole mount socket outlet*
- *6A type C + 30mA RCBO protecting the light*
- *10A type C + 30mA RCBO protecting the outlet for decorative lights*
- *10A type C + 30mA RCBO protecting the supply to bus stops where applicable*
- *A DIN system for the above. Product Weidmuller terminations*
- *Labelling with source of supply, circuit number, cable size & type*

3.6 COMMS BOARDS AND TELEMETRY SYSTEMS

Space is to be left above the in pole electrical distribution for future communications and telecommunications hardware. Consult Waverley Council for requirements prior design and again prior to pole shop drawing production. Space for communications cabling run in flexible from the pole base shall be allowed within MFPs.

3.7 SOCKET OUTLETS

10 A GPOs installed shall comply with AS3112 for general applications and AS3123 for industrial applications. Outlets for events and other purposes may be required within poles and switchboard outlet sections. Confirm requirements with Waverley Council at time of design.

3.7.1 CHRISTMAS DECORATION GPO

These outlets shall be mounted on top section of the multifunction poles and shall be IP56 rated as a minimum, be weatherproof type, impact resistant & UV stabilised.

3.8 MISCELLANEOUS WORKS AND EQUIPMENT

A set of keys (drill attachments) to be provided to Waverley Council for the removal of cladding to access the termination boards.

Manufacturers warranties and certificates are to be supplied to Waverley Council with all required accredited engineering signoffs.

All poles, cubicles etc are to be labelled with the location of supply in accordance with the Service and Installation Rules of NSW. The label shall be engraved aluminium or stainless steel and shall be permanently fixed to the pole immediately above the door or cladding covering access to electrical equipment. Council will provide asset number and contact details to be included on the label.

3.9 INCOMING SUPPLY SERVICE MAIN

Service mains are to be taken from an Ausgrid pillar or timber pole to either the main switchboard or a private pillar. Mains conduits to allow for future upgrade to 200A at the main switchboard.

3.10 MAIN SWITCHBOARDS (MSB)

Main Switchboards (MSBs) are to:

- *Main switchboard to be compliant with Ausgrid requirements and meet the general design specifications*
- *Be constructed of Stainless Steel, the stainless finish shall be 316 SS with No#4 Electropolish*
- *Contain three phase busbars*
- *Be mounted on galvanized plinth which sits securely fixed to a concrete foundation*
- *Have separate doors/sections for metering equipment & for distribution switchgear*
- *Have separate doors/sections for event outlets and comms equipment, confirm with Waverley Council at time of design*
- *Have locking facilities to suit ABLOY padlocks (to match Council Master Key)*
- *Have three point locking bars for doors greater than 600mm high*
- *Have initial ASP2 connection to be standard 80A per phase with 250A molded case circuit breaker as Service Protection Device, initially set at 100A*
- *Allow for upgrade to 200A per phase with busbars set up for 200A CT metering*
- *Have engraved machine screw fixed labels*
- *Have Schneider switchgear*
- *Have a power analyser (not energy meter) capable of displaying instantaneous phase current and maximum demand phase current on all phases, Schneider PM3250*

Acceptable switchboard manufacturers are:

- *Blacktown City Switchboards*
- *Chadwick*
- *KE Brown*
- *FUJI SMB Harwal*
- *Relec*

This list of manufacturers is to be placed on design drawings single line diagrams.

3.10.1 SWITCHBOARD DRAWINGS

Shop drawings of switchboard/assemblies shall be submitted that incorporate metered/unmetered conductors and/or Ausgrid equipment for their acceptance prior to approval submission.

Shop drawings and as-built drawings shall be in the approved pdf and/or Autocad format and show the following information:

- *Manufacturer's name and type of any standard equipment*
- *The general arrangement of equipment*
- *Full details of cabinet construction and dimensions*
- *The method of supporting busbars and equipment*
- *A description of all materials to be used*
- *Clearances between live parts, and live parts and earth*
- *Busbar dimensions and ratings*
- *Internal wiring sizes and ratings*
- *The size and wording of labels*
- *Wiring diagrams and schematics of instrument protection and control circuits*
- *Front elevation*
- *Vertical section through each compartment*
- *Sheet metal details*
- *Finishing process details*
- *Weights of assemblies heavier than 500 kilograms*
- *Calculations where PTTA assemblies are being adopted*
- *Calculations verifying the maximum internal temperature ratings will not be exceeded*
- *Details of:*
    - Compliance with AS 63439
    - Maximum fault withstand ability
    - IP rating to *AS 1939 Degrees of protection provided by enclosures for electrical equipment*

3.11 EARTHING

The Service Provider shall supply and install the earthing system for the installation including all cabling, clamps, test links and all associated accessories and equipment in accordance with AS 3000 Wiring Rules. All communications and technical system earths shall be adequately separated from power system cables.

3.11.1 CABLING ACCESSORIES AND APPLIANCES

Lighting fittings and socket outlets shall be earthed by means of the earth conductor, which forms part of the respective circuit cabling. A separate earthing conductor shall be used for each circuit. Earthing conductors shall be run back to the earth bar with the switchboard from where the supply originated.

All exposed metal fittings, such as cable trays and ducts, associated with the Electrical Services shall be earthed.

3.11.2 EQUIPOTENTIAL BONDING

All street lighting poles shall be equipotentially bonded in accordance with AS 1768 Lightning protection. All equipotential bonding shall be connected to the earth bar within each street lighting pole. From this earth bar, reinforcement bars shall be connected within the footing to give a combined maximum of 10 ohms or less.

3.11.1 GRADING RING

Provide a 16mm² Cu grading ring of 1m diameter around each MFP, 300mm below ground surface, run as bare cable below ground, bonded to the MFP earth bar.

3.12 BALANCE OF LOAD

Unless otherwise indicated, the electrical installation shall be balanced as closely as possible between the individual phases of the supply cable.

3.13 LUMINAIRES

Luminaire selection varies depending on location and context:

- Permanent Unmetered Supply (PUMS): Luminaire selected from the standard Ausgrid list
- Waverley Council MFP network: Izylum 3 EVO(streetlight)
- Pedestrian crossings: We-ef RFL540-SE, 111- N series

Minimum performance requirements are as follows.

- *Ingress protection Ratings IP65 Minimum*
- *Lumens per watt - > 100lm/W*
- *Led category class 1*
- *Minimum performance 70% at 50,000Hr*
- *LED colour Temperature 3000K (Neutral white) for commercial/ 4000 K for pedestrian streetlight*
- *LED colour Temperature 2700-3000K for residential/park light*
- *Optic: 5300 or 5304 or 5307 (based on location)*
- *Luminaire to have a Zhaga adaptor and 7 PIN NEMA Base/receptacle with shorting cap both downward facing*
- *Luminaire Colour: Metallic Grey (RAL 9006)*
- *Backlight Prevention: In narrow streets < 9 m*
- *Meet exterior lighting standards: To AS/NZS 1158.0, AS/NZS 1158.1.1, AS/NZS 1158.1.2, AS/NZS 1158.2, AS/NZS 1158.3.1 and AS/NZS 1158.4*
- *Supplied with circular flexible leads pre-termin*

Design service providers must allow for an additional 20% output in selecting the luminaire and

nominate in the design package the necessary dimming to counter this additional provision, the applicable lighting design maintenance factor is then 0.64 (0.8 x 0.8). The intent is for future provision in the case of changed environmental conditions.

3.13.1 Lighting Control System and Registration

The lighting control system shall be the OWLET IV NEMA AUS 80SW smart NEMA module and OWLET IV ZHAGA luminaire controllers, this will control streetlights via the luminaire's 7 pin NEMA and ZHAGA sockets. This smart module will be added to Council's existing remote lighting control system. (EXEDRA).

The supply of the lighting control system shall include equipment as follows (as well as all other equipment necessary to facilitate the required control):

- *OWLET IV NEMA AUS 80SW smart NEMA module or OWLET IV ZHAGA luminaire controllers outdoor lighting controller to be provided for each pole mounted luminaire.*
- *Decorative lighting (other than pole mounted Christmas lights) will have the smart NEMA module mounted in a custom bracket fixed to the pole outreach arm, the smart NEMA module will switch power to the decorative lighting and provide dimming signals to the decorative lighting. (TBA by Council Asset Section)*

The objective of providing lighting control is to:

- *Turn on lights at dusk and off at dawn;*
- *Time scheduling and programming*
- *Provide lighting control with 0-10V dimming facility using NEMA7 cells to adjust lighting levels remotely*
- *Avoid the use of time switches or PE cells where possible*

Registration of the lighting control system shall be done at the time of installation by the developer or contractor on the EXEDRA mobile app using the below methods:

If asset data is provided by the client:

- *Pole IDs and GPS locations provided by the client for the street lights at the time of installation to be updated in the EXEDRA app. The barcodes on new controllers are to be scanned and the information saved in the app.*

If asset data is not provided by the client:

- *A new asset is to be created using the "create a new object" feature in the EXEDRA app. A pin is to be created at the correct installed location and serves as the pole ID. The controller barcode is to be scanned with all information saved directly in the app.*

For further clarification on how to register an asset in the EXEDRA mobile app, please refer to Annexure A - Guide for using the EXEDRA app in the field, or contact Waverley Council's Assets team at assets@waverley.nsw.gov.au.

4. ERECTION AND INSTALLATION

The Service Provider must provide and carry out the following activities required for the work detailed in this Technical Specification:

- Supply and install Waverley Council's freestanding main switchboard as indicated on the street lighting plan drawings including the detailed design of the board and the sizing of all sub-circuits from the board
- Install electrical connections from the main switchboard to the pillar/pole nominated by Ausgrid
- Supply all necessary materials and installation of conduit lines in connection with electrical supplies to MFPs
- Liaise and arrange with Ausgrid and Waverley Council's Representative regarding the removal of existing light poles. Council does not install any new Ausgrid streetlights. Therefore, private (Council) light is required. Council only install MFPs.
- Liaise and work in association or in conjunction with Ausgrid for the installation of underground ducts and pits
- Arrange attendance of Ausgrid inspectors for installation, inspection and acceptance of the work
- Liase with Council's asset officers to coordinate the location of any associated assets on proposed MFPs.
- Supply all necessary materials and installation of new pits complete with conduits and pit lids. Install pit requirements to the relevant authority's installation requirements and those detailed in the stone paving section
- Supply all necessary materials and installation of concrete foundations for street lighting poles
- Complete foundations with conduits, reinforcing and galvanised steel rag bolt assembly to AS 1798 Lighting poles and bracket arms
- Provide cabling from Waverley Council's main switchboards to all MFPs
- Provide cabling to lights, bus stops and high-level GPO outlet supply in Multi-function poles
- Provide weatherproof outlets on the poles at high level for a future connection for decorative lights
- Carry out tests on the completed conduit line as described in this Technical Specification to demonstrate the acceptability of the conduit line
- Arrange attendance of Ausgrid for installation of services connecting to Ausgrid assets
- Pay for application and costs of establishing Ausgrid electrical supplies to the main switch board(s)
- Maintain temporary lighting and electrical supplies for the duration of the project
- Liaise and arrange with Telstra and other telecommunication providers regarding the route of conduits for telecommunications cabling
- Implement any other modification required to meet standards and to obtain Waverley Council's Representative approval
- Ensure that waste packaging materials for which a commercial recycling option is available are recycled as opposed of being disposed of as general waste to landfill. At a minimum, this includes cardboard/ paper, metals and soft plastic wrapping.
- Comply with the following:
  - The current statutory requirements in place
  - TfNSW and Ausgrid design standards for electrical design for traffic signals installations

- No separate cabling dedicated for the supply of low-level GPOs is required to be installed in the reticulation conduits from the main switchboard. GPOs are to be supplied specifically from the phase circuit in the MFP

Inspection will be made of the following:

Hold Points

- Marked conduit line route and the location of each pit and street light
- MSB shop drawings
- MFP shop drawings
- Luminaire & NEMA device technical data sheets
- Cable sizing & maximum demand calculations
- MSB delivered
- MSB fitted to plinth
- Lighting operational prior to decommissioning of Ausgrid lighting.

Witness Points

- Trench excavation with conduit and pits in place prior to backfill
- Survey check of pole footing position
- Conduit run into MFP footing prior to concrete pour
- MFP prior to mounting on footing
- Draw wires and cables pulled in
- Electrical inspection and test

4.1 MOUNTING OF EQUIPMENT

All equipment shall be mounted:

- Within the assembly cabinet with only toggles, indicators, handles and dials protruding
- On fixing rails or insulating panels
- To not rely on busbars for support
- To enable easy access for adjustment, replacement or maintenance
- So that arc discharges during faults are not directed towards live metal or insulating medium.

Equipment that is intended for future installation shall have mountings, studs, busbar connections and escutcheon openings provided with painted blanking covers. Equipment shall be installed so that a unit can be simply replaced without disturbing adjacent units.

4.2 WIRING METHODS

4.2.1 WIRING METHODS

The Service Provider shall install all wiring so that it can be readily renewed, repaired or relocated without affecting finishes and construction.

4.2.2 INSTALLATION OF WIRING

All cables shall:

- Be installed between equipment without any joints

- Be installed on the loop in, loop out principle without the use of connectors for sub-circuit wiring
- Be installed so that they can readily be withdrawn for the purposes of relocation and/or rewiring
- Be installed such that they are not bent through a radius less than the minimum bending radius recommended by the manufacturer
- For luminaires be of suitable length to avoid joints within poles, cables from luminaires to be 2C+E 1mm² Cu circular flexible leads with length to run from luminaire to pole circuit breakers + 1m spare. This cable shall be provided pre-terminated to the luminaire

4.2.3 THERMO PLASTIC INSULATED CABLES

Thermo Plastic Insulated (TPI) cables shall:

- Be enclosed within conduits or cable troughing
- Not be drawn into conduit systems until the conduit run is complete and swabbed out
- Be jointed only at terminals specifically designed for the purpose in switchboards, in poles or outlets.

4.2.4 DERATING

The sizes of conductors as specified are the minimum size which shall be provided.

The size, grouping, spacing, enclosure and location of cables shall be installed so that the current rating of the conductors as permitted by *AS 3008 Electrical installations – Selection of cables* with the appropriate derating factors applied, is not less than the specified current rating of the circuit breaker or fuse which protects the conductor.

Where conductors are installed, grouped, spaced or enclosed in such a manner that their derated current rating is less than the specified current rating of the protective device, the size of the conductor shall be increased to provide a current rating of the conductor which is not less than the specified current rating of the respective protective circuit breaker or fuse.

4.3 CONDUIT LINE TRENCH WIDTH AND DEPTH

The width and depth of the street lighting conduit line shall comply with the minimum dimensions as Ausgrid details. It should be noted that at the termination of conduit lines under road gutters, the minimum cover over the conduit line is to be 750mm.

Trenches are to be excavated so that the conduit lines can be laid with 300mm clearance all round from other obstructions, unless otherwise approved by Waverley Council's Representative and the relevant Utility Authority.

Twenty metres (20m) of fully excavated trench shall be maintained ahead of all incomplete conduit lines to allow for deviation if required. The Service Provider shall allow for any costs incurred by having to carry out portions of the work at times outside normal hours or to avoid inconvenience to the public or occupiers of premises near the conduit line route. The Service Provider shall liaise with Waverley Council's Representative prior to proceeding.

All other conduit lines should be installed at a depth indicated by AS 3000 Wiring Rules Table 3.7 or by Ausgrid's local service and installation rules, whichever is the greater.

Polythene film warning strips to indicate the presence of the conduit lines shall be laid in the trench at a depth shown on Ausgrid standard details and AS/NZS 3000 Wiring Rules.

The Service Provider shall accurately record the routes of underground cables before backfilling and supply the drawing to the Waverley Council's Representative.

4.4 CONDUITS ENTERING MFPs

The Service Provider is to provide custom-made reducers to suit, and is to allow adequate lead time for their procurement. Heavy duty conduit shall be in accordance with the method of installation as required by AS 3000 Wiring Rules. The conduits shall be run in a straight line from pit to pole with one 90-degree bend at the pole to accommodate the rag bolt assembly. Where this installation is not possible, the Service Provider shall obtain acceptance from Waverley Council's Representative prior to backfilling.

4.5 STREET LIGHTING SWITCHBOARD CONNECTION

Street lighting connection switchboard requirements are detailed within the New South Wales services and installation rules.

The Service Provider shall provide details of all busbars, fixings, studs and clearances required to be incorporated within equipment for the satisfactory connection of cables where equipment and/or switchboards are provided by others.

4.6 CABLE SELECTION PRIOR TO ORDER

Written details shall be submitted of verified loadings and calculated maximum demand, fault level and voltage drop for the proposed route length and wiring method of respective sub-main cables.

No variation will be allowed for replacement of cables due to failure in verifying the proposed loads.

4.7 REDUNDANT CABLE & EQUIPMENT

All redundant cable & equipment shall be removed by the Service Provider.

4.8 STATUTORY AUTHORITIES – AUSGRID

The Service Provider shall make application and pay all costs for the procurement of the following electrical services:

- Main switchboards
- Special small services connections
- Temporary power connections.

The conduit line route shall be coordinated with Ausgrid and conduits, cable and modify pits installed as required.

Plans and specifications for street light conduit lines works shall be prepared to meet the standards and requirements of Ausgrid and be approved by Ausgrid prior to commencement of work.

The Service Provider shall ensure all Works comply with Ausgrid requirements detailed below (sections 4.9 and 4.10).

4.9 AUSGRID REQUIREMENTS

The Service Provider shall abide by the Electrical Safety Rules and Regulations for Working on the Transmission and Distribution Systems, where work is to be carried out near Ausgrid equipment or

conductors which are in service. If required by 'Before You Dig' Ausgrid response arrange for an Ausgrid spotter to be on site during the works.

Where required, the Service Provider shall use an approved and accredited/authorised Service Provider to carry out works normally performed by the electricity distributor.

4.10 DAMAGE TO EXISTING SERVICES

The Service Provider shall ensure that the Works proceed with care in order to avoid damage to any existing service. The Service Provider shall be responsible for any damage caused to existing services, including pipes, cables or other works in or under the site.

Should any damage be caused to existing Statutory Authority services, repairs will be carried out by that Statutory Authority and the costs involved shall be charged to the Service Provider.

4.11 TEMPORARY WORKS

The Service Provider shall maintain street lighting and pedestrian lighting as required by AS 1158 Lighting for roads and public spaces throughout the Works until such time as the new systems have reached Practical Completion. Note that Ausgrid existing lighting and power shall only be removed once the new Waverley Council lighting network is operating and power to other services is commissioned through the new undergrounding network to be provided.

4.12 BUS SHELTER LIGHTING

For each bus shelter provide the following:

1. *Electrical 1 x 50mm conduit to pit on the main run*
2. *Communications 2 x 32 mm conduits to pit on the main run*
3. *Power from nearest MFP with separate RCBO*

For any further questions or concerns, please contact the Assets Team at Assets@waverley.nsw.gov.au.

5. COMPLETION

5.1 INSPECTION, TESTING AND COMMISIONING

5.1.1 INSTALLATION OF WIRING

The contractor shall carryout all electrical testing in accordance with AS/NZS 3000 Wiring Rules.

Records of tests shall be kept and included in As-Built documentation, as a minimum tabulated test records are to be provided for each cable of the installation:

- *Voltages at source of supply phase to phase & phase to neutral*
- *Prospective short circuit current at source of supply*
- *Continuity of earthing conductors*
- *Cable insulation resistance phase to neutral, phase to earth, neutral to earth for single phase circuits*
- *Cable insulation resistance red phase to white phase, red phase to blue phase, blue phase to white phase, phases to neutral, phase to earth, neutral to earth for three phase circuits*
- *Cable load of circuits & incoming mains cable (lights on)*
- *Fault loop impedance*
- *Prospective fault current at end of circuit*

Note, items with electronics shall be removed from service during insulation resistance testing (i.e. lights/controls).

5.2 WORKING AND AS-BUILT DRAWINGS

The Service Provider shall provide working drawings as required.

Information required includes but is not limited to:

- *Rating of cables*
- *General arrangement of conduit lines and pits both in plan and longitudinal section.*
- *Cross-sections showing the locations of ducts.*
- *Plan location of the conduit lines accurately specified by offset measurements from building lines to create conduit line at 20m intervals, at each end of each duct run and at each change of direction of the conduit lines*
- *Schematic connection details and circuit drawings for all Ausgrid and Waverley Council supplies*
- *New lighting pole connection details for TfNSW, Telstra and Ausgrid incoming conduits and cables*
- *Switchboard metering and enclosure including control arrangements, schematics and metering arrangements*
- *Circuit schedules & laminated layout drawings at switchboards*

6. MAINTENANCE

The installation is to be maintained by the Service Provider for a duration of 12 months from practical completion (PC).

Item	At PC	Prior to 12 months from PC
All luminaires switch on at dusk	Satisfactory/Unsatisfactory	Satisfactory/Unsatisfactory
All luminaires switch off at dawn	Satisfactory/Unsatisfactory	Satisfactory/Unsatisfactory
Poles straight & vertical	Satisfactory/Unsatisfactory	Satisfactory/Unsatisfactory
Luminaires – cobwebs/dust	Satisfactory/Unsatisfactory	Satisfactory/Unsatisfactory (clean lights)
Switchboard equipment	Satisfactory/Unsatisfactory	Satisfactory/Unsatisfactory
Street cabling circuit insulation resistance (repeat for each circuit)	Results from initial installation	R - W phase _____M Ω W - B phase _____M Ω R - B phase _____M Ω R phase - N _____M Ω W phase - N _____M Ω B phase - N _____M Ω R phase - E _____M Ω W phase - E _____M Ω B phase - E _____M Ω N - E _____M Ω
Earth continuity (repeat for multiple circuits)	Results from initial installation	_____ Ω
RCD operation (repeat for each RCBO)	Results from initial installation	Satisfactory/Unsatisfactory
Voltage at MSB	Results from initial installation	R - W phase _____V W - B phase _____V R - B phase _____V R phase - N _____V W phase - N _____V B phase - N _____V
Circuit load (lights on, repeat for each circuit)	Results from initial installation	R phase _____A W phase _____A B phase _____A N _____A

Rectify the items above should these fall outside of required values from Standards and provide a report on the works undertaken to bring the installation back to a satisfactory standard prior to the end of the defects liability period.

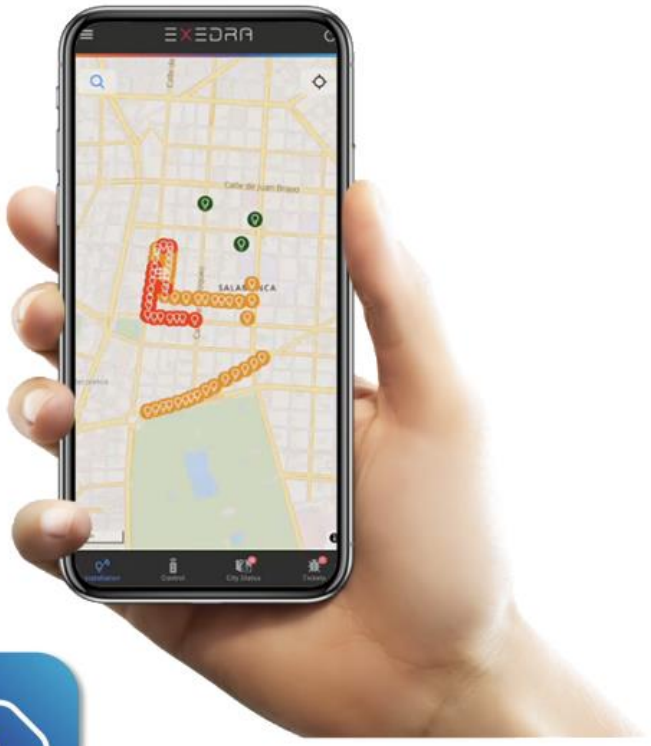
7. ANNEXURES

7.1 ANNEXURE A: GUIDE FOR USING THE EXEDRA APP IN THE FIELD

SCS by Sylvania Schréder

EXEDRA Mobile App

Schréder HYPERION



EXEDRA

Download on the App Store

Get it on Google play

1

1. Introduction:

This document provides a comprehensive overview of the Schréder EXEDRA Mobile application, detailing its key features, functionalities, and step-by-step instructions for effective use in the field.

It should be stored in an accessible location and made available to all personnel and organizations authorized to operate the EXEDRA Mobile App.

---

2. Schréder EXEDRA Mobile Application

The Schréder EXEDRA Mobile App enables users to connect to a Schréder EXEDRA server to perform asset monitoring, installation, and management while on-site.

Compatible with both Android and iOS devices (phones and tablets), the application can be installed either via their respective app stores or, for Android devices, through a direct installation file.

Key functionalities of the EXEDRA Mobile App include:

- **Installation:**
  Perform common installation actions while in the field, such as searching for an asset, creating a new one, associating controllers via QR code, or updating asset information.
- **Realtime Control:**
  Operate, control, and test a selected light point in real time to validate performance and behavior instantly on-site.
- **City Status:**
  Access detailed information about individual light points, including their operational status and any assigned alarms, all at a glance.
- **Tickets:**
  Create and assign new maintenance tasks directly from the field, or check which tickets are currently active for efficient issue resolution.

---

3. Installation Module

The **Installation** panel within the app allows users to carry out essential asset management tasks directly in the field. Key functions include:

- Searching for an asset.
- Creating a new asset.
- Moving an existing asset.
- Scanning a controller QR code to associate it with an asset.

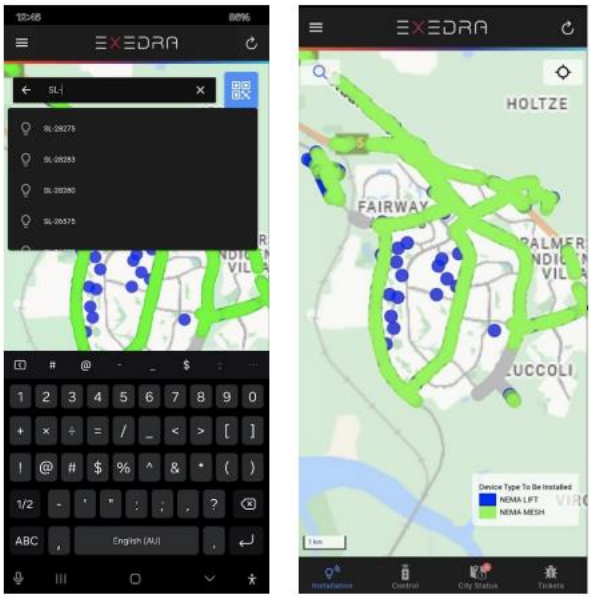
The map view automatically centers on the user's current position, enabling the selection of nearby assets or the ability to search by asset name or QR code via the search button.

Upon selecting an object, a detailed panel appears, displaying asset information and available installation actions. Additionally, users can capture or upload photos from the phone's camera or gallery to associate with the asset.

⚠️ Important:
At the start of the installation, SCS-Schréder requested the client to provide asset data for the light poles. This was necessary to complete the network design and determine which poles should be equipped with a **NEMA LIFT** or **NEMA MESH** node.

Once this information was received, SCS-Schréder finalized the network design and created a dedicated layer within the **EXEDRA Mobile App** to assist field crews in easily identifying which light pole is associated with each type of smart node.

📍 *An example of this can be seen below.*



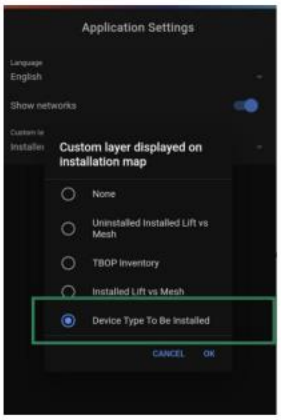
Pre-Installation Setup and EXEDRA App Configuration:

Prior to installation, SCS-Schréder conducts training sessions for the field crew on using the EXEDRA Mobile App for asset capture and management. It is strongly recommended that all crew members activate their EXEDRA accounts and verify the application's configuration during the training session to avoid delays on the day of installation.

To enable the NEMA LIFT and NEMA MESH network layers within the EXEDRA App, follow these steps:

1. Open the EXEDRA Mobile App.
2. Tap the three horizontal lines (menu icon) in the top-left corner.
3. Select the Application tab.
4. Enable the Show Networks option.
5. Under the Layers section, activate the layer corresponding to the device type being installed.

Note:
The layer naming conventions may vary depending on the client's requirements and project configuration.



Asset Creation, Editing, and Deletion

If an asset hasn't been created in the CMS, users can create it directly from the **Installation** panel:

- **To create an asset:**
  Perform a long press on the desired map location. Select the object type (e.g., light point), controller model, asset name, and Geo Group.
- **To move or delete an asset:**
  Long press on the asset on the map. This will display two action icons on the right side of the screen for moving or deleting the asset.

⚠️ **Important:**

When using the Scan QR Code for Luminaire Scan option in the EXEDRA app, please note this function is specifically designed to scan the Controller ID#, not the luminaire label.

The correct procedure is:

- In the Installation tab, tap on the pin (Pole ID) on the map.
- Then select Scan QR Code for Luminaire Scan to capture the Controller ID#.

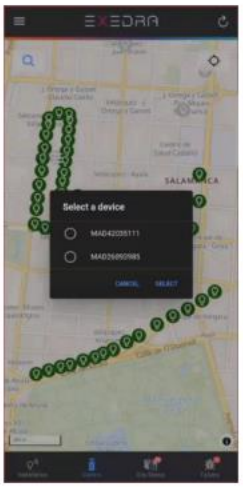
If the crew accidentally scans the luminaire's QR code using this option, the system will not automatically link the asset to the controller — which may cause data inconsistency and require manual correction later.

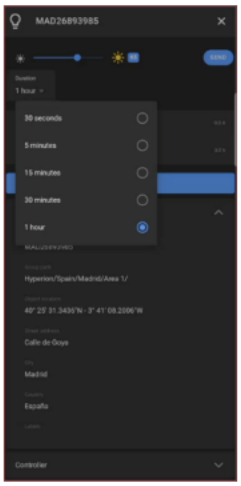
4. Realtime control

The **Real-Time Control** feature allows users to view the current measured values, device status, and the latest dimming settings for an individual luminaire, with the ability to operate it manually when required.

Using the manual control option, users can adjust the luminaire's dimming level for a specified duration.

Additionally, a **Test Procedure** can be initiated within the Real-Time Control panel. This function automatically sends a sequence of predefined dimming levels to the luminaire, with each level being automatically validated by the system to confirm correct operation.





5. City status

The **City Status** feature provides real-time access to the operational status of individual light points.

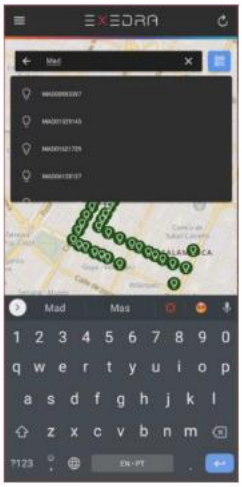
Users can retrieve information in the following ways:

- Select a light point directly from the map.
- Search for a specific light point by entering its ID in the search field.
- Scan the associated QR code on-site to instantly access the light point's details.

The City Status interface displays general information about the light point's location, status, and operational metrics.

Additional tabs within the interface allow users to:

- View **active tickets and alarms** associated with the selected light point.
- Access a **history log** of all previous tickets and alarms for that asset.



6. Tickets

The **Tickets** section allows users to view all active tickets and access their associated details.

By default, tickets are listed in chronological order. The search function enables users to:

- Filter tickets assigned to them.
- Sort tickets by date.
- Identify light points linked to specific tickets via the map view.

To create a new ticket:

1. Select the **Create Ticket** option.
2. Enter the required details, including **title**, **description**, and **severity**.
3. Save the ticket for submission.

Within the map view, users can visually identify if one or multiple light points are associated with a ticket — for example, in cases such as a circuit failure affecting a group of lights.