When I'm working on a problem,
I never think about beauty. I think
only how to solve the problem. But
when I have finished, if the solution
is not beautiful, I know it is wrong.
Richard Buckminster Fuller

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

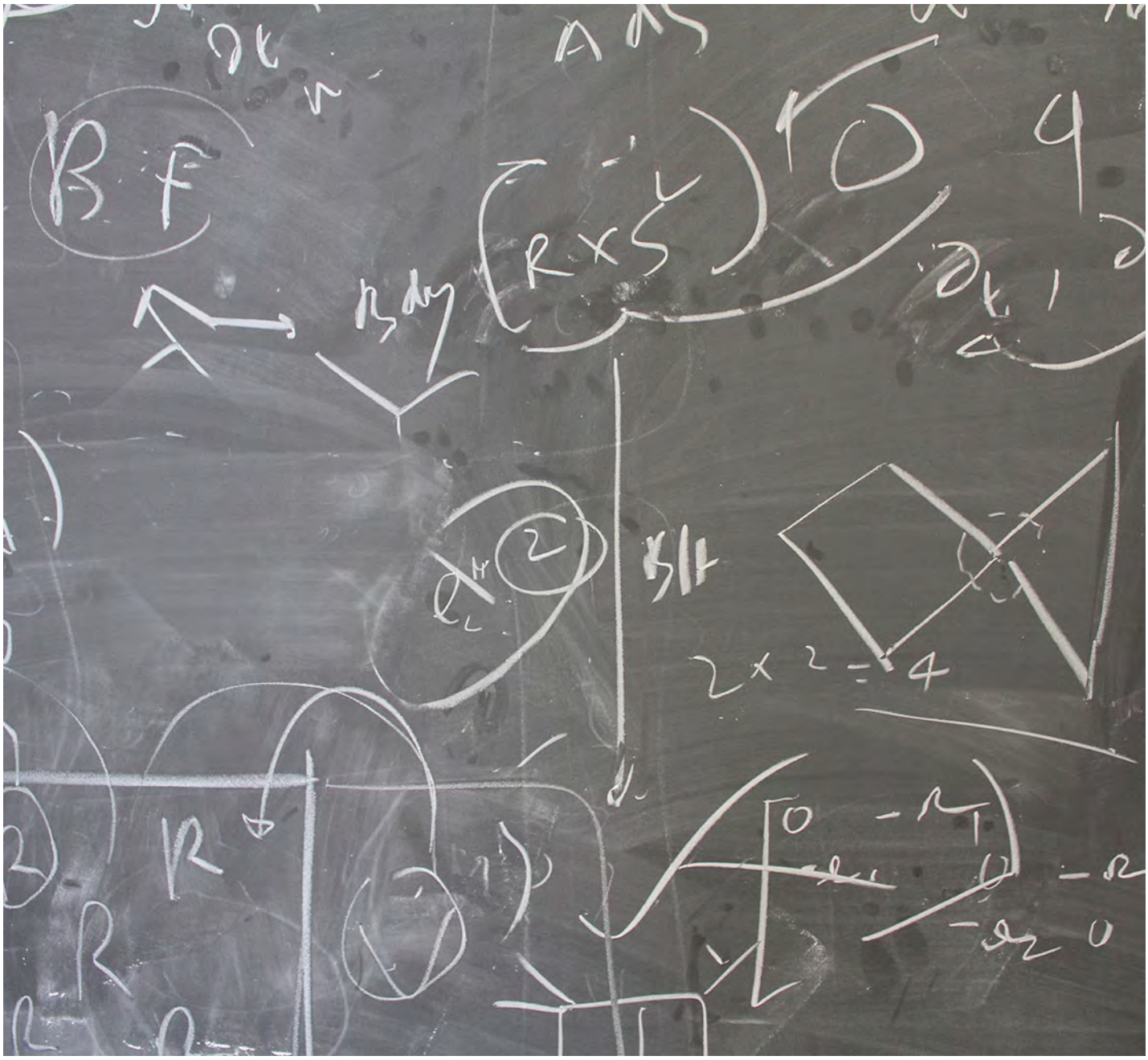
Copenhagen
London
Sydney
Hong Kong
New York

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

LIGHTING DESIGN

STEENSEN VARMING

Cronulla Town Centre Public Domain
Cronulla Mall
Luminaire Datasheets



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ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

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Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
20.02.2023	A	Tender		AEK	AEK

Sydney February 20th , 2023

Nari Lee
Lighting Designer

Nari.Lee@steensenvarming.com
+61 / 02 9967 2200

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

General

Type and Manufacture
The luminaires in these data sheets intend to indicate a preference for a particular make and model which have been specifically selected as they incorporate features required in the design including materials, shape, output and quality.

The following selection criteria inform the luminaire selection:
- Performance (photometrics, Light output ratio/ luminaire efficiency, operating temperatures and heat management, size uniformity of luminous surfaces and openings, glare ratings)
- Quality (workmanship, quality of manufacture and components, Ingress protection ratings, class of material)
- Compliance with the relevant standards (evidence/ certificate to be provided)
- Architectural quality and aesthetics (including shape, dimensions and finish)
- Track records of lighting/ luminaire companies
- Specific Project Requirements

Specific manufacturers or trade names or figure numbers mentioned in this document are for the purpose of defining the required lighting/ photometric performance, class of materials, quality, design or workmanship.

Any lighting equipment shall be as specified or approved equal in every aspect. If alternatives are submitted, well documented evidence has to be provided comparing the alternatives with that specified to substantiate the equality of the alternative. The basis of the luminaire specification (selection criteria as above) shall also form the base for the selection of alternative fittings. Alternative fittings need to be assessed by the same parties that are involved in the approval of specified luminaires including the lighting designer, the architect, the client or client representative and the superintendent. The assessment includes a sample review process as well as the review of the product literature and technical data. This may involve photometric testing. If the contractor wishes to provide alternatives for assessment, the costs associated with the review process (including consultancy fees) are the contractors responsibility.

For any alternatives submitted, it is the contractor's responsibility to ensure that the power requirements satisfy the maximum demand, the fitting dimensions match the details and construction process and the lead time matches the overall procurement strategy.

Notes
- All luminaires to be supplied with a warranty of minimum 3 years. For LED luminaires warranty to include colour consistency within 2 MacAdam steps.
- All LED luminaires need to be provided with binning range information, life expectancy (LM80) information and confirmation regarding heat management.
- A number of spare parts (such as diffusers) shall be provided, nominally 5% of the total number, unless specified otherwise elsewhere.
- All control gears and controllers to match the relevant light sources and power ratings and to comply with the control system specified.
- Fittings nominated are for the purpose of tender.
- Playground integrated and shade structure integrated lighting are to be supplied, installed, certified and tested by the Council nominated playground installer and

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shade installer. The specification of these types is for information and subject to change to co-ordinate with final placement and integration details of these elements. Refer to lighting details and scope diagram for information.

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C1

Description	Catenary luminaire IP65 – Mounted to type P2 poles
Model	ZXL16 Series
Catalogue No.	ZXL16-CAT-BM
Manufacturer	HK USA Lighting Group
Supplier	Litesource and Controls
Light Source	LED, 10 W, 2700 K, 295lm, CRI 95
Finish	Black
Dimensions	57mm (Dia.) x 424mm(H)
Control	■ Remote step-down transformer for dimming functionality - electrical consultant to confirm integration in the overall lighting control system
Accessories	■ Turnbuckle, suspension cable, power cable and all accessories as a complete catenary system. ■ Solite lens ■ Spread lens (to be confirmed in sample review)
Location	■ Cronulla Mall – Central Zone mounted to type P2
Notes	■ To provide weatherproof remote-control gear for MLV dimming. Type to be compatible with the luminaire and control system. To be mounted in the base of the pole. ■ Final load calculation assessment of C1 catenary light to be undertaken by pole manufacturer. ■ Spacing of fittings between poles is subject to final manufacturer assessment and sag. Provide shop drawings for approval. ■ Mounted to type P2 poles. ■ Mounting arrangement and finish to be suitable for marine grade environment.

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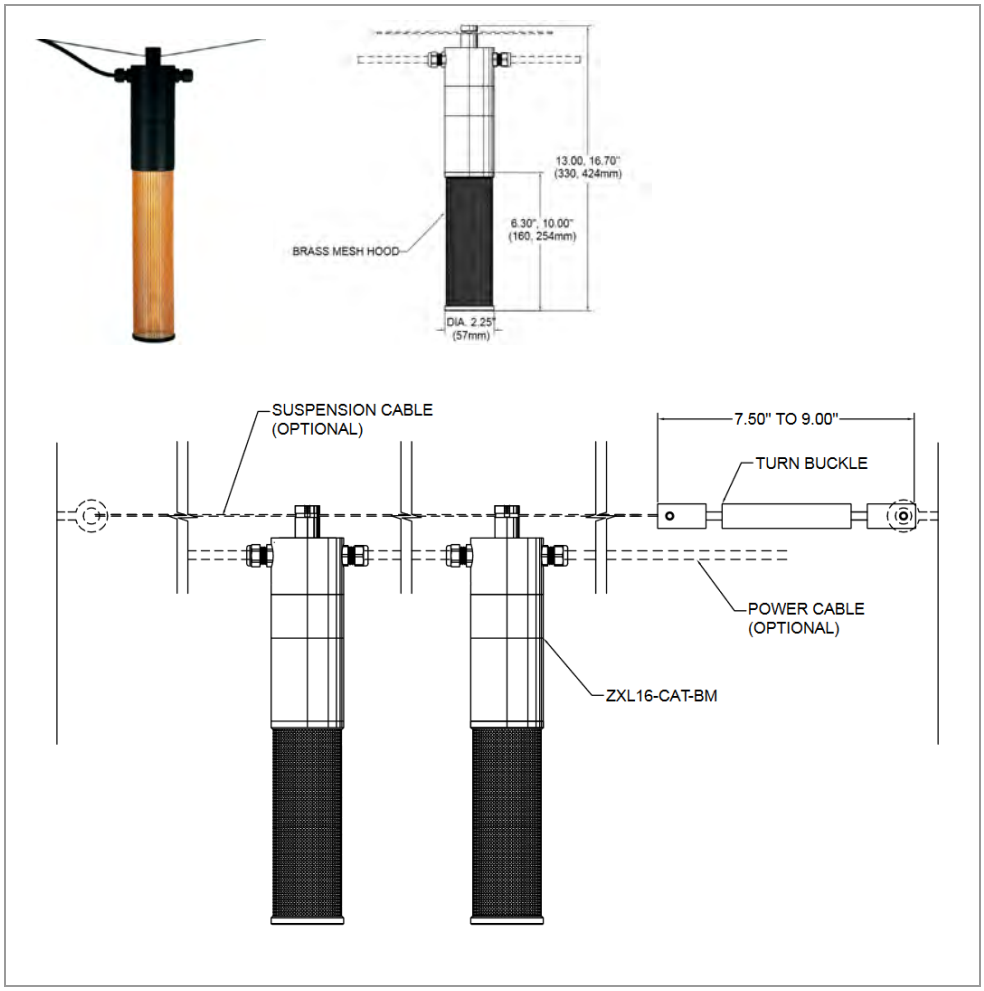

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D1/D2 – Option 1

Description	Surface mounted downlight luminaire IP66 – to be supplied and installed by Council nominated Playground Installer as part of the shade structure.
Model	FLC321
Catalogue No.	D1: 145-9963+0013 D2: 145-9945+0013 (TBC pending beam angle selection)
Manufacturer	We-ef
Supplier	Buckford
Light Source	**D1**: LED, 12 W, 3000 K, 1620lm, CRI 80, symmetric, very narrow beam, 'sharp cut-off' **D2**: LED, 12 W, 3000 K, 1620lm, CRI 80, beam angle tbc with final shade placement and arrangement.
Finish	Black
Dimensions	115mm (Dia.) x 230mm(H)
Control	■ Remote IP68 Dali Dimmable LED control gear to be located in concealed, accessible and weatherproof location above the structure, within the structural pole or in an adjacent lighting pole or electrical pit – subject to the final arrangement and shade structure placement.
Accessories	■ Spigot mounting (mounting type subject to final installation detail) ■ Flat surface fitter to support sigot mounting (mounting type subject to final installation detail) ■ Provide a fully enclosed cap to seal/ protect from above. Ensure suitable size for heat dissipation requirements of the luminaires – as per manufacturers instructions. ■ All electrical connections to be IP68 ■ All junction boxes to be IP68 gel-filled
Location	■ Cronulla Mall – Integrated within playground shade structure
Notes	■ Option 1 or Option 2 to be selected in consultation with the shade manufacturer to suit required details and integration. ■ Type, quantity and location of D1/ D2 subject to placement of shade structure within the playground. ■ Shade manufacturer to provide shop drawings of detail for approval.

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- Mounting arrangement and finish to be suitable for marine grade environment.
- Refer to lighting detail for information

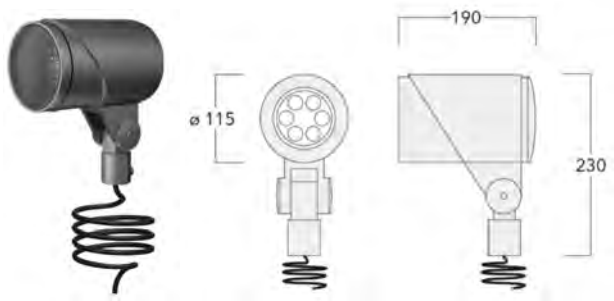

Image: Spigot mount + flat surface fitter

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D1/D2 – Option 2

Description	Surface mounted downlight luminaire IP66 - to be supplied and installed by Council nominated Playground Installer as part of the shade structure.
Model	Lira Mono
Catalogue No.	D1: LIRA-BM-10W-3000K-DALI-24VDC-07 D2: LIRA-BM-10W-3000K-DALI-24VDC-TBC
Manufacturer	GVA Lighting
Supplier	Buckford
Light Source	**D1**: LED, 10 W, 3000 K, 648lm, CRI 80, 7˚ **D2**: LED, 10 W, 2700 K, 648lm, CRI 80, beam angle tbc with final shade placement and arrangement.
Finish	Black
Dimensions	73mm (Dia.) x 106.5mm(h) (+snoot)
Control	■ Remote IP68 Dali Dimmable LED control gear to be located in concealed, accessible and weatherproof location above the structure, within the structural pole or in an adjacent lighting pole or electrical pit – subject to the final arrangement and shade structure placement.
Accessories	■ 50mm Snoot (snoot height subject to final installation detail) ■ SM70 bracket (bracket type/ height subject to final installation detail) ■ Provide a fully enclosed cap to seal/ protect from above. Ensure suitable size for heat dissipation requirements of the luminaires – as per manufacturers instructions. ■ All electrical connections to be IP68 ■ All junction boxes to be IP68 gel-filled.
Location	■ Cronulla Mall – Integrated within playground shade structure
Notes	■ Option 1 or Option 2 to be selected in consultation with the shade manufacturer to suit required details and integration. ■ Type, quantity and location of D1/ D2 subject to placement of shade structure within the playground. ■ Shade manufacturer to provide shop drawings of detail for approval.

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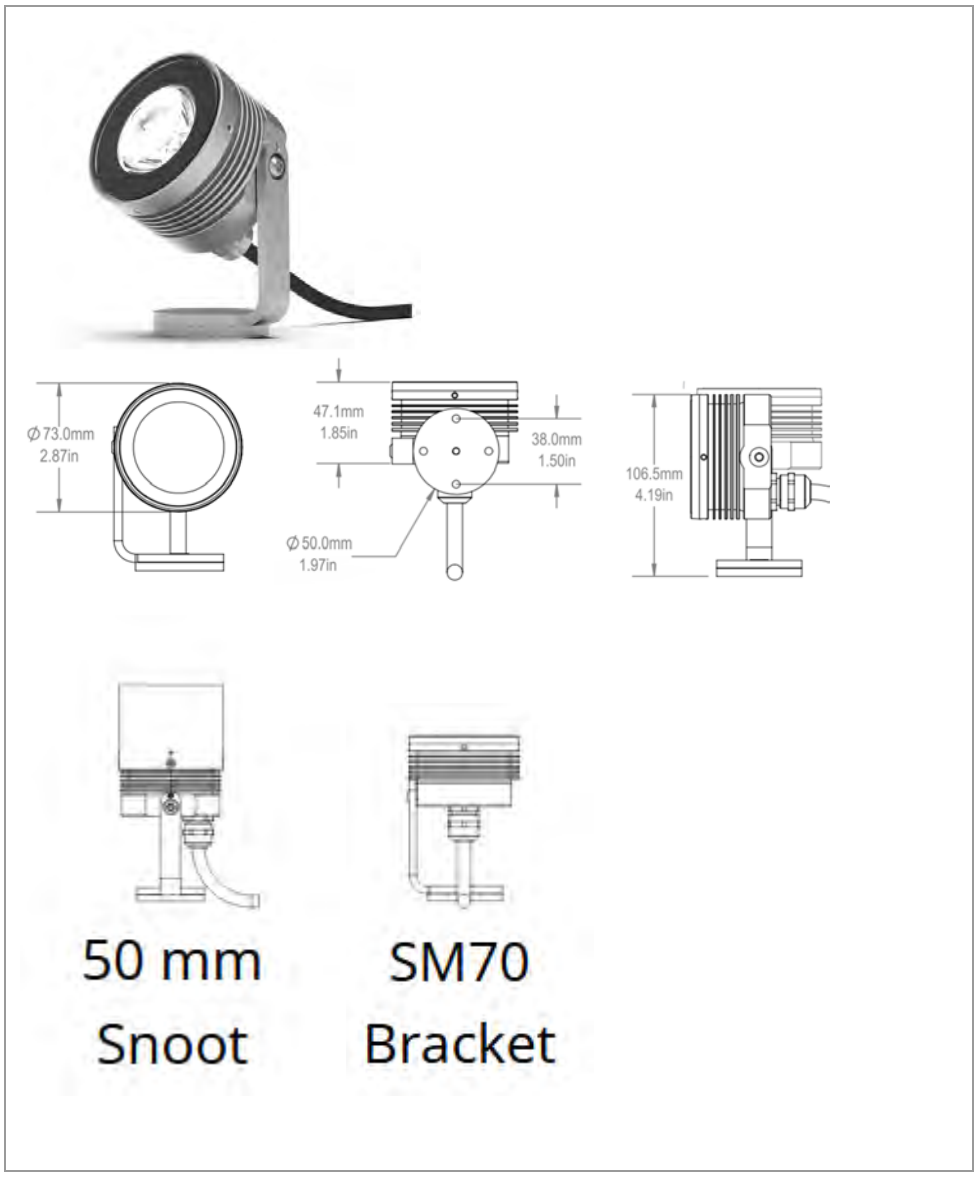
- Mounting arrangement and finish to be suitable for marine grade environment.
- Refer to lighting detail for information



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L1

Description	Surface-mounted LED flexible luminaire IP67
Model	MIMI A010
Catalogue No.	MI-SA-C-A-010-27-X-67-TBC-D67A-EB-g
Manufacturer	KKDC
Supplier	KKDC
Light Source	LED, 10W/m, 2700K, 920lm /m, CRI 94, 95° (Diffused cover)
Finish	Standard
Dimensions	13mm(w) x 15mm(h) x length to suit benches to the closest increment
Control	■ Remote IP68 Dali Dimmable LED control gear to be located in concealed, accessible and weatherproof location in adjacent electrical pit with ELV cable running from the driver to the light (above slab and under the pacing). Cabling and reticulation to electrical consultants design and detail.
Accessories	■ EB- end cap bracket to be provided at each end of the luminaire and screw fixed into substrate. Maximum length of fitting with this mounting arrangement is 1046mm. Where luminaire length exceeds this, provide fittings symmetrically arrangement and mounted end to end. ■ Allow for washers for packing of luminaire if required. Fitting is to sit flush – not protrude or be rebated. ■ IP68 electrical male/female connectors for plug and play. Connectors required for luminaire and cable lengths fed through solid seating elements – refer to lighting detail. ■ All electrical connections to be IP68 ■ All junction boxes to be IP68 gel-filled. ■ Cable entry position to be determined by the Contractor to suit integration with furniture design. ■ Where two lengths are installed end to end, at the junction, provide a cover plate to conceal cabling. ■ Where two lengths are installed end to end, fittings to be pre-wired to allow end to end mounting.
Location	■ Cronulla Mall – integrated seat lighting
Notes	■ Contractor to provide shop drawing of final installation detail for approval.

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- All electrical connections are to be concealed and the arrangement to facilitate future maintenance by Council but is protected from public access. Access panel to have tamper proof screws.
- Furniture manufacturer to provide rebate for mounting of type L1 luminaire. Width and height to suit luminaire with suitable building tolerance.
- Mounting arrangement and finish to be suitable for marine grade environment.
- Refer to lighting detail for information.

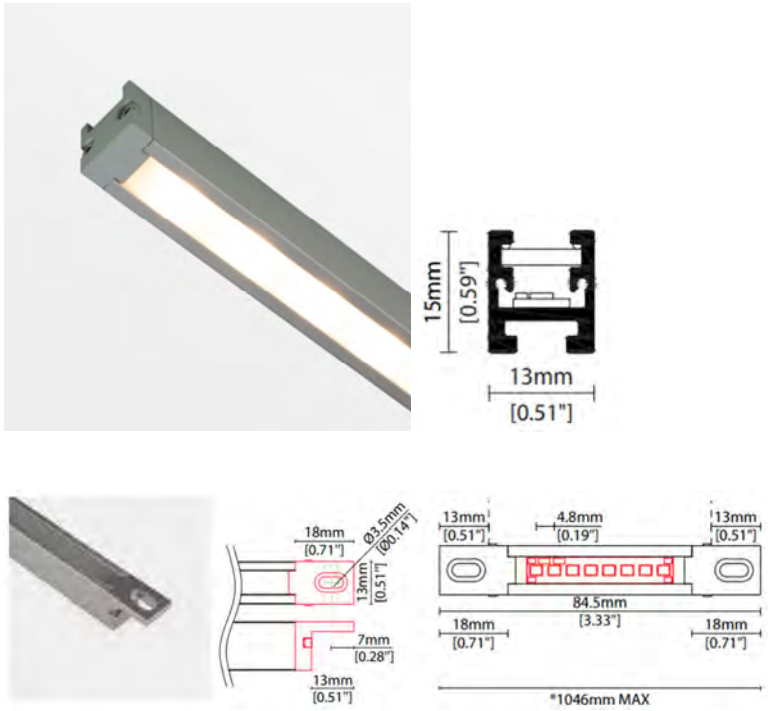

Image: End cap mounting bracket

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L2

Description	Surface-mounted LED luminaire IP67 – to be supplied and installed by Council nominated Playground Installer.
Model	KKSL 504 – e line
Catalogue No.	SL-SA-X-E-30-to suit panel-67-X-X-g
Manufacturer	KKDC
Supplier	KKDC
Light Source	LED, 12.5W/m, 3000K, 950lm /m, CRI 90, 110°
Finish	Standard
Dimensions	Luminaire: 13mm(w) x 12.3mm(h) x length to suit panel and luminaire incremental length (to be co-ordinated with playground manufacturer) Luminaire in clip: 16.7mm(w) x 13.5mm(h)
Control	■ Remote IP68 Dali Dimmable LED control gear to be located in concealed, accessible and weatherproof location in adjacent pole or electrical pit – to be co-ordinated by electrical contractor to be within maximum distance as nominated by manufacturer. Contractor to size cable to suit final location. Playground manufacturer to free issue driver to electrical contractor for installation.
Accessories	■ KKCP-02 surface mounting brackets – quantity to suit installation detail requirements and total length. To be approved in shop drawings. ■ IP68 gel-filled junction box ■ All electrical connections to be IP68. Provide with IP68 male/ female connectors ■ Frame and panel arrangement by playground manufacturer. Refer to lighting detail for requirements.
Location	■ Cronulla Mall - Whale Head and Whale Tail
Notes	■ Playground manufacturer to provide shop drawings of arrangement for approval. ■ Mock-up testing/ prototype of edgelit detail with dichroic panel is required for final installation detail and dot frit arrangement. ■ Luminaire must be 'cool to touch' ■ Within playground structure, all cabling to be extra low voltage.

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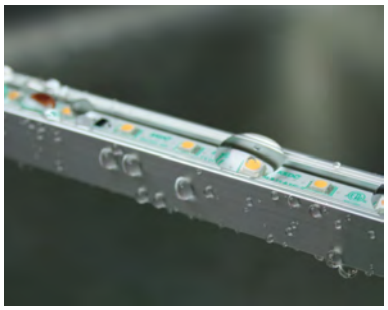
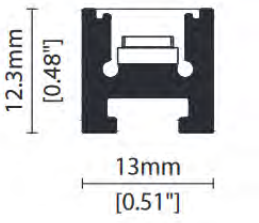
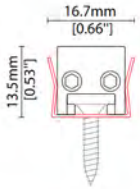
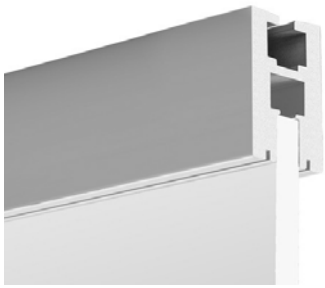
- Fitting selection subject to co-ordination with playground manufacturer.
- Mounting arrangement and finish to be suitable for marine grade environment.
- Refer to lighting detail for information.

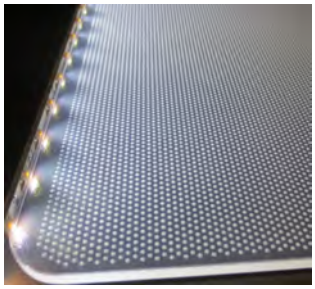




KKCP-02 (1no.)
KKCP-52 (500no.)
Clip (allow 3 per metre/40in)
S/Steel finish
L25/W16.7/H13.5mm
(L0.98/W0.66/H0.53")







Right Image: Indicative edgelight channel
Left Image: Indicative edge lit panel with dot frit (no frame – frame is required)

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L3

Description	Surface-mounted LED flexible luminaire IP67 IK10 – to be supplied and installed by Council nominated Playground Installer.
Model	Neon Side
Catalogue No.	Neon Side
Manufacturer	Vuelite
Supplier	Litesource and Controls
Light Source	LED, 15W/m, 3000K, 800lm /m, CRI 90, 110° with dot free diffused light
Finish	Standard
Dimensions	Luminaire: 16mm(w) x 17mm(h) x length to suit whale tail arrangement and luminaire incremental length (to be co-ordinated with playground manufacturer) Flexible mounting extrusion: 17.4mm(w) x 18mm(h)
Control	■ Remote IP68 Dali Dimmable LED control gear to be located in concealed, accessible and weatherproof location in adjacent pole or electrical pit – to be co-ordinated by electrical contractor to be within maximum distance as nominated by manufacturer. Contractor to size cable to suit final location. Playground manufacturer to free issue driver to electrical contractor for installation.
Accessories	■ Stainless steel flexible mounting extrusion – to be continuous for the length of LED ■ IP68 gel-filled junction box ■ All electrical connections to be IP68. Provide with IP68 male/ female connectors ■ Mounting extrusion by playground manufacturer as part of playground structure. Refer to lighting detail for requirements. ■ Side cable entry – to be advised and verified by playground manufacturer to suit final installation requirements.
Location	■ Cronulla Mall - Whale tail
Notes	■ To be UV resistant to prevent yellowing over time ■ Playground manufacturer to provide shop drawings of arrangement for approval. ■ Luminaire must be 'cool to touch'

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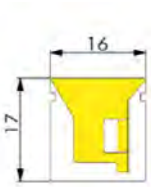
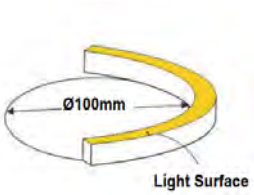
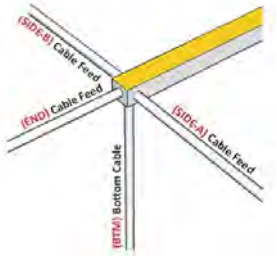
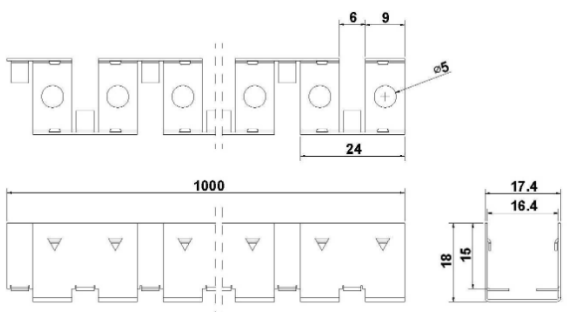
- Within playground structure, all cabling to be extra low voltage.
- Fitting selection subject to co-ordination with playground manufacturer.
- Mounting arrangement and finish to be suitable for marine grade environment
- Refer to lighting detail for information









Indicative detail arrangement

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L4

Description	Surface-mounted LED luminaire IP67 – to be supplied and installed by Council nominated Playground Installer.
Model	KKSL 352 – e line
Catalogue No.	SL-SA-X-E-30-to suit panel-67-X-X-g
Manufacturer	KKDC
Supplier	KKDC
Light Source	LED, 5.5W/m, 3000K, 410lm /m, CRI 90, 110°
Finish	Standard
Dimensions	Luminaire: 13mm(w) x 12.3mm(h) x length to suit panel and luminaire incremental length (to be co-ordinated with playground manufacturer) Luminaire in clip: 16.7mm(w) x 13.5mm(h)
Control	■ Remote IP68 Dali Dimmable LED control gear to be located in concealed, accessible and weatherproof location in adjacent pole or electrical pit – to be co-ordinated by electrical contractor to be within maximum distance as nominated by manufacturer. Contractor to size cable to suit final location. Shade structure manufacturer to free issue driver to electrical contractor for installation.
Accessories	■ KKCP-02 surface mounting brackets – quantity to suit installation detail requirements and total length. To be approved in shop drawings. ■ IP68 gel-filled junction box ■ All electrical connections to be IP68. Provide with IP68 male/ female connectors ■ Frame and panel arrangement by shade structure manufacturer. Refer to lighting detail for requirements.
Location	■ Cronulla Mall – Integrated within playground shade structure
Notes	■ Shade structure manufacturer to provide shop drawings of arrangement for approval. ■ Mock-up testing/ prototype of edgelit detail with dichroic panel is required for final installation detail and dot frit arrangement. ■ Fitting selection subject to co-ordination with shade structure manufacturer.

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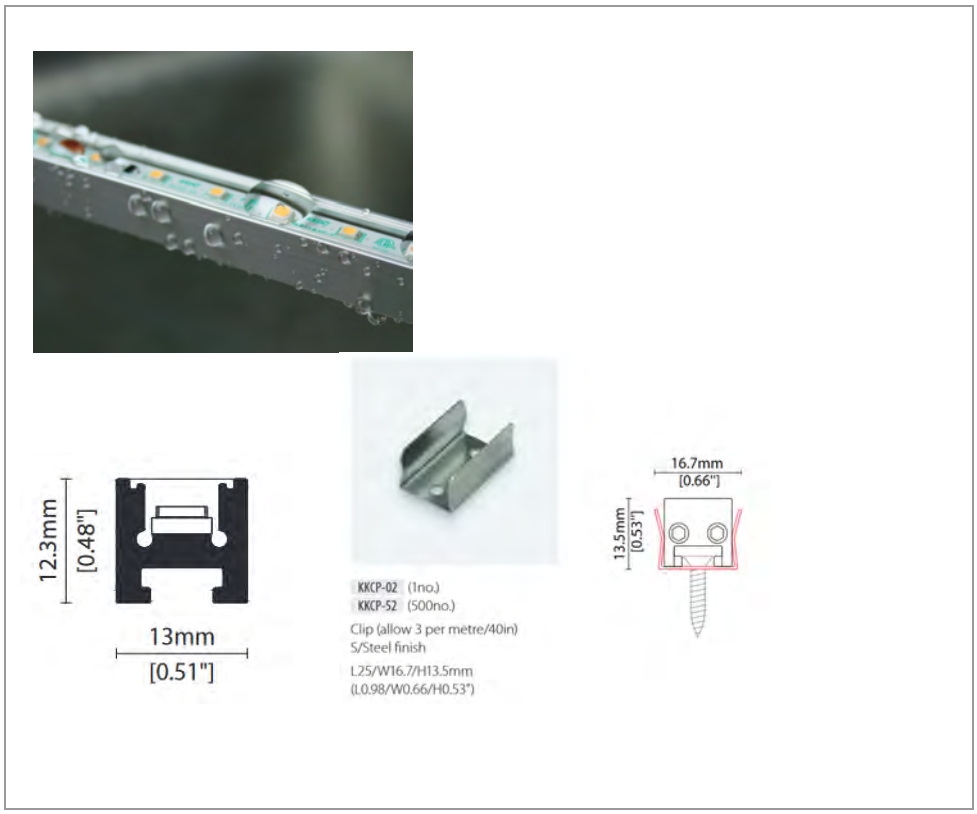
- Mounting arrangement and finish to be suitable for marine grade environment.
- Refer to mounting detail for information



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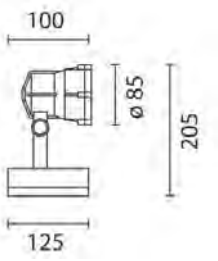
SP1

Description	Tree mounted spotlight luminaire IP66
Model	Mini Woody ø85mm
Catalogue No.	E199
Manufacturer	iGuzzini
Supplier	iGuzzini
Light Source	LED, 10.7 W, 3000 K, 590 lm, CRI 80, 26°
Finish	Black – final finish to be confirmed by Council
Dimensions	85 mm (Dia) x 205 mm (h)
Control	Remote IP68 DALI dimmable driver. Remote driver to be mounted in a concealed, accessible and weatherproof location within adjacent electrical pit or in the base of the adjacent lighting pole. To be co-ordinated by the contractor to suit the final reticulation arrangement. Extra low voltage cable in small conduit to fittings
Accessories	■ Tree strap tension belt ■ Long lead to control gear (to match tree – contractor to confirm on site) ■ All electrical connections to be IP68 ■ All junction boxes to be IP68 gel-filled
Location	■ Cronulla Mall – in tree lighting in forecourt areas
Notes	■ Luminaire mounting height to be co-ordinated on site with trees ■ Refer to lighting detail



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P2

Description	Integrated Pedestrian Multi-function Lighting Pole
Model	City Elements 230
Catalogue No.	City Elements 230
Manufacturer	Hess
Supplier	Form and Light
Light Source	Pathway: LED, 28 W, 3000 K, CRI 90, Batwing distribution Beacon: LED, RGBW, 100W Tree: LED, 3000K, CRI90, distribution TBC
Finish	Standard high quality marine grade aluminium pole with marine grade coating and additional air salty coating to avoid deterioration of exterior peeling of paint. Finish colour black – tbc by Council
Dimensions	230mm(dia) x height as per lighting detail accounting for required height above and below grade. To be finalised and approved in shop drawings for each type. Council to advise luminaire set down.
Control	■ Integral DALI dimmable control gear for path lighting, tree lighting elements ■ Integral DMX dimmable control gear for beacon lighting element. ■ Each element to have separate and individual control with smooth dimming transitions
Accessories	■ Module 1: Pedestrian path lighting module- AA 2xLevo3 01 ■ Module 2: Beacon lighting element with custom dot pattern and RGBW function. Luminous element approx 1000mm tbc by manufacturer with overall height. ■ Module 3: Blank panel BH300. To have fixing points and cable gland to facilitate mounting of projector or other third party luminaire in the future (future artwork lighting). Where pole has a projector mounted – to be fixed to this module. (Refer to projector- not included as part of pole supply). ■ Module 4: Blank or Tree lighting spotlight (pending pole type as per schedule) ■ Module 5: CCTV or tree lighting spotlight (pending pole type as per schedule). ■ CCTV camera type, quantity, location and aiming is nominated by Council for integration with Module 5. (Refer to CCTV – not included as part of pole supply).

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- Where elements are not included, provide blanking panel as needed to maintain overall alignment.
- Catenary eyelet at 4300mm (pending pole type as per schedule). (Refer to C1 – not included as part of pole supply). Final load calculation assessment of C1 catenary light to be undertaken by pole manufacturer.
- Integrated speaker module. Subject to Council confirmation on required quantity and location to be confirmed prior to order).
- Pole to have structural material/re-enforcement to support projector/ catenary as required for each individual pole type.
- Internal mounting plate for power
  - Arrangement 1: 15 x AMP power outlet
  - Arrangement 2: 4 x 240V power outlet

  Outlets to be provided and installed to the internal mounting plate by electrical contractor (not part of pole supply). To be IP rated series 56 Clipsal or similar.
- Internal mounting plate for remote drivers – remote LED drivers of other lighting elements to be located in the base of the pole as required.
- Flush fit access panel for maintenance – access via key operated lock or a triangle key – TBC by Council prior to order.
- Base plate, rag bolt assembly and footing by structural engineer – to be below grade. Footing to manufacturers/ structural engineers detail to suit site conditions (including soil and wind conditions) and new civil works as well as projector and catenary loads.

Location

- Cronulla Mall

Notes

- Direction/ orientation of all elements to be approved in shop drawings for each pole type
- Provide shop drawings of each pole for approval
- Projector, Catenary, CCTV camera and power are not provided as part of the pole supply and need to be supplied and installed by the Contractor separately.
- Luminaire pole with straight minimalist profile
- Integrated services arrangement
- Must have availability of various optics and outputs to suit required functionality.

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Luminaire Schedule

	Path	Tree	Projector	CCTV	CATENARY	240V Power	15AMP Power
PT2.1	1	1	1	1	0		X
PT2.2, PT2.7, PT2.17	1	2	0	0	0		X
PT2.3, PT2.8	1	1	2	1	0		X
PT2.4, PT2.5, PT2.19	1	0	2	1	0		X
PT2.6, PT2.16, PT2.18	1	1	0	1	0		X
PT2.9	1	1	2	0	1	X	
PT2.10, PT2.15	1	1	0	1	1	X	
PT2.11, PT2.12. PT2.13, PT2.14	1	1	0	0	1	X	
PT2.20, PT2.21	1	0	2	0	0		X


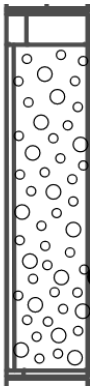

Image: RGBW beacon element with custom dot pattern

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Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

Projector (P2)

Description	LED gobo projector IP65 – Mounted to P2 (to be supplied separately – not part of pole supply)
Model	ZXL38i-IP
Catalogue No.	ZXL38i-IP
Manufacturer	HK USA Lighting Group
Supplier	LiteSource and Controls
Light Source	LED, 51 W, tuneable white (custom arrangement), 2000 lm
Finish	Black (to be confirmed by Council to match pole finish)
Dimensions	135mm (Dia.) x 390-416mm(L) x 308mm(H)
Control	■ Remote IP68 DALI dimmable LED control gear to be located in the base of the pole.
Accessories	■ Glare shield- GSA type ■ Gobo optical arrangement ■ Custom metal gobo – bubble/ dot pattern. Allow 3 x pattern types. To be developed by Steensen Varming. ■ Mounting bracket to suit pole fixing requirements. To be co-ordinated by the Contractor with the pole manufacturer. ■ All electrical connections to be IP68 ■ Connection/ fixing and cable penetration to pole with gasket and IP68 cable glands – mounting bracket and cable details to be co-ordinated with type P2 BH300 element.
Location	■ Cronulla Mall – Plaza areas; Mounted to P2
Notes	■ Orientation and location on the pole to be approved in shop drawings. ■ Gobo pattern to be provided separately and approved in shop drawings.

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ABN 50 001 189 037
t : +61 / 02 9967 2200
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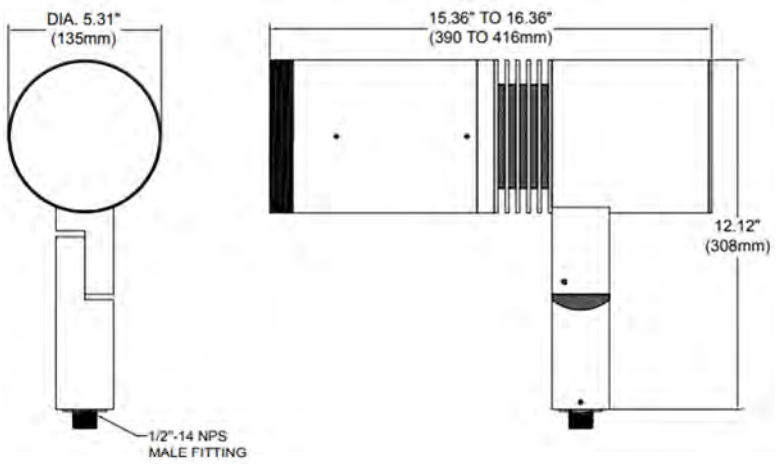

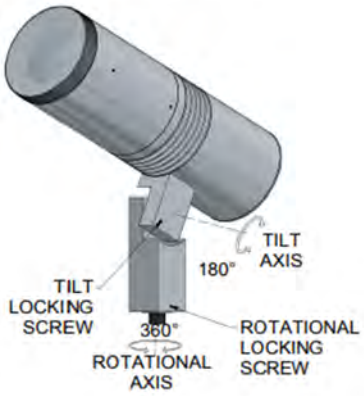

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ABN 50 001 189 037
t : +61 / 02 9967 2200
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CCTV (P2)

Description CCTV camera - Mounted flush within P2 Module 5 in nominated poles (to be supplied separately by Contractor and installed within pole housing– not part of pole supply)

Model As nominated by Council - SONY SNC XM637 or equivalent to be confirmed by the council

Location Cronulla Mall

Notes

- CCTV type, quantities, locations and orientation is nominated by Council for integration in the lighting poles.
- Contractor to liaise with Council to confirm integration requirements to the Council CCTV system.
- Requires approval by Council prior to order and approval in pole shop drawings.

Engineering services enable architecture.
Sean Mulcahy

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

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London
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New York

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e : info@steensenvarming.com

LIGHTING DESIGN

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Cronulla Town Centre Public Domain
Cronulla Mall
Lighting Specification

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Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

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Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
20.02.2023	A	Tender Issue		AEK	AEK

Sydney February 20th, 2023

Ashleigh Kennedy
Associate

Ashleigh.kennedy@steensenvarming.com
+61/ 02 9967 2200

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

Table of Contents

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
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e : info@steensenvarming.com

1.0 Project Particulars

1.1 Introduction

This specification forms part of the contract documents.

This specification provides
- A general description of the works in general terms and to specify general conditions and requirements for their execution, including sub-contracting, approvals, testing and completion.
- A general description of the design intent and provide an understanding of the systems documented on specification and drawings with an outline of what is required of the Contractor in their interpretation of the documents, their implementation and construction of the works and the outcomes required in completing the project.

Provision should be made in the Tender Return Schedules for compliance with all section of this document.

The specification must be read together with
- the Luminaire Data sheets and
- the associated lighting drawings.

1.2 The Project

The project entails the new lighting to the Cronulla Mall and the associated infrastructure. Multi-function integrated lighting poles with a staggered approach provide the main circulation lighting to the edge of the mall, whilst integrated lighting in benches, trees, playground and shade structure, combined with feature lighting elements within the pole, provide human scale, layered lighting, visual interest, increased perception of brightness and overall ambience also contributing to the functional illumination.

The integrated playground and shade structure lighting is to be supplied, installed, tested and commissioned by the Council appointment Playground installer. Details of the lighting are included in the Tender package for information and are subject to co-ordination and finalisation of the design with the relevant manufacturers. The Contractor is to make all electrical connections, provide all required electrical infrastructure, install remote LED control gear, integrated into the control system and certify the final installation.

CCTV requirements within the mall are the responsibility of the Contractor. The Contractor is to liaise with Council for the final arrangement and integration requirements with their systems.

The electrical design and lighting control system is designed and documented by the electrical consultant.

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ABN 50 001 189 037
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e : info@steensenvarming.com

1.3 Definitions

In interpreting this section, the following words shall have the meaning assigned to them below:

Approved or Approval:	means approval by, or to the approval of, the Principal's Authorised Person and/or all relevant Authorities.
Authorities:	means any authority having jurisdiction over the works such as the following: Local Council/ Department of Planning; Energy Australia; WorkCover Authority; AGL; Telstra, Austel, Optus; All Australian Standards and referenced International Standards.
Consultant:	means **Steensen Varming (Australia) Pty Ltd.**
Contract	The agreement between the Contractor and the Principal constituted by the Contract Documents.
Contract Documents	The documents described as such in the Contract together with: This specification; Completed Tender Return Schedules; Associated Drawings (including equipment schedules).
Contractor:	means the organisation, engaged by the Principal or Managing Contractor to undertake the works.
Drawings:	means the services drawings listed in this specification and other drawing referred to in the Contract Documents.
Principal:	means Sutherland Shire Council or their nominated representative.
Project	means the development of the Cronulla Mall Lighting
Specialist Sub -Contractor	means the organisation engaged by the Contractor or Sub-Contractor to undertake specialist services, other than a Consultant or a Supplier.
Sub-Contractor:	means the organisation engaged by the Contractor to undertake the services works, other than a Consultant or a Supplier.

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2.0 General

Prior to commencing the works, the Contractor shall ensure it is familiar with the contract documents, including the drawings and specification and all other associated documents. The Contractor shall ensure it is familiar with the project staging works and scope. The Contractor shall notify the Principal's Authorised Person of any work or material shown or specified in these documents which in its opinion will not give satisfactory results.

It should be noted that the drawings may not show exact measurements and all the civil, landscape and services details. The Contractor shall utilise structural, landscape, civil and electrical drawings as well as those provided by specialist contractors for accurate assessment and measurement.

All equipment and services shall be coordinated with the streetscape, its finishes and other services and to the approval of the Principal's Authorised Person.

Any inconsistency between the drawings and the specification or in either document separately shall be reported to the Principal's Authorised Person by the Contractor before any work is commenced. The Principal's Authorised Person will decide the course of action to be followed.

Any items either shown on drawings or described in specification are deemed to be included.

2.1 Roles, Objectives and Expectations

The Contractor shall possess relevant specialist expertise and experience in the type, scale and complexity of work necessary to complete the works.

The Contractor shall read and note all clauses in the General Requirements of Contract and Annexure and preliminaries as applicable to its trade.

The Contractor shall provide all plant, labour and materials to complete the works and co-ordinate and co-operate with all other trades associated with its trade work.

The Contractor shall:

- Raise any issues requiring design input or clarification, in time to allow it to meet the contract program, particularly in respect to:
    - Interpretation of the specification or drawings;
    - Problems in complying with the specification;
    - Omissions from the construction documents;
    - Suggested alternatives / substitutions.
- Certify compliance with contract documents, including all variation instructions, at completion;
- Certify compliance with all Authority requirements;

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t : +61 / 02 9967 2200
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- Pay all fees and charges associated with meeting statutory and Authority requirements;
- Obtain all Authority permits and certificates in a timely manner to allow the progress of the work in accordance with the contract program;
- Implement procedures to ensure that only competent tradesmen are used for the works;
- Be cognisant of the role of all relevant parties during the construction phase of the project and to assist them in the conduct of their duties wherever possible;
- Contribute, in the spirit of partnering, towards the successful execution of the Project;
- Provide manufacturer's and construction drawings;
- Provide samples and prototypes where specified or appropriate;
- Make final plant selections to meet the requirements specified;
- Stage the works as agreed with the Principal or the Principal's Authorised Person, to ensure the full functionality of the space.

2.2 Related Documents

This specification and associated drawings shall be read in conjunction with all other contract and reference documents, including but not limited to the following:

- Landscape and Civil drawings and Specifications;
- Electrical Engineers drawings and Specifications;
- Playground documentation;
- Shade structure documentation;
- Other documents as identified within the Head Contract;
- All other relevant documents to the project.

2.3 Coordination Responsibility

The Contractor is responsible for coordination at both the coordinated workshop drawing stage and onsite installation stage.

In the process of preparing coordinated workshop drawings, the Contractor acknowledges that tender drawings have been drawn to show design in principle, and is required to develop from these principles detailed workshop drawings, taking into account the urban design, landscape, tree locations, structures, furniture locations, playground arrangement, shade structure arrangement, installation and access requirements and coordination with other sub-contractors and their coordinated workshop drawings. The Contractor is deemed to have allowed for this exercise and any necessary deviation of routes from the tender drawings that may be required as a result of this exercise.

At the installation stage, the Contractor is required to coordinate both in spatial terms with the urban design, landscape, tree locations, structures, furniture locations, playground arrangement, shade structure arrangement and other trades to confirm their respective coordinated workshop drawings and also in respect of sequence of installation to ensure that all trades and services can be installed in accordance with coordinated workshop drawings. The Contractor is deemed to have allowed for this exercise and any necessary deviations from the workshop drawings that may occur in this exercise.

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Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
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2.4 Co-Operation / Co-Ordination

Works on the site executed under other contract(s) may be proceeding concurrently with the works included in this contract. The Contractor shall co-operate as necessary with all other contractors and with each firm to whom part or parts of the contract works are sub-let.

The Contractor shall be responsible for co-ordination with all trades to ensure that all services are accommodated satisfactorily, particularly in voids and cavities. Details of other services, supports for suspended ceilings, etc. should be obtained from the Principal's Authorised Person and the relevant trade.

2.5 Understanding of Design Intent

By submitting a tender for this project, the Contractor is expected to have acquainted itself with all the tender documents and fully understand the design intent of all systems for the project, in terms of staging, programme, performance outcome, energy and environmental impacts and life expectancies.

It is a requirement of this specification that the Contractor presents a statement of understanding as part of its tender submission to illustrate that they fully understands the design intent of the tender documents.

2.6 Obvious Work

Obvious Works includes all works and equipment of a minor nature not specifically mentioned but necessary for the operation of the specified equipment and systems.

If neither the specification nor plans contain any mention of minor parts which in the opinion of the Principal's Authorised Person are reasonably and obviously necessary for the satisfactory completion of the contract works such parts shall be provided by the Contractor without any additional charge or cost.

2.7 Notices and Fees

The Contractor shall throughout the course of the works give all notices, pay all fees, charges, levies and deposits and otherwise conform with the requirements of all properly constituted authorities with respect to the scope of work.

2.8 Flora and Fauna

The works interface with existing and new landscaping works. The Contractor is to:

- Consider the important flora and fauna at the site in the process of the demolition and construction;
- Consider installation requirements including trenching method for site conditions and to minimise impact to existing roots; and

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- Provide and adhere to approved work method statements that take into account the local natural environment;

2.9 CCTV Co-ordination

The CCTV camera type, location, quantities and orientation within the pole are included within the documentation as advised by Council. The Contractor is to liaise with Council to finalise the CCTV arrangement and scope prior to commencement of works. The Contractor is responsible for integration of the CCTV system with Council's infrastructure and to Council's requirements.

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ABN 50 001 189 037
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3.0 Existing Site Contract Requirements

3.1 Survey Works

The Contractor shall undertake a site survey prior to submitting the tender to verify all matters that could affect post tender costs or works. No variations will be accepted post tender for any omission of works or cost arising from information available at the time of tender. The Contractor shall make arrangements through the principal's representative to visit the site in the first week after receipt of the invitation to tender.

The specialist surveys may include but not limited to the following:

- Contaminated ground survey;
- Location of existing underground services (by electrical installer, to determine exact locations for avoidance/ connection);
- Sewer, drainage, CCTV survey;
- Other survey as identified within the Head Contract.

3.1.1 Special Surveys

The Contractor shall arrange and provide for all specialist surveys to be undertaken if required over and above those undertaken by the Principal, and forward the results of these to the principal's representative prior to submitting "for comment" the associated Contractor drawings and technical submittals.

3.2 Timing Related Issues, Temporary Works and Continuity of Operations

Refer to the electrical specification and head contract for services that are to remain operational during the works, the sequencing and programming and all associated requirements.

This section of the Specification shall be read in conjunction with any staging diagrams/ plans from the construction / project manager.

3.3 Interruption of Existing Services

Refer to the electrical specification for requirements relating to interruption of existing services.

Level 8, 9 Castlereagh Street
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ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

3.4 Redundant Equipment

The Contractor shall remove from the site all equipment and services which are to be made redundant as part of the works. The redundant equipment shall be disposed of by the Contractor. All effort shall be made to recycle redundant equipment associated with this Contract. The Contractor shall provide a waste management plan together with records of relevant disposal and recycling activities.

All redundant electrical and lighting equipment shall be removed. Redundant electrical services and control services shall be stripped back to source and associated ways in the distribution panels and shall be labelled as 'spare'.

Refer to electrical consultant documentation for all requirements.

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ABN 50 001 189 037
t : +61 / 02 9967 2200
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4.0 Codes and Regulations

4.1 Conformity with Codes and Regulations

The works shall be manufactured, installed and tested in accordance with Australian and AS/NZ Standards referenced in the National Construction Code of Australia or with other approved standards where the Australian Standards are not applicable.

All works shall be in accordance with this specification and the current Australian Standards and standards detailed within.

Except where the specification required a higher standard, the work is to be carried out in strict conformity with the provisions of all relevant Acts, Ordinances, Regulations, Codes, etc. of:

- The Insurance Council of Australia;
- The Standards Association of Australia;
- The National Construction Code of Australia.

Authorities and Councils such as:

- The local Council;
- The local water and electricity supply authorities;
- NSW Fire Brigade;
- Environmental Protection Authority;
- Metropolitan Waste Disposal Authority;
- WorkCover;
- Any other Authority having jurisdiction over the installation to ensure that the machinery and installation will comply with the Rules and Regulations.

On completion of the installation and prior to final payment being made the Contractor is to arrange for each Authority having jurisdiction to inspect and check the contract works and where required by the Superintendent to obtain certificates from such Authority to the effect that the equipment, machinery and installation complies with that Authority's requirements. These certificates are to be provided to the Superintendent.

4.1.1 Lighting:

AS/NZS 1158.0	Lighting for Roads and Public Spaces - Introduction
AS/NZS 1158.1.1	Lighting for Roads and Public Spaces - Vehicular traffic (Category V) lighting – Performance and design requirements
AS/NZS 1158.1.2	Lighting for Roads and Public Spaces - Vehicular traffic (Category V) lighting – Guide to design, installation, operation and maintenance

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
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AS/NZS 1158.2	Lighting for Roads and Public Spaces – Computer procedures for the calculation of light technical parameters for Category V and Category P lighting
AS/NZS 1158.3.1	Lighting for Roads and Public Spaces - Pedestrian Area (Category P) Lighting - Performance and Design Requirements
AS/NZS TS 1158.6	Lighting for Roads and Public Spaces – Luminaires – Performance
AS/NZS 3000	Electrical installations (known as Australian/New Zealand Wiring Rules)
AS 3137	Luminaires
AS/NZS 3827.1	Lighting system performance – Accuracies and tolerances – Overview and general recommendations
AS/NZS 4051.	EMC compliance:
AS/NZS 4879.2	External power supplies
AS/NZS 60598.1	Luminaires - General requirements and tests (IEC 60598-1, Ed. 8.0
AS/NZS 60598.2.1	Luminaires - Particular requirements - Fixed general purpose luminaires
AS/NZS 60598.2.2	Luminaires - Particular requirements - Recessed luminaires (IEC 60598-2-2, Ed. 3.0)
AS/NZS 60598.2.22	Luminaires - Particular requirements - Luminaires for emergency lighting
AS/NZS 6A1000.3.2	Harmonic limits
AS AS/NZS 6A0598.1	Luminaires, general requirements and tests
AS/NZS CISPR 15	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
IES LM 80	IES Approved Method for Measuring Lumen Maintenance of Led Light Sources IES LM 79 Electrical and Photometric Measurements of Solid - State Lighting Products
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

4.2 Workplace Health and Safety (WH&S), Service Aisles, Walkways and Access Spaces

The Contractor is to ensure adequate space be provided for servicing of equipment and parts in plantrooms and the general areas. Equipment shall be installed to ensure adequate serviceability without the need for unsafe work practices. Reference shall be made to:

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

- Manufacturer's installation instructions;
- WorkCover requirements;
- Australian Standards.

In locating equipment, the Contractor shall pay particular attention to furnishing easy access to it, in accordance with OH&S Act. The Contractor shall indicate all aisles, walkways and service areas around all items of equipment on drawings.

In the construction stage, all such aisles shall be preserved; piping, ductwork and cable trays shall be left above head level or along the wall or to the side where they will not interfere with passage.

The Contractor will be required to disassemble and reinstall any piping, supports or assemblies which interfere with the freedom of passage, at no extra cost. Where any doubt exists as to the adequacy and width of the passage way, verify the condition with the Superintendent before proceeding.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

5.0 Drawings and Technical Submittals

The overall target completion date has been specified elsewhere in this Contract. It is the Contractor's responsibility to programme the work in a logical and realistic manner to achieve the target completion date. In this context, it is the requirement of this specification that the logical sequencing of events is maintained:

- Equipment submissions; (samples, literature and prototypes)
- Equipment procurement/purchasing;
- Preparation and coordination of workshop drawings;
- Site coordination;
- Installation;
- Cleaning of equipment
- Testing and balancing/ adjusting
- Commissioning, including dynamic checking and verification of automatic control systems.

The above list is not intended to be exhaustive but to emphasise the sequence in which these key items should take place to avoid instances such as equipment being ordered prior to review thus leading to deviations from specification or coordination problems due to change in dimensions. Any unnecessary acceleration on the submission and review process due to events occurring out of sequence or delaying of some from the Contractor's initiative will not be accepted.

5.1 Contractor's Deliverables Register

Following Contract award, the Contractor shall prepare a register of all necessary Contractors' deliverables. This register shall be maintained as a "live" document throughout the contract until all items have been delivered. The register shall be issued on a regular basis (at least monthly). This will include items such as technical submittal, sample review submissions and co-ordinated workshop drawings. The register will show planned dates for delivery of submissions for review by the consultants. The Contractor acknowledges that certain equipment / co-ordinated workshop drawings / sample reviews require more time to review than others. Therefore to enable the consultant to ensure resources are available to carry out reviews at the necessary time, the Contractor shall ensure that the planned review dates are advised with sufficient notice to enable the consultant to plan ahead. Any delays in reviews as a result of the review date information not been provided in time will be the Contractor's responsibility

5.2 Inspections and Hold Points / Tests

There are a number of hold points and witness points during the construction phase of the project which require inspection and verification. The Contractor shall provide sufficient notice (at least 2 weeks) to all relevant parties to attend inspections or for the review of submissions. Works shall not proceed without relevant authorisation.

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Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

Refer to the relevant sections of this specification for details on submissions, inspections/witness, testing and commissioning.

Hold Points Include:
- Submission and Review of Samples and Mock-ups
- Submission and Review of Workshop Drawings;
- Submission and Review of Technical Data;
- Inspection and Review of Installation works as detailed below:

    - Work Method Statements for specific works considered sensitive or works that may have an impact on the functional operation of the facility or adjacent facilities;
    - Prior concrete pour;
    - Inspection before removal of scaffolding or when certain areas are not to be accessible any more for other reasons;
    - Commissioning, Calibration, Testing and Certification of all systems prior to Completion and Occupation.

The above list is not intended to be exhaustive but to emphasise the sequence in which these key items should take place to avoid instances such as equipment being ordered prior to review thus leading to deviations from specification or coordination problems due to change in dimensions. Any unnecessary acceleration on the submission and review process due to events occurring out of sequence or delaying of some from the Contractor's initiative will not be accepted.

5.3 Contractor's Drawings

The Contractor is to provide complete manufacturing and installation Shop Drawings and all necessary technical data covering the Work under the Contract.

All drawings shall adhere to the following requirements:

Drawings are to be prepared in digital format and submitted to the Principal's Authorised Person in PDF in accordance with the following requirements:

- Drawings are to be prepared in digital format and submitted to the Principal's Authorised Person in PDF;
- Prepare on DWG base from landscape layouts of the latest agreed revision number;
- Provide drawings to the actual service and equipment layouts;
- Drawings shall include the set-out dimensions from landscape elements;
- All Contractor's drawings for distribution shall be submitted by the Contractor in reproducible electronic format to the Principal's Authorised Person;
- All drawings shall be in accordance with the project specific and client guidelines, the version of which is current at the date of acceptance of this contract.

Where necessary further copies of drawings shall be submitted to the appropriate authorities.

Drawings are required for:
- Manufacturer's drawings of purpose made equipment;
- Details of labelling and engraving;

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e : info@steensenvarming.com

- Lighting Layouts and Lighting Controls SLDs;
- Sections and Details;

Revised Contractor's drawings shall be submitted by the Contractor, if requested.

Refer to the Contractors Drawing Definitions section for further information on what is required for each drawing submission.

5.4 Samples

The Contractor shall submit for the review of the Principal's Authorised Person prior to commencing installation samples of all accessories, fitting and apparatus proposed to be used in the work and only such items as are approved may be installed.
Samples to be submitted include but are **not** limited to the following:

- All luminaires specified, in working order;
- Lighting control items
- Control interface
- Others as noted in the relevant sections

To facilitate a full understanding and visualisation of the proposed works some equipment will be required to be 'mocked up' to clearly demonstrate its installation method and coordination with other elements.

The Contractor shall make an allowance for amendment and resubmission to be made and ordering, fabrication or manufacture to commence in accordance to satisfy the Contract Program.

5.5 Electronic Submittal Procedures

All Contractors' submittals shall be transmitted in electronic (PDF) format. The intent of electronic submittals is to improve environmental impact and expedite the construction process by:

- Cost – reduced cost of paper, printing, time, and couriers;
- Time – reduced turn around and transfer time;
- Environmental – reduced use of paper, toner and transport.

Refer to the main contract documents for further details and requirements.

5.6 Contractor's Drawing Definitions

Refer to the main contract documents and requirements.

For lighting the following is required.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
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5.6.1 Design Drawings

The contractor shall do a full detailed design drawing set including schematics at a scale of no less than 1:100 for review by the Principal.

5.6.2 Coordinated Workshop Drawings

Coordinated workshop drawings shall show the inter-relationship of two or more engineering services and their relationship to the street. The main features of coordinated working drawings shall be as follows:

- Plan layouts shall be to a scale of at least 1:100;
- The drawing shall make allowance for installation working space and space to facilitate commissioning and maintenance;
- The drawings shall be spatially co-ordinated and there shall be no physical clashes between the system components when installed, critical dimensions, datum levels and invert levels shall be provided;
- The spaces between pipe and duct runs shown on the drawing shall make allowance for the service at its widest point. Insulation, standard fitting dimensions and joint widths shall therefore have been allowed for on the drawing;
- The drawing shall indicate positions of main fixing points and supports where they have significance to the structural design or spatial constraints;
- The drawing shall indicate integration of lighting within built elements and set-outs from key landscape and urban features;
- The drawing shall indicate aiming arrangement of all pole lighting elements;
- The drawing shall indicate the position of the gobo lighting extent;
- The drawing shall indicate co-ordination with all other services including electrical.

5.6.3 Installation Drawing

This is defined as a drawing based on the detailed design drawing or coordinated workshop drawing with the primary purpose of defining that information needed by the tradesmen on site to install the works.

The main features of installation drawings shall be as per co-ordinated workshop drawings plus:

- Allowances shall be made for inclusion of all supports and fixings necessary to install the works;
- The drawing shall make allowances for installation details provided from manufacturers' drawings;
- Allowances shall be made for plant and equipment. This includes any alternatives to the designer's original specified option that have been chosen;
- Ensuring that the required test points are incorporated to allow satisfactory testing, regulating and commissioning.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

5.6.4 Manufacturer's Drawing

This is defined as a drawing prepared by a manufacturer, fabricator or supplier for a particular project, and which is unique to that project. Examples include drawings for luminaire length, luminaire installation, customised lighting elements such as the pole lighting arrangement, control and switchgear panels and associated internal wiring.

5.6.5 Builders' Work Information

This is defined as a drawing to show the provisions required to accommodate the engineering services which significantly affect the design of the building structure, fabric and external works. Also, drawings (or schedules) of work to be carried out by building trade and are required to be costed at the design stage, such as plant bases.

The critical criterion with builders' work information is that it includes all openings (or other provisions) which significantly affect structure, fabric or external works. Builders' work details Drawing to show requirements for building works necessary to facilitate the installation of the engineering services.

Builders' work details carry forward and confirm or refine tile structurally significant items from tile builders' work information, and also introduce new items that are not structurally significant, such as plinth dimensions for the actual plant items ordered.

5.6.6 Works as Executed Drawings

This is defined as a drawing showing the building and services installations as installed at the date of practical completion. The main features of the 'Works As Executed Drawing' shall be as follows:

The drawings shall be to a scale not less than that of the installation drawings;
- Locations of all the lighting, remote control gear, switches, sensors;
- The drawing shall be labelled with appropriate luminaires names and circuit/ control groups;
- The drawings shall have marked on them positions of access points for operating and maintenance purposes;
- The drawings shall not be dimensioned unless the inclusion of a dimension is considered necessary for location.

5.7 Operating and Maintenance Manual

Prior to the production of the 'Operating and Maintenance manuals', the Contractor responsible for providing the drawings shall allow for adequate time on site to liaise with the Client to reach an agreed documentation standard.

The Contractor shall submit to the Principal prior to Completion Operating and Maintenance Instruction Manuals which shall comprise a description of each

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

installation, its operation and the regular operating and maintenance routines to be adopted.

Electronic versions of Operating Instruction Manuals shall be provided, adequately sectioned and annotated into volumes and referenced.

Refer to the electrical specification for specific requirements.

The following is to be included for lighting:
Lighting Content of O&M Manuals:

Lighting Installation General

- The purpose of the installation;
- Installation records;
- Description of the installation;
- How the installation is to be used;
- How to keep the installation operational;
- Maintenance schedules;
- How the installation may be changed;
- Disposal of the installation.

The following sections set out a presentational sequence for an O&M manual, describing what is required under each heading.

Contractual and Legal Guides:
The contractual and legal records of an installation shall include;

- The name and address of the installation;
- Details of local and public authority consents;
- Details of the design teams, consultants, installation contractors and associated sub-contractors;
- Dates for the start of the installation, for handover (practical completion) and for the expiry of the defects liability period;
- Information on all guarantees affecting components, systems and plant items, together with expiry dates and names, addresses and telephone numbers of relevant contacts.

For each item of equipment/ luminaire type installed and contained in the list of services covered by the O&M manual, copies of the following documents shall also be provided, where applicable:

- Test certificates;
- Manufacturers' guarantees and warranties;

A clear statement shall be made in this section concerning hazards and safety precautions of which the operators and maintainers need to be aware. This shall include;

- Any known feature or operational characteristic of the equipment or systems installed which may produce a hazard;
- Any known hazards against which protection can be provided;
- Any mandatory requirements relating to safety;

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

- Any other safety precautions which shall be observed;
- Any other relevant warning.

Overall Purpose
This section shall provide a general overview of the original design intent (available in outline from the design brief and in detail from the specification). It shall include a summary for each engineering system installed, giving:

- The parameters and conditions within which it has been designed to operate a system;
- The type of each service (gas, electricity and water) required to operate a system;
- The intended method of control.

The section shall be kept as brief as possible.

Description
This section shall provide a detailed description of each engineering system installed. It shall include:

- The system type;
- System location and what it serves;
- What the system depends upon in order to function;
- Design data, basic design parameters, basic assumptions made during design;
- Reasons for selecting particular equipment;
- Expected service life (where available);
- Planned operational efficiency.

Equipment Schedule
The type, model number and serial number of all component items within the system shall be listed, together with the names of their respective manufacturers or suppliers.

Parts Identification and Recommended Spares
This shall comprise a parts identification list detailing and identifying replaceable assemblies, sub-assemblies and components. It shall include suppliers' recommendations for both spares and running spares (parts required for replacement due to wear or deterioration).

Items normally held in stock by a supplier, or for which a refurbishment service is available, shall be identified separately.

Spares Policy
This section shall offer a guide to the setting up of a spares facility including recommended stock levels. It shall be prepared after consultation with the occupier regarding the consequences of failure, risk to core business, and the period of acceptable downtime. It shall also take into account suppliers' recommendations as given above. Again, those items normally held in stock by a supplier (or for which a refurbishment service is available) shall be clearly identified.

Commissioning Data
The results of all commissioning work and associated tests shall be given. This shall include all Light level and lighting control settings agreed upon and programmed.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

Operation
Instructions shall be given for the safe and efficient operation of the lighting system, under normal and emergency conditions. These will be in addition to manufacturers' literature, and shall include:

- A recommended strategy for operation and control;
- An outline of the general operating mode;
- Standard operating and emergency operating procedures

Maintenance Instructions
The manufacturer's recommendations and instructions for maintenance shall be detailed for each luminaire and item installed. Clear distinction shall be made between planned tasks (preventative maintenance) and work done on a corrective basis.

Maintenance Schedules
Maintenance schedules shall be provided for all preventive maintenance tasks. These shall be based on both manufacturers' recommendations and other authoritative sources (such as statutory or mandatory requirements).The schedules shall include:

- Inspections;
- Adjustments;
- Periodic overhaul.

The frequency of each task may be expressed as specific time intervals, running hours or completed operations, as appropriate. Collectively, the schedules will form a complete maintenance cycle, repeated throughout the working life of the installation.

The source of the schedules shall be stated, and necessary periodic inspections and tests for instance, local authority or supply authority purposes shall also be noted.

Fault Finding
Procedures for the logical diagnosis and correction of faults shall be provided.

Names and Addresses of Manufacturers
Details of all manufacturers and suppliers of equipment listed in the manual shall be provided, including name, address, telephone number, e-mail contact and website. Any additional information likely to help the building operator make contact with, or obtain advice from, a manufacturer or supplier shall also be included.

Index of Plans and Drawings
An index shall be provided of all 'Works As Executed Drawings' supplied during the installation process, identified by number and title. The index shall also include a schedule of all drawings issued by manufacturers and suppliers during the course of the installation work, such as control panel wiring diagrams.

Handover O&M Manuals
A complete set of all manufacturers' literature shall be provided for the equipment installed.

This literature shall provide the following information:

Manufacturers Literature

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

- Description of the product as purchased;
- The cost and date of purchase;
- Performance-behavioural characteristics of the equipment in use;
- Applications (suitability for use);
- Operation and maintenance details;
- Labour, plant, materials and spatial resources required;
- Methods of operation and control;
- Cleaning and maintenance requirements;
- Protective measures;
- Labour safety and welfare associated with the equipment;
- Public safety considerations.

Where the data is not adequately provided in manufacturers' literature, the author of the O&M manual shall attempt to gather the information. If the information proves unavailable, or if a supplier is unwilling or unhelpful, this shall be treated as a breach of contract.

5.7.1 Training and User Guide

The Principal's nominated staff, shall be fully instructed by the Contractor in the operation and maintenance of the installed services, and this shall commence with the commissioning of the lighting design.

This instruction shall extend over the whole of the commissioning, running-in and maintenance periods and shall include "hands on" instruction to provide familiarity with the whole system. At the same time "class room" type instruction shall be given to cover major components.

The instruction shall be carried out by specialist engineers to the satisfaction of the Principal. Provide all certificates necessary to occupy and operate the installation.

Perform all necessary training to ensure satisfactory operation of the system by the users of the system.

The training shall take the form of two (2) days on-site with six nominated end-users of the system covering all aspects of the operation of the installed Lighting Control System.

At the completion of the project and after the completion of commissioning, the Contractor shall provide the client with a set of clear instructions and operational procedures of using and running the systems.

The Contractor shall:

- Arrange a meeting with the client and other stakeholders to present the systems, how they function and how the instruction and operational procedures will enable the client to occupy and operate the systems successfully and efficiently, including any trouble shooting procedures;
- After the meeting, conduct a tour of the installation to all relevant areas to familiarise the client and other stakeholders of equipment/system locations and access routes for operation and maintenance;

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

- At the end of the Defects Liability Period, arrange a meeting with the occupants, client and the Principal's Authorised Person to present how the systems have functioned, illustrate that all defects have been rectified and maintenance have been carried out;
- Provide a User Guide for the building occupant.

5.8 Preventative Maintenance

The contract works shall be maintained in a complete and satisfactory working order during the twelve (12) months following Contract Completion Date. The Contractor shall be responsible for the supply and cost of all parts and expendable items during this period.

The Contractor shall maintain the plant in accordance with the duties listed in the Operating and Maintenance Manual.

5.8.1 Warranties

Refer to the main contract documents for the extent of the Defects Liability Period. In addition to the warranties required under the Defects Liability Period provide warranties on all services and systems, including installed reticulation systems, wiring systems and communication systems. Include the details of such warranties within the Operation and Maintenance Manuel. All warranties shall include parts, labour, delivery, any re-testing and/or commissioning, removal and disposal of faulty parts. All warranty periods shall commence on the date of handover, the Contractor shall make any necessary arrangements with equipment suppliers to ensure of this requirement is met.

5.8.2 Certification

Prior to Contract completion, the Contractor shall provide to the Principal's Authorised Person one copy of a file containing all Certification required under the Contract, including but not limited to:

All construction Certification provided by the Contractor's installers, including all support material as above;

- A covering certificate from the Contractor confirming the works comply with all relevant Codes, regulations and requirements;
- The file of Certification shall commence with a detailed list of contents, followed by the Contractor's Certificate, and then followed by general Certification.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

6.0 Lighting - General

6.1 Lighting intent

The new lighting to Cronulla Mall utilises an integrated services pole to provide both circulation lighting and experiential lighting within a minimalist and simple aesthetic that reduces visual clutter. A unique colour change element creates a visual marker connecting to the Kingsway. The opposite pole arrangement and pole layout sets a grid for the mall and demarcation of circulation and gathering spaces.

Brighter edges define the main circulation zone, whilst greater use of light, shade and accents through the central zone allow special elements to stand out, create visual interest and support places of gathering.

Integrated lighting to the benches, trees, playground and shade structure, combined with feature lighting elements within the pole, provide human scale, layered lighting, visual interest and overall ambience.

The playground intervention at both ends of the mall has integrated lighting to enhance these sculptural elements at night. Projected light 'bubbles' on the ground plane visually link the spaces and conceptually integrate the whale head and whale tail with the whale blowing bubbles from it's mouth, splashing around in the water, and flicking up it's tail. The 'bubble' pattern is also reflected in the unique pole beacon element for visual cohesion.

Dynamic lighting elements including the unique pole beacon element, projected gobo lighting and shade structure integrated lighting activate the mall, creating surprise and delight.

With different modes of operation for different times of the night, the mall lighting responds to changes in use of the space over the evening and reduces light in the late evening when not required.

6.2 Extent of Work

The extent of works shall include the supply, delivery, installation, commissioning, testing, certification and warranty of the lighting design as specified and indicated on the drawings and specification.

The extent of work includes but not limited to the following:

- Coordination with other services and infrastructure;
- Coordination with landscape elements and related trades;
- Coordination with urban elements including furniture, playground, shade structure requirements;
- Coordination of lighting elements and third party equipment mounted to P2 poles;
- Coordination of tree mounted lighting with final tree types as installed on day 1;
- Disconnection, Demolition and Removal of existing redundant lighting services

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

(refer to electrical documentation)
- Power infrastructure to luminaires (as per electrical engineer's documentation)
- Cables, wiring systems (as per electrical engineer's documentation);
- Luminaires including light sources and control gear, mounting systems and block outs;
- Lighting control systems (as per electrical engineer's documentation to meet functional description);
- Playground and shade structure electrical connections, associated electrical infrastructure, installation of remote LED control gear, integration with the control system, certification of installation. (Integrated playground and shade structure lighting is to be supplied, installed, tested and commissioned by the Council appointment Playground installer);
- CCTV and liaising with Council for the final arrangement and integration requirements with their systems;
- Workshop Drawings;
- Samples;
- Mock-ups and prototypes;
- Testing and Commissioning;
- As Built Manuals and Drawings;
- Operation/User Manuals;
- Training;
- Warranties;
- 12 months Defects liability;
- 12 months Preventative Maintenance.

All works and equipment of a minor nature not specifically mentioned but necessary for the operation for the above mentioned equipment and systems.

6.3 General

Supply and install all luminaires and lighting controls as indicated on the drawings and as specified. All luminaires are listed on the legend / luminaire data sheets and must be installed complete with light sources, control gear and accessories necessary for their proper functioning and must be in accordance with the provisions specified herein.

All luminaires are to be accessible for maintenance with only reduced need for access equipment.

The Contractor will be required to finalise the lighting detailing (in coordination with the relevant trades) and associated cabling and control gear locations as outlined in this specification and as indicated on the drawings.

Specific manufacturers or trade names or figure numbers mentioned in the Luminaire Data Sheets are for the purpose of defining the required lighting/ photometric performance, class of materials, form, quality, design and workmanship and have also been tested in calculations and proposed detailing.

The following selection criteria inform the luminaire selection:

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

- Performance (photometrics, Light output ratio/ luminaire efficiency, operating temperatures and heat management, size uniformity of luminous surfaces and openings, glare ratings);
- Quality (workmanship, quality of manufacture and components, Ingress protection ratings, class of material);
- Architectural quality and aesthetics (including shape, dimensions and finish);
- Detailing (incl Form, size etc);
- Track records of lighting/ luminaire companies.

The Contractor must be responsible for the specified performance of the equipment and materials and of the installations of which they form part. The Contractor should therefore obtain from such manufacturers or suppliers adequate guarantees in respect of such equipment and materials, and ensure that the supplied lamps and control gear are compatible.

At the commencement of the project the Electrical Contractor must notify the design team of the lead times of the fittings and must confirm the lead times prior to placing an order. The Electrical Contractor is responsible for ensuring the delivery schedules meet the program requirements.

6.4 Workshop Drawings

Refer to Section 4 for complete workshop drawing requirements.

Specifically, the following workshop drawings must be submitted and approved:

- All pole arrangement for each pole type – including orientation of all elements including third party elements
- Catenary lighting arrangement
- Playground integrated lighting (by Council's nominated playground installer)
- Shade structure integrated lighting (by Council's nominated playground installer)
- Integrated seating lighting within furniture
- Lighting control system including user interface

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

7.0 Lighting Equipment

7.1 Equipment Selection

Refer to the Luminaire Data Sheets for all luminaires, accessories and specific requirements.

The equipment selections have been made to
- Align with the overall intent for the lighting atmosphere (as described above)
- Align with project requirements and aspirations, including aesthetic and functional needs
- Integrate with other services

7.2 Spares and Contingency

A number of additional luminaires and accessories shall be supplied to the client for future requirements. The following spare parts shall be provided as part of the works:
- Provide extra length of LED luminaires for type L2 and L4 for future maintenance;
- Provide additional spare lenses as nominated in the luminaire datasheets;
- Provide 5% spare lenses, covers and snoots for catenary lighting elements;
- Provide 5% spare gobos for the projector

7.3 Light Sources (LED)

Approved LED manufacturers are as follows: Cree, Philips (Lumileds), Nichia, Osram, GE, Xicato or as specifically specified in the Luminaire datasheets.

If other manufacturers are suggested by the contractor, written acceptance must be obtained from the Superintendent.

The LEDs are
- To be supplied with suitable control gear to match the load;
- Colour consistency to be checked and confirmed prior to installation;
- LED components to be binned for flux, colour (in wavelength) and forward voltage (Vf).
    1. Manufacturer to provide confirmation of Binning for future lamp replacements.
    2. The binning coordinates should be contained within a 3-step Mac Adam ellipse.
- The rated lamp life should be a minimum of 50,000 hours operation with 80% lumen maintenance;
- Contractor to provide the following confirmation from the LED luminaire supplier/ manufacturer as per of the O&M manuals:
    - Confirmation of how colour consistency is ensured among fixtures and test data demonstrating colour stability over time to be provided;

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

- Confirmation that the thermal management system keeps the LED junction temperature below specified maximums;
- Written binning policy;
- Written end-of-life policy, and how spares will be made available;
- Length of warranty, and details of what exactly is covered (details of which components are included and if labour is included);
- Details of LED manufacturer.

7.4 Control Gear

LED Control Gear shall be capable of following:

- Digital Controlled Dimming with a dimming curve equal to Tridonic or Dynalite;
- Switching operation should only be via a digital signal;
- Constant light output independent of fluctuating supply voltage between 198V-254V;
- Have polarity free control bus;
- must meet IEC harmonic standards;
- Power factor greater than →0.95;
- High Frequency Operation: operating frequency 40-100 kHz;
- Intelligent Voltage Guard;
- Intelligent Temperature Guard;
- DALI / DMX Compatible and programmable/ addressable via the digital control bus;
- Error feedback and Programmable features in DALI/ DMX Mode;
- Ta of → 50 Degrees C;
- Energy class CELMA A-1 Energy Efficiency Index (EEI);
- ENEC and CE identification and Certified to:
  - EN 55015,
  - EN 55022,
  - EN 61347-2-4,
  - EN 60925,
  - EN 61347-2-3,
  - EN 60929 8.1.
- must meet IEC harmonic standard EN 61000-3-2;
- ASIC light management.
- Fully electronic lamp management and digital communication with ASIC (Application Specific Integrated Circuit) and microprocessor.
- Safe shutdown of defective lamps;
- Automatic restart after lamp replacement;
- thermally protected and in compliance with IEC specifications 928 and 929 for safety and performance.

- LED drivers are to be provided from an approved list of manufacturers these include:
- EldoLED
- Philips
- Tridonic

If other manufacturers are suggested by the contractor, written acceptance must be obtained from the consultant.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

Due to the environmental conditions, all remote LED control gear is to be IP68 rated.

Where colour tuneable lighting is required (as nominated in the datasheets), DALI type 8 will be required and the correct control gear and systems need to be provided to enable colour tuning (warm to cool).

7.5 Installation of Luminaires

The luminaire installation must be conducted in accordance with the luminaire manufacturers' instructions and recommendations.

The installation of the lighting must include a number of Hold Points prior to final order of fittings. Samples of the proposed fittings must be submitted for inspection, testing and mock up. Acceptance of the proposed fittings is subject to successful mock-up of the fittings at night. The lead time of such fittings needs to be considered in this exercise.

Generally the orientation and exact direction of the fittings must be confirmed prior to installation.

The fittings must be positioned in alignment in accordance to the lighting consultant's and landscape/ civil documentation.

The orientation of all elements within and mounted to the P2 lighting poles are to be approved in shop drawings.

Luminaires must be arranged to suit the desired lighting effect and be positioned in accordance with manufacturers' recommendations.

All luminaires must be effectively earthed.

Luminaires must not be used for illumination during construction.

7.6 Location

The exact location of the lighting must be determined from the Landscape / Civil drawings. The final positions must be agreed on site and must take into account coordination of services and specific Australian Standards.

The lighting detailed to date must be included as part of the contract works and minor alterations must be forthcoming. The final location of luminaires is subject to change and allowances in the tender must be made for such minor alterations.

Any modifications and deviations to equipment and services from those shown on the drawings must be made where necessary to accommodate the services within the actual space conditions.

All equipment which must be serviced, operated or maintained must be located in fully accessible positions. Access doors must be furnished as required for this

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

purpose. If any equipment cannot be so located the same must be brought to the attention of the Superintendent.

The Contractor will at all times be fully responsible for the correct positioning and installation of all work and equipment installed by them in accordance with the specification and in consultation and co-operation with all other trades. No extra costs of any kind will be allowed if work and equipment has to be removed and replaced.

7.7 Supports

Mount luminaires on proprietary supports by means of battens, trims, noggings, roses and packing material, as necessary.

All screw, battens, roses, noggins, trims, packing, etc., necessary for the proper fixing of luminaires, must be provided by the subcontractor as part of the works, whether individually specified or not. Packing pieces must be fitted where required to level the luminaires and to prevent distortion.

Where a building member does not exist in the position required, the Subcontractor must supply and install a suitable fixing. Metal sections provided in suspended ceilings must not be smaller than the main framing of the suspended ceiling.

Adjust the length of suspensions so that the lighting system is level and even.
Tolerance: ≤ 3 mm.
Levelling: The suspension system length must be adjusted so that the lighting system is level and even.
Where required, fit packing pieces to level luminaires and prevent distortion of luminaire bodies.
The trim-less luminaires must be installed by the Plastering contractor according to the manufacturer's recommendations prior to termination by electrical contractor.

7.8 Samples

Samples of **all** luminaries specified, the proposed equipment and installation must be submitted for approval prior to commencement of manufacture or the placement of orders.

Samples to be submitted include all luminaires and items of equipment as documented and specified.

The samples must be in working condition and equipped with all light sources and control gear as specified and necessary for their proper functioning.

Also provide technical detail and literature as required and detailed throughout the specification.

The samples should be submitted in a timely manner.

There are some critical luminaires that are to be reviewed as full working samples as a matter of priority – the specific types are noted in the luminaire data sheets.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

At the commencement of the project the Electrical Contractor must notify the design team of the lead times of the fittings and must confirm the lead times prior to placing an order. The Electrical Contractor is responsible for ensuring the delivery schedules meet the program requirements.

Make allowance for amendment and resubmission to be made and ordering, fabrication or manufacture to commence in accordance to satisfy the Contract Program.

It is noted that all equipment when required to be white must be matte (unless specified otherwise).

7.9 Mock-ups and Prototypes

Following a shop drawing review process, a number of luminaires are to be prototyped and reviewed once the shop drawings are approved.

Prototypes:

- Playground integrated lighting of dichroic panels (type L2) (By Council's nominated Playground installer)
- Shade structure integrated lighting of dichroic panels (type L4) (By Council's nominated Playground installer)

A number of lighting installations need to be tested/ mocked-up for final decision on mounting arrangements, luminaires, lumen output, beam degree etc.

Mock-ups:

- Projector lighting (mounted to P2)

The following equipment must be provided by the contractor for the mock-ups if required to undertake the mock-up:

- Scissor lift with operators and harnesses (for operator and passenger). Scissor drivers may need to be licensed electricians (a well as being operators). Barricades may be required;
- Standby Generators – for external and/or/if no power is available.
- Power leads and power boards;
- Tools and Accessories such as screwdrivers, Allen keys, pliers, spanners, scissors and craft knives and consumables such as masking tape, matte black cardboard and cotton gloves;
- Additional LEDs with different colour temperatures should be provided for the mock-up to confirm the specified light colour – if required by the lighting design

It is envisaged that the mock-ups will involve 1-2 licensed electricians, with one of them holding a scissor lift operating license, the lighting designer and one representative of the architects and client.

A review of all mock-ups must be conducted by the lighting designer, client and architect.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

7.10 Alternatives

The luminaries stated in the luminaire data sheets shall be allowed for by the Electrical Contractor in the tender price.

Any alternative offers of equipment shall be clearly indicated in the tender together with the price variation that would result and details of differences to the specified fitting.

If alternatives are submitted, the equipment shall be as specified or approved equal in every aspect. It is Contractor's responsibility to provide well documented evidence comparing the alternatives with that specified to substantiate the equality of the alternative. The basis of the luminaire specification (selection criteria as noted in the luminaire data sheets) shall also form the base for the selection of alternative fittings.

It is the contractor's duty to ensure that any luminaire submitted as an alternative to a specified item meets the same standards as the specified item, achieves the same results and has the same standard of review by members of the design team:

- Alternative equipment must be considered both individually and in relation to other items on the project to ensure aesthetic acceptability.
- The basis of the luminaire specification (selection criteria as noted in the data sheets) must also form the base for the selection of alternative fittings;
- The submission of full photometric characteristics for all alternative luminaires being offered must be ensured, including the necessary polar curves or equivalent as well as detailed lighting calculations;
- The equipment being offered as alternatives must be of equal quality, durability and robustness as the specified items;
- Alternative fittings need to be assessed by the same parties that are involved in the approval of specified luminaires;
- Samples for both specified and suggested alternative luminaires and any components forming the total luminaire and its support must be submitted for approval prior to commencement of manufacture or the placement of orders;
- The energy consumption of the submitted luminaire must be checked against that of the specified luminaire
- The ease and simplicity of maintenance should be considered as part of any assessment of any alternative submitted;
- Any alternative luminaires should meet any specific maintenance factor for the installation;
- The adjustments, if any, that would be affected to the tender price if the alternative were approved;
- For any alternatives submitted, it is the contractor's responsibility to ensure that the power requirements satisfy the maximum demand, the fitting dimensions match the details and construction process and the lead time matches the overall procurement strategy;
- The Electrical Contractor is responsible for ensuring the delivery schedules meet the program requirements.

The Contractor must not order or install alternative equipment and materials prior to the Superintendent's written authority.

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8.0 Lighting Control

8.1 General

The contractor is to provide a new intelligent lighting control system to support the new Cronulla mall lighting. The control system is to:

- Support relay on/off, DALI dimming, DMX dimming, MLV dimming with individual dimming control to each lighting element
- Automation of various scenes throughout the evening as well as support the dynamic lighting elements reflecting the conceptual narrative.
- All dynamic elements must have smooth and deep dimming for a successful visual outcome.
- All lighting dimming or colour change transitions are to have a smooth fade rate.

The system design is to provide provision/ capacity to extend and support the new Cronulla town square lighting in the future for a complete functioning system co-ordinated with the electrical staging.

The system is to facilitate web based remote control for Sutherland Shire Council via a 4G network.

The system is to facilitate fault finding.

The system is to have a graphical user interface.

For event mode, the user interface is to have pre-set colour settings for the lighting pole beacon element. The Contractor is to liaise with Council for the required colour settings.

The system specification and design is by the electrical consultant – refer to the electrical documentation.

8.2 Operation

The lighting control is to be automated via time clock.

The following scenes are to be programmed with the final settings confired in commissioning.

Sunrise – Sunset:

- All exterior lighting off

Sunset – 9pm

- All lighting to be on with dimming levels set to achieve a balanced lighting outcome
- A ripple of light once every half hour to create surprise and engagement (see ripple of light description below)

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- Subtle, slow change in intensity and white light colour temperature (shifting from warm to cool white) for projected gobo lighting (mounted to P2). The colour settings are to have a summer and winter mode. Summer – cooler white ones. Winter – warmer white tones. The final CCT and intensity settings are to determined during commissioning.
- Shade integrated downlights (type D1) to dim up and down

9pm – 11pm

- As per Sunset – 9pm
- General pedestrian pole lighting to reduce in intensity

11pm – Sunrise

- Tree lighting, bench lighting, playground lighting, shade structure lighting to turn off.
- General pedestrian pole lighting to stay on and reduce intensity
- Gobo lighting to stay on in a static mode and reduce in intensity
- Pole beacon element to stay on at a dimmed level and amber colour temperature

Ripple of Light

- Every half hour, a water ripple of light down the mall to create surprise and delight
- Pole gobo projector lighting: light to dim to off. Starting at the whale mouth, 'bubbles' of light turn on moving up the mall as the whale blows water from it's mouth and splashes in the ocean, ending at the whale tail and Kingsway end of the mall. The light intensity and colour to shift as per the sunset mode.
- Pole Beacon Element: A shift in colour temperature from amber to white moving from the whale head to the whale tail following the gobo lighting. At the same time, the intensity should dim to a low level then increase to full output.
- D1 spotlights within the shade structure: To dim to off. Starting at the whale mouth, the lights are to dim up to full intensity following the gobo lighting.

Special Events

- For special events, the pole beacon element has RGBW functionality. A specific colour is to be selected through the user interface (pre-set option or colour wheel). All beacon elements are to be the same colour throughout the mall and also in the Kingsway. The control system is to allow the colour over-ride to be set for a period of time, after which it should be revert to the original settings. When the colour mode is selected, for the ripple of light, the beacon is to dim to a low level, then increase in intensity, rather than shift in colour.

Pole Beacon Element

- Settings 1 – for the general evening to be amber
- Setting 2 – for the ripple of light, automated shift in CCT from amber to warm white
- Setting 3 – For event mode, RGBW functionality selectable through the user interface.

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8.3 Circuiting

Circuiting of the lighting must fully comply with AS3000 and have 25% spare capacity. The circuiting must also be arranged to suit the required switching and control proposal. Refer to the electrical drawings for circuiting arrangements.

8.4 Light Switches

Refer to electrical drawings and equipment schedules and/or drawing legends for the light switch type and details.

Also provide labelling on the light switches where the operation of the switch is not apparent. The label must identify the functional use of the switch, i.e. ‘corridor’.

8.5 Dimmers and Control

The Contractor must supply and install dimmers and dimmer controls as indicated on the drawings and as specified. Each dimmer must be selected and sized to suit its lighting load and application. The Contractor must submit details of the proposed dimmer for review and approval prior to ordering.

The dimming system is designed and specified by the electrical consultant – refer to electrical consultant documentation for requirements.

Dimmers must be located adjacent to electrical distribution boards.

The system must be fully compatible with all the dimmable electronic ballasts and electronic transformers incorporated within the luminaires nominated.

All Load Controllers must be DALI and/or DMX and/or MLV as nominated and designed to operate continuously at 100% of rated load.

The control equipment need to provide the flexibility noted in the control drawings/ operation intent and match the relevant loads of the groups.

The controller should include or be connected to a relay which allows the load to be turned off completely when turning the lighting off.

Refer to electrical consultant specification for details on control system and equipment.

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9.0 Lighting Commissioning

The Review, Testing and Commissioning process must ensure that the lighting design intent is realised in the final installation.

Commission and test all aspects of the lighting system in accordance with the Australian Standards and Manufacturers' recommendations.

The commissioning process includes the setting-to-work of the lighting installation, the regulation of the system and the fine-tuning of the lighting system.

All necessary labour, manufacturers'/ suppliers' representatives, instruments, manufacturer's literature and fuel must be made available by the Contractor. Record manufacturer's name and model number of each instrument used in all tests and last date of calibration.

All test data will be tabulated with design requirements. All test data must be signed and dated by the contractor's representative, with details of his official position.

9.1 Pre-commissioning

All final settings must be agreed at commissioning stage.

All luminaire positioning that requires co-operation with other installers (such as air conditioning contractors or plasterers) should be coordinated well before commissioning stage.

All lighting system components should be installed according to the lighting drawings and specifications, all components should be those specified in the original design.

All control gear must be checked for compliance with the associated light sources.

Luminaires should be in the correct position (as defined by drawings) and in the correct orientation. The spacing between the fittings must be as shown in drawings. Critical offset distances of luminaires or structures must be achieved according to architectural and lighting documentation.

Alignment of all luminaires should be checked to avoid glare and unwanted spill light.

All luminaires must be clean and undamaged with the correct lamps fitted. All safety accessories on luminaires should be securely mounted; associated remote control gear should be fixed securely and concealed in a secure position.

The operation of all luminaries must be verified and faulty equipment must be replaced.

The Grouping of the luminaires must be as shown in the lighting drawings.

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All lamps must have the correct colour temperature as specified.

The installation of all luminaires must be carried out in accordance with the lamp and luminaire manufacturers' installation instructions and manuals.

All items must be uniquely and clearly labelled.

9.2 Commissioning

The exact details of any proposed Testing and Commissioning must be confirmed and agreed prior to arranging the time and date.

The operation of all the aspects of the lighting system must be demonstrated.

It is important that the aiming and focusing of directional/ adjustable luminaires (or luminaires with adjustable shield) and wall washers are adequately addressed. If other lighting needs to be switched off during the process, the site should be allowed to be free from other works requiring light.

The commissioning steps should be carried out as follows:

- The illuminances must be measured in key areas and checked against the requirements.
- The control system should work and be programmed correctly (as per documentation);
- It should be ensured that the light switches switch the correct zone of luminaires (as labelled);
- The luminaires should not dim to a point where flicker is detected. Appropriate time-delays must be set to reduce nuisance dimming caused by transient conditions;
- All default control settings should be correct and according to the lighting designer's intent. All scenes must operate according to the specification;
- The shading systems must work as specified. The shading should be minimised before the lights are activated and the lights should be switched off (or dimmed down) before the shading is activated;
- All sensors must be calibrated to give the specified light levels at the specified positions. The calibration should be performed using a certified, calibrated portable light meter.

The Contractor must engage the lighting control supplier or certified personnel to complete the detailed commissioning and programming of the lighting control systems to suit the various scenes and functions required. Details of the scenes and functions must be confirmed by way of workshop drawings and on site meetings.

It is envisaged that this exercise will involve at least 1 site meeting (after daylight hours) to ensure the intent of the lighting design is met. Thus reprogramming of the system to suit will occur.

The operation of all luminaries must be verified and faulty equipment must be replaced at no additional cost.

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The Contractor must allow to liaise with the dimming system supplier in order to ensure that default scenes and pre-sets as specified and required are programmed into the dimming system at practical completion. The dimming system supplier must provide commissioning staff to facilitate the final programming of the dimming system during the commissioning phase. Costs and charges associated with programming of the dimming system and engagement of the dimming system manufacturer's commissioning staff must be borne by the Contractor, and must be included as part of the supply and installation of the dimming and control system. The Contractor should allow for some or all commissioning sessions to be conducted outside normal working hours.

The contractor must engage the lighting control supplier or certified personnel to complete the detailed commissioning and programming of the lighting control systems to suit the various scenes and functions required. Details of the scenes and functions are provided on the drawings. The lighting control system functionality and various programmed scenes in the key areas must be reviewed by a Lighting Consultant representative.

The Electrical Contractor must allow for some of or all commissioning sessions to be carried outside normal working hours in order to capsulate night time settings etc.

The Electrical Contractor must allow a programming period of 1 day to revisit the system and make minor adjustments.

9.3 Final Checks

The lighting system should be checked for correct operation under representative operational conditions when the site is occupied. Contractor to allow for minor adjustments to the control settings to be undertaken with the client.

The Contractor must provide 'As Built' Documentation in accordance with the Specification including results of the testing and commissioning for review by the Lighting Designer and relevant stakeholders.

Prior to the issue of the `Final Certificate' the performance of all safety and control functions of each system must be verified by way of certified report from the respective manufacturers or suppliers. Such checks must be undertaken regularly and not later than one (1) month before the schedule expiry date of the Defects Liability Period.

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10.0 Tender Schedule

10.1 Schedule A - of Tender Price Lighting Design

The following schedules are to be completed and returned when submitting the tender.

The price filled in by the Tenderer against each item must include all charges including purchase of materials, GST, labour, delivery to site, off-loading, travel, overhead and profit.

All electrical works and lighting control system to be completed as part of the electrical Tender return schedules.

Item No.	Title of Work		Tender Price
1.	External luminaires	$	
2.	Playground lighting works	$	
3.	Shade structure lighting works	$	
4.	CCTV	$	
5.	Mock-ups and Prototypes		
6.	Certification	$	
7.	Testing and Commissioning	$	
8.	Workshop Drawings	$	
9.	As-built Drawings, Operational and Maintenance manuals	$	
10.	Training	$	
11.	Preventive Maintenance	$	
12.	Warranties	$	
13.	12 months Defects Liability	$	
14.	On a monthly basis provide an update of Contractor's deliverables registers outlining information such as technical submittals, sample submissions, workshop drawings and Inspection Hold points	$	
15.	Other items not listed above, give full details:	$	
16.	Sub Total (excl. of GST)	$	
17.	GST	$	
18.	**Total** (Excluding GST)	**$**	

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Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

Signature of Witness: _____

Date: _____

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10.2 Schedule B – Schedule of Unit Rates - Luminaires

The price filled in by the Tenderer against each item must include all charges including purchases of materials, labour, freight, travelling time, profit and GST.

The schedule of Unit Rates must be used in assessing variation claims.

Item	Description	Addition	Deletion
For each luminaire type identified within the luminaire schedule. List each fitting type		$	$

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10.3 Hourly Rates

The Tender offer was based on the following hourly rates:

Tradesman:		/hr
Apprentice:		/hr
Labourer:		/hr

The Tender offer was based on:		Days
Working hours for a period of total:		Working days
The Tender offer was based on:	$	Hour site allowance
Variations to the Contract will be charged at:	$	Per hour

Name of Tenderer: _____

Signature of Tenderer: _____

Date: _____

Signature of Witness: _____

Date: _____

CRONULLA TOWN CENTRE PUBLIC DOMAIN
LIGHTING DESIGN

TENDER DESIGN

DRAWING LIST

LEGEND

- C1 CATENARY LUMINAIRE IP65
- D1 SURFACE MOUNTED DOWNLIGHT
- D2 SURFACE MOUNTED DOWNLIGHT
- L1 SURFACE MOUNTED LINEAR LUMINAIRE
- L2 SURFACE MOUNTED LINEAR LUMINAIRE
- L3 SURFACE MOUNTED LINEAR LUMINAIRE
- L4 SURFACE MOUNTED LINEAR LUMINAIRE
- P2 INTEGRATED PEDESTRIAN MULTI-FUNCTION LIGHTING POLE
- P2 PATH LIGHTING (INTEGRATED)
- P2 TREE LIGHTING (INTEGRATED)
- P2 POLE MOUNTED GOBO PROJECTOR
- P2 CCTV (INTEGRATED)
- SP1 TREE MOUNTED SPOTLIGHT

FOR TENDER
THIS IS NOT A WORKSHOP DRAWING
NOT FOR CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE CONSTRUCTIONAL DIMENSIONED WORKSHOP DRAWINGS IN ACCORDANCE WITH THE RELEVANT SECTIONS IN THE SPECIFICATION

TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

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New York

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ABN 50 001 189 037
t : +61 / 02 9967 2200
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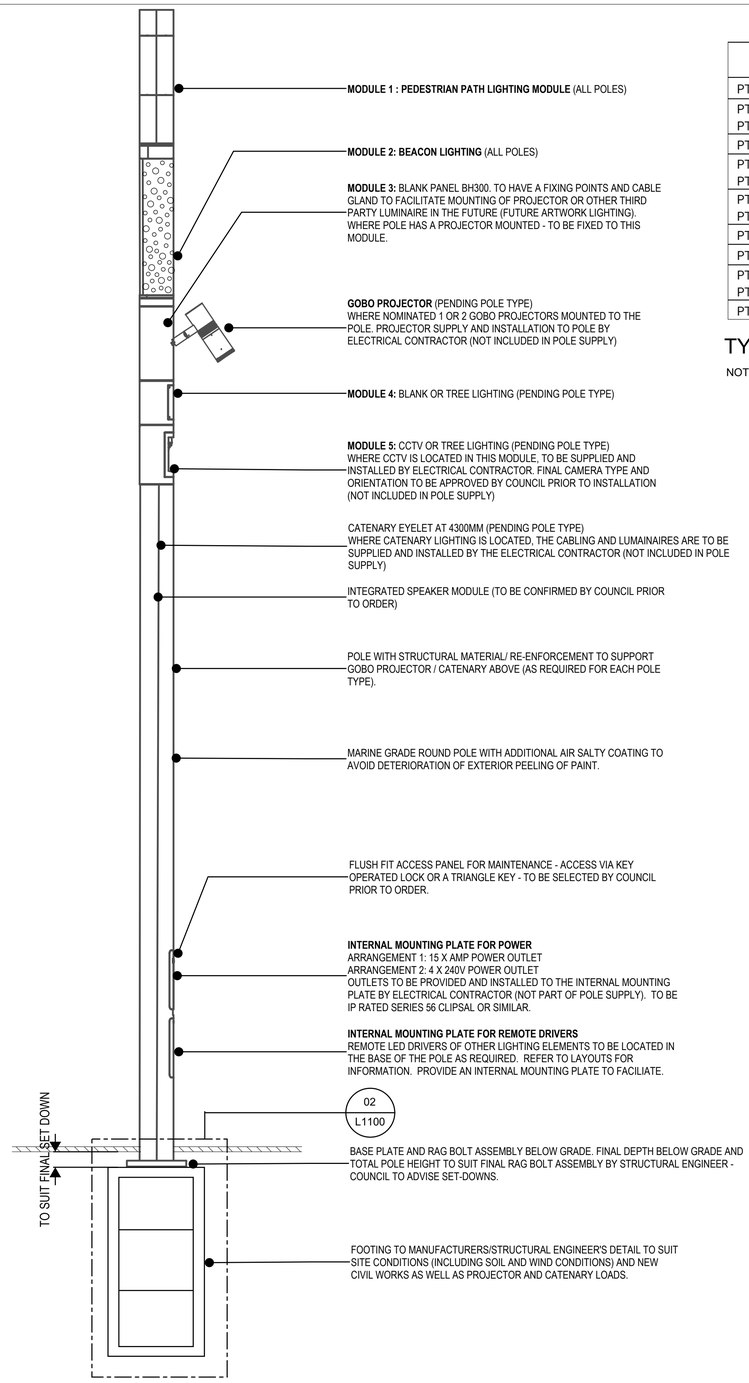
PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
COVER SHEET AND LEGEND

A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1000	A



	Path	Tree	Projector	CCTV	CATENARY	240V Power	15AMP Power
PT2.1	1	1	1	1	0		X
PT2.2, PT2.7, PT2.17	1	2	0	0	0		X
PT2.3, PT2.8	1	1	2	1	0		X
PT2.4, PT2.5, PT2.19	1	0	2	1	0		X
PT2.6, PT2.16, PT2.18	1	1	0	1	0		X
PT2.9	1	1	2	0	1	X	
PT2.10, PT2.15	1	1	0	1	1	X	
PT2.11, PT2.12. PT2.13, PT2.14	1	1	0	0	1	X	
PT2.20, PT2.21	1	0	2	0	0		X

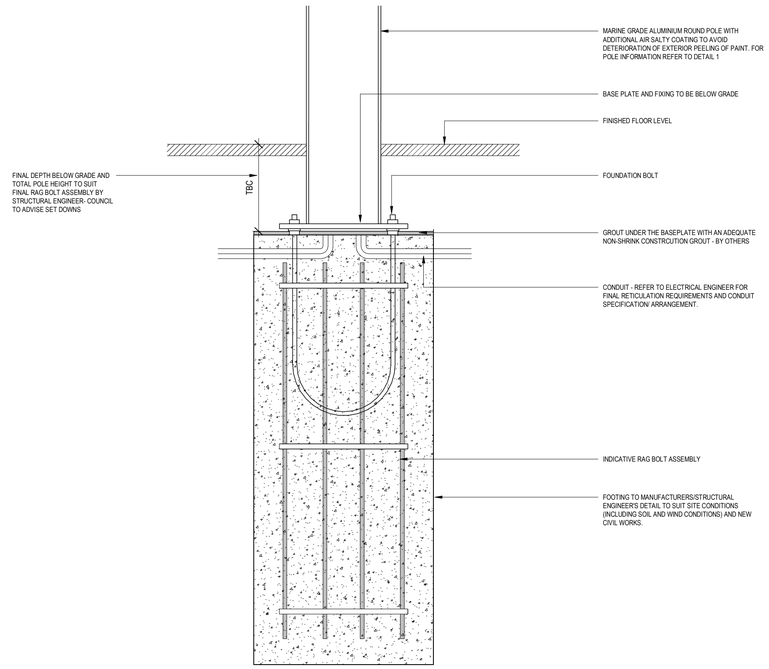
TYPE P2 - ARRANGEMENT SCHEDULE

NOTE: ALL POLES HAVE MODULE 2 BEACON LIGHT

1 MULTI FUNCTION INTEGRATED POLE - TYPE P2

NTS

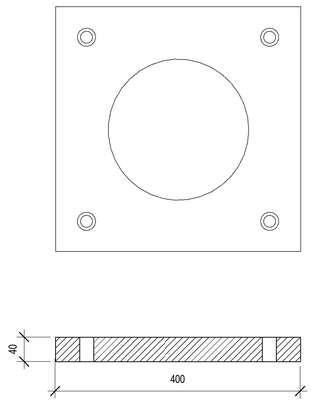
NOTES:
1. CONTRACTOR TO PROVIDE SHOP DRAWINGS OF FINAL ARRANGEMENT OF EACH POLE TYPE FOR APPROVAL
2. FINAL ANGLE OF EACH MODULE TO BE APPROVED IN SHOP DRAWINGS PRIOR TO FABRICATION.
3. REFER TO ELECTRICAL CONSULTANT FOR ALL ELECTRICAL CONNECTION DETAILS, CIRCUITING AND RETICULATION.
4. FOOTING DETAILS ARE INDICATIVE ONLY. FINAL DETAIL TO MANUFACTURERS REQUIREMENTS/ ENGINEERS SPECIFICATION TO SUIT SITE CONDITIONS INCLUDING SOI, WIND AND NEW CIVIL WORKS.



2 INDICATIVE POLE FOOTING DETAIL

NTS

NOTES:
1. FOOTING DETAILS ARE INDICATIVE ONLY. FINAL DETAIL TO MANUFACTURERS REQUIREMENTS/ ENGINEERS SPECIFICATION TO SUIT SITE CONDITIONS INCLUDING SOIL, WIND AND NEW CIVIL WORKS.



3 MANUFACTURERS POLE BASE PLATE DETAIL

NTS

NOTES:
1. DETAIL PROVIDED BY MANUFACTURER AND INCLUDED WITHIN DOCUMENTATION SET TO ASSIST IN CONTRACTOR CO-ORDINATION OF FOOTING DETAILS AND INSTALLATION.
BASE PLATE TO BE BELOW GRDE WITH INSTALLATION TO MEET MANUFACTURERS REQUIREMENTS.

FOR TENDER

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TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

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Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT

CRONULLA TOWN CENTRE PUBLIC DOMAIN

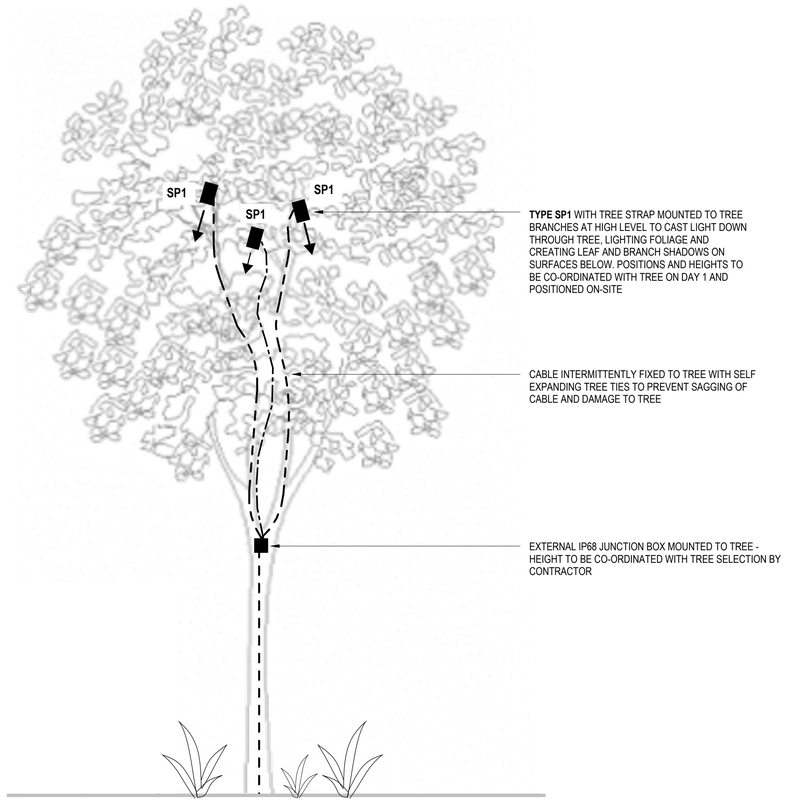
DRAWING TITLE

LIGHTING DESIGN
DETAILS SHEET 1 - POLE

A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1100	A



1 SP1 TREE MOUNTED LIGHITNG
NTS

NOTES:

1. TREE STRAP AND EXPANDING TREE CABLE TIES TO BE MONITORED BY COUNCIL AND ADJUSTED OVER TIME AS THE TREE GROWS.
2. CO-ORDINATION OF MOUNTING LOCATIONS IS TREE SPECIFIC AND IS TO BE CO-ORDINATED BY THE CONTRACTOR TO SUIT
3. FINAL TREE SELECTION ON SITE IN CONSULTATION WITH LIGHTING DESIGNER AND COUNCIL.
   REMOTE LED CONTROL GEAR TO BE LOCATED IN A CONCEALED, ACCESSIBLE AND WEATHERPROOF LOCATION WITHIN ADJACENT ELECTRICAL PIT OR IN THE BASE OF THE ADJACENT LIGHTING POLE. TO BE CO-ORDINATED BY THE CONTRACTOR TO SUIT FINAL RETICULATION ARRANGEMENT. CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS TO BE IP68 RATED. ALL JUNCTION BOXES TO BE IP68 GELL-FILLED.

FOR TENDER

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TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

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ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

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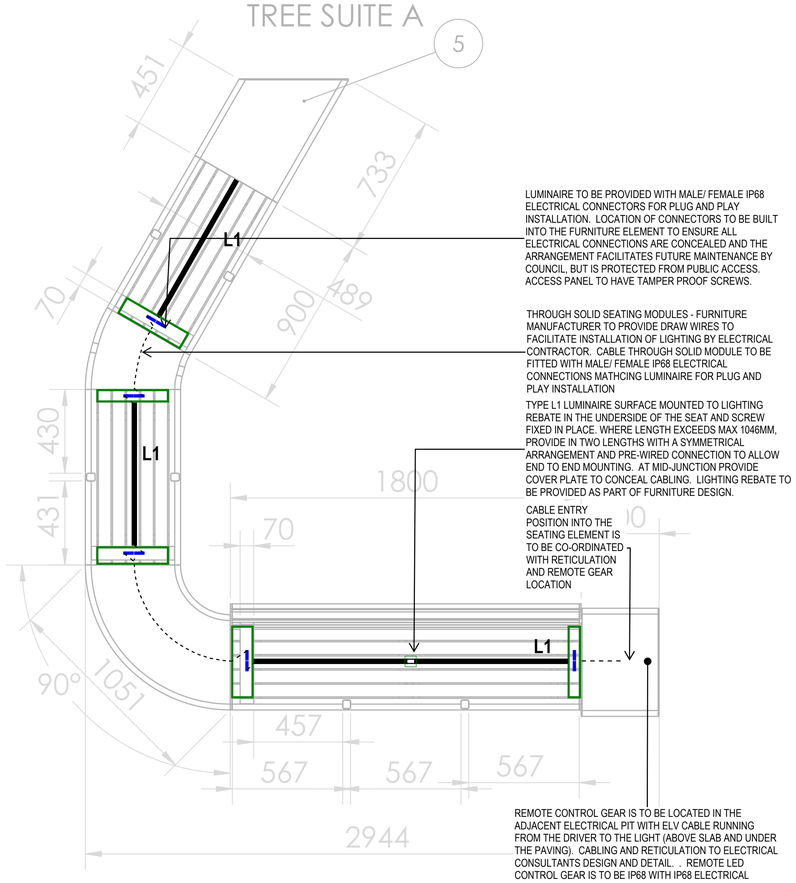
PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
DETAILS SHEET 2 - TREE

A1

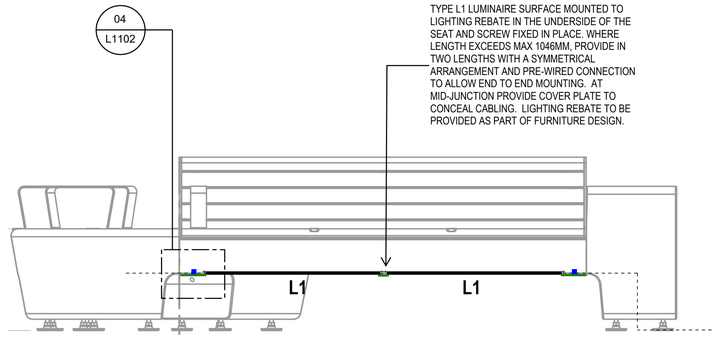
CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1101	A



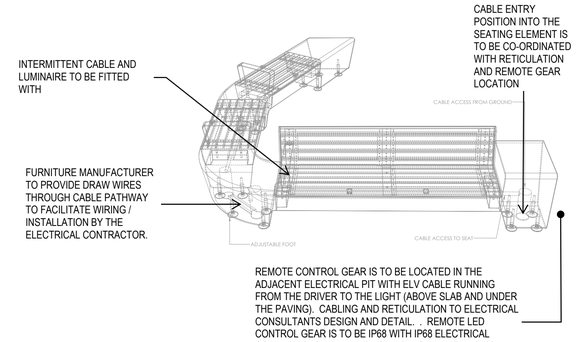
1 INTEGRATED BENCH LIGHTING - TYPE L1 PLAN
NTS

NOTES:
1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. DETAILS INDICATE LIGHTING REQUIREMENTS FOR CO-ORDINATION BY FURNITURE MANUFACTURER. CONTACTOR TO PROVIDE SHOP DRAWINGS OF FINAL INTEGRATION DETAIL FOR APPROVAL.
3. FURNITURE MANUFACTURER TO PROVIDE DRAW WIRES THROUGH CABLE PATHWAY TO FACILITATE WIRING / INSTALLATION BY THE ELECTRICAL CONTRACTOR.
4. LUMINAIRES TO BE PROVIDED WITH MALE/ FEMALE IP68 CONNECTORS TO BE LOCATED AT EACH SIDE OF THE SOLID SEATING MODULE. INTERMEDIATE CABLE THROUGH SOLID SECTION TO BE FITTED WITH MATCHING MALE/ FEMALE IP68 CONNECTORS FOR PLUG AND PLAY INSTALLATION.
5. THE LIGHTING AND CABLING INSTALLATION DETAIL IS TO ENSURE ALL ELECTRICAL CONNECTIONS ARE CONCEALED AND THE ARRANGEMENT FACILITATES FUTURE MAINTENANCE BY COUNCIL, BUT IS PROTECTED FROM PUBLIC ACCESS.
6. REMOTE LED CONTROL GEAR IS TO BE IP68 WITH IP68 ELECTRICAL CONNECTIONS. ALL JUNCTION BOXES ARE TO BE IP68 GELL-FILLED. REMOTE CONTROL GEAR IS TO BE LOCATED IN THE ADJACENT ELECTRICAL PIT WITH ELV CABLE RUNNING FROM THE DRIVER TO THE LIGHT (ABOVE SLAB AND UNDER THE PAVING). CABLING AND RETICULATION TO ELECTRICAL CONSULTANTS DESIGN AND DETAIL. CABLE ENTRY POSITION INTO THE SEATING ELEMENT IS TO BE CO-ORDINATED.



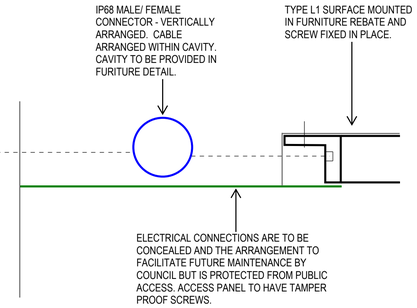
2 INTEGRATED BENCH LIGHTING - TYPE L1 INDICATIVE ELEVATION
NTS

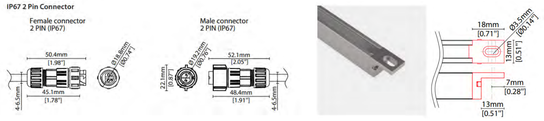
NOTES:
1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. DETAILS INDICATE LIGHTING REQUIREMENTS FOR CO-ORDINATION BY FURNITURE MANUFACTURER. CONTACTOR TO PROVIDE SHOP DRAWINGS OF FINAL INTEGRATION DETAIL FOR APPROVAL.
3. FURNITURE MANUFACTURER TO PROVIDE DRAW WIRES THROUGH CABLE PATHWAY TO FACILITATE WIRING / INSTALLATION BY THE ELECTRICAL CONTRACTOR.
4. LUMINAIRES TO BE PROVIDED WITH MALE/ FEMALE IP68 CONNECTORS TO BE LOCATED AT EACH SIDE OF THE SOLID SEATING MODULE. INTERMEDIATE CABLE THROUGH SOLID SECTION TO BE FITTED WITH MATCHING MALE/ FEMALE IP68 CONNECTORS FOR PLUG AND PLAY INSTALLATION.
5. THE LIGHTING AND CABLING INSTALLATION DETAIL IS TO ENSURE ALL ELECTRICAL CONNECTIONS ARE CONCEALED AND THE ARRANGEMENT FACILITATES FUTURE MAINTENANCE BY COUNCIL, BUT IS PROTECTED FROM PUBLIC ACCESS.
6. REMOTE LED CONTROL GEAR IS TO BE IP68 WITH IP68 ELECTRICAL CONNECTIONS. ALL JUNCTION BOXES ARE TO BE IP68 GELL-FILLED. REMOTE CONTROL GEAR IS TO BE LOCATED IN THE ADJACENT ELECTRICAL PIT WITH ELV CABLE RUNNING FROM THE DRIVER TO THE LIGHT (ABOVE SLAB AND UNDER THE PAVING). CABLING AND RETICULATION TO ELECTRICAL CONSULTANTS DESIGN AND DETAIL. CABLE ENTRY POSITION INTO THE SEATING ELEMENT IS TO BE CO-ORDINATED.



3 INTEGRATED BENCH LIGHTING - TYPE L1 INDICATIVE CABLE DIAGRAM
NTS

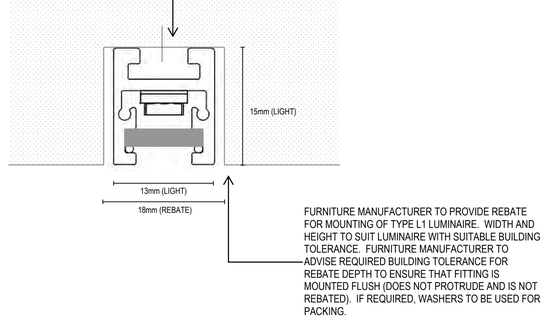
NOTES:
1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. DETAILS INDICATE LIGHTING REQUIREMENTS FOR CO-ORDINATION BY FURNITURE MANUFACTURER. CONTACTOR TO PROVIDE SHOP DRAWINGS OF FINAL INTEGRATION DETAIL FOR APPROVAL.
3. FURNITURE MANUFACTURER TO PROVIDE DRAW WIRES THROUGH CABLE PATHWAY TO FACILITATE WIRING / INSTALLATION BY THE ELECTRICAL CONTRACTOR.
4. LUMINAIRES TO BE PROVIDED WITH MALE/ FEMALE IP68 CONNECTORS TO BE LOCATED AT EACH SIDE OF THE SOLID SEATING MODULE. INTERMEDIATE CABLE THROUGH SOLID SECTION TO BE FITTED WITH MATCHING MALE/ FEMALE IP68 CONNECTORS FOR PLUG AND PLAY INSTALLATION.
5. THE LIGHTING AND CABLING INSTALLATION DETAIL IS TO ENSURE ALL ELECTRICAL CONNECTIONS ARE CONCEALED AND THE ARRANGEMENT FACILITATES FUTURE MAINTENANCE BY COUNCIL, BUT IS PROTECTED FROM PUBLIC ACCESS.
6. REMOTE LED CONTROL GEAR IS TO BE IP68 WITH IP68 ELECTRICAL CONNECTIONS. ALL JUNCTION BOXES ARE TO BE IP68 GELL-FILLED. REMOTE CONTROL GEAR IS TO BE LOCATED IN THE ADJACENT ELECTRICAL PIT WITH ELV CABLE RUNNING FROM THE DRIVER TO THE LIGHT (ABOVE SLAB AND UNDER THE PAVING). CABLING AND RETICULATION TO ELECTRICAL CONSULTANTS DESIGN AND DETAIL. CABLE ENTRY POSITION INTO THE SEATING ELEMENT IS TO BE CO-ORDINATED.





4 TYPE L1 - DETAIL DIAGRAM 1 FOR CO-ORDINATION
NTS

NOTES:
1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. DETAILS INDICATE LIGHTING REQUIREMENTS FOR CO-ORDINATION BY FURNITURE MANUFACTURER. CONTACTOR TO PROVIDE SHOP DRAWINGS OF FINAL INTEGRATION DETAIL FOR APPROVAL.
3. FURNITURE MANUFACTURER TO PROVIDE DRAW WIRES THROUGH CABLE PATHWAY TO FACILITATE WIRING / INSTALLATION BY THE ELECTRICAL CONTRACTOR.
4. LUMINAIRES TO BE PROVIDED WITH MALE/ FEMALE IP68 CONNECTORS TO BE LOCATED AT EACH SIDE OF THE SOLID SEATING MODULE. INTERMEDIATE CABLE THROUGH SOLID SECTION TO BE FITTED WITH MATCHING MALE/ FEMALE IP68 CONNECTORS FOR PLUG AND PLAY INSTALLATION.
5. THE LIGHTING AND CABLING INSTALLATION DETAIL IS TO ENSURE ALL ELECTRICAL CONNECTIONS ARE CONCEALED AND THE ARRANGEMENT FACILITATES FUTURE MAINTENANCE BY COUNCIL, BUT IS PROTECTED FROM PUBLIC ACCESS.
6. REMOTE LED CONTROL GEAR IS TO BE IP68 WITH IP68 ELECTRICAL CONNECTIONS. ALL JUNCTION BOXES ARE TO BE IP68 GELL-FILLED. REMOTE CONTROL GEAR IS TO BE LOCATED IN THE ADJACENT ELECTRICAL PIT WITH ELV CABLE RUNNING FROM THE DRIVER TO THE LIGHT (ABOVE SLAB AND UNDER THE PAVING). CABLING AND RETICULATION TO ELECTRICAL CONSULTANTS DESIGN AND DETAIL. CABLE ENTRY POSITION INTO THE SEATING ELEMENT IS TO BE CO-ORDINATED.



4 TYPE L1 - DETAIL DIAGRAM 1 FOR CO-ORDINATION
NTS

NOTES:
1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. DETAILS INDICATE LIGHTING REQUIREMENTS FOR CO-ORDINATION BY FURNITURE MANUFACTURER. CONTACTOR TO PROVIDE SHOP DRAWINGS OF FINAL INTEGRATION DETAIL FOR APPROVAL.
3. FURNITURE MANUFACTURER TO PROVIDE DRAW WIRES THROUGH CABLE PATHWAY TO FACILITATE WIRING / INSTALLATION BY THE ELECTRICAL CONTRACTOR.
4. LUMINAIRES TO BE PROVIDED WITH MALE/ FEMALE IP68 CONNECTORS TO BE LOCATED AT EACH SIDE OF THE SOLID SEATING MODULE. INTERMEDIATE CABLE THROUGH SOLID SECTION TO BE FITTED WITH MATCHING MALE/ FEMALE IP68 CONNECTORS FOR PLUG AND PLAY INSTALLATION.
5. THE LIGHTING AND CABLING INSTALLATION DETAIL IS TO ENSURE ALL ELECTRICAL CONNECTIONS ARE CONCEALED AND THE ARRANGEMENT FACILITATES FUTURE MAINTENANCE BY COUNCIL, BUT IS PROTECTED FROM PUBLIC ACCESS.
6. REMOTE LED CONTROL GEAR IS TO BE IP68 WITH IP68 ELECTRICAL CONNECTIONS. ALL JUNCTION BOXES ARE TO BE IP68 GELL-FILLED. REMOTE CONTROL GEAR IS TO BE LOCATED IN THE ADJACENT ELECTRICAL PIT WITH ELV CABLE RUNNING FROM THE DRIVER TO THE LIGHT (ABOVE SLAB AND UNDER THE PAVING). CABLING AND RETICULATION TO ELECTRICAL CONSULTANTS DESIGN AND DETAIL. CABLE ENTRY POSITION INTO THE SEATING ELEMENT IS TO BE CO-ORDINATED.

FOR TENDER

THIS IS NOT A WORKSHOP DRAWING

NOT FOR CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE CONSTRUCTIONAL DIMENSIONED WORKSHOP DRAWINGS IN ACCORDANCE WITH THE RELEVANT SECTIONS IN THE SPECIFICATION

TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

Copenhagen
London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
DETAILS SHEET 3 - BENCH

A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1102	A

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NOTES:

1. PLAYGROUND INTEGRATED LIGHTING (TYPE L2 AND L3) IS TO BE PROVIDED AS PART OF THE PLAYGROUND WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER.
2. SHADE STRUCTURE LIGHTING (TYPE D1/D2 AND TYPE L4) IS TO BE PROVIDED AS PART OF THE SHADE STRUCTURE WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER.
3. PROJECTED LIGHT INDICATED IS PROVIDED FOR TYPE P2 LIGHTING POLES WITH PROJECTOR MOUNTED LUMINAIRES (BY CONTRACTOR).
4. PLAYGROUND AND SHADE INTEGRATED LIGHTING DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES AND INTEGRATION DETAILS SUBJECT TO PLAYGROUND AND SHADE STRUCTURE CO-ORDINATION WITH THE PLAYGROUND / SHADE STRUCTURE MANUFACTURER.
5. REFER TO LIGHTING LAYOUTS AND L1106 FOR REQUIREMENTS.
6. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRCUTRE, LOCATE AND INSTALL THE REMOTE LED CONTROL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION IN THE BASE OF AN ADJACENT LIGHTING POLE OR WITHIN AN ELECTRICAL PIT SUBJECT TO THE FINAL ARRANGEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO IP68 GEL-FILLED.
7. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRUITING.
8. REFER TO DRAWING L1107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
9. ALL CABLING WITHIN THE PLAYGROUND STRUCTURE IS TO BE EXTRA LOW VOLTAGE.
10. ALL LUMINAIRES WITHIN THE PLAYGROUND STRUCTURE ARE TO BE 'COOL TO TOUCH'.
11. ALL CABLE GLANDS WITHIN THE PLAYGROUND AND SHADE STRUCTURE ARE TO BE IP68 RATED TO PREVENT MOISTURE INGRESS WITHIN THE STRUCTURAL ELEMENTS.
12. PLAYGROUND AND SHADE MANUFACTURER TO PROVIDE SUITABLE INTERNAL ARRANGEMENT TO FACILIATE RETICULATION. ACCESS HATCHES TO BE IP68 SEALED WITH A GASKET AND LOCKED WITH TAMPER PROOF SCREWS. INTERNAL STRUCTURE WITH CABLE TO BE HOLLOW AND PROVIDED WITH DRAW WIRES.
13. PLAYGROUND AND SHADE MANUFACTURER TO FREE ISSUE LUMINAIRE DRIVER TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION ON-SITE.
14. PLAYGROUND MANUFACTURER AND SHADE MANUFACTURER TO PROVIDE SHOP DRAWINGS OF LIGHTING DETAILS FOR APPROVAL.
15. MOUNTING ARRANGEMENT, FINISH AND MATERIALS OF ALL EQUIPMENT TO BE SUITABLE FOR MARINE GRADE ENVIRONMENT.

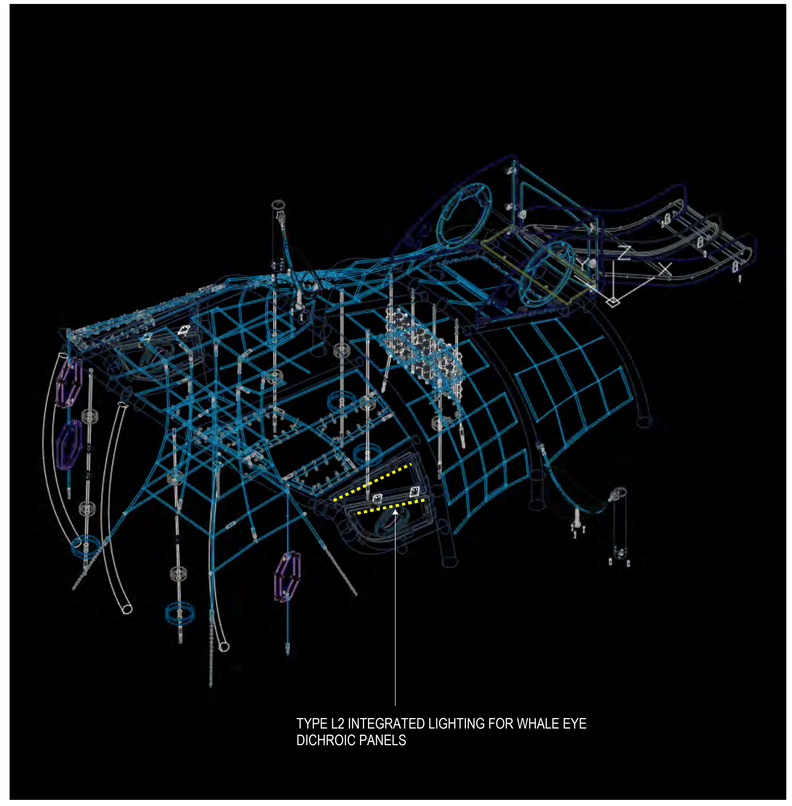
PROJECTED PATTERNED LIGHT 'BUBBLES' FROM WHALE MOUTH (PROJECTOR MOUNTED TO TYPE P2 - BY CONTRACTOR - REFER TO LIGHTING LAYOUTS AND POLE DETAIL)

02 L1106

INTEGRATED LIGHTING FOR WHALE EYE DICHROIC PANELS (EDGELIT WITHIN FRAME) - TYPE L2 TO PROVIDE A GLOW AT NIGHT. BY COUNCIL APPOINTED PLAYGROUND INSTALLER. REFER TO L1006 FOR PERFORMANCE REQUIREMENTS.

SHADE STRUCTURE WITH INTEGRATED LIGHTING TO SPOTLIGHT LOW LEVEL PLAY PIECES TYPE D1, PROVIDE GENERAL ILLUMINATION TYPE D2 AND ILLUMINATE DICHROIC PANELS (EDGELIT WITHIN FRAME) TYPE L4 TO PROVIDE A GLOW AT NIGHT. BY COUNCIL APPOINTED PLAYGROUN INSTALLER. REFER TO L1005 FOR PERFORMANCE REQUIREMENTS.

02 L1105



TYPE L2 INTEGRATED LIGHTING FOR WHALE EYE DICHROIC PANELS

PLAYGROUND LIGHTING DESIGN INTENT - FOR INFORMATION

FOR TENDER

THIS IS NOT A WORKSHOP DRAWING

NOT FOR CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE CONSTRUCTIONAL DIMENSIONED WORKSHOP DRAWINGS IN ACCORDANCE WITH THE RELEVANT SECTIONS IN THE SPECIFICATION

TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

Copenhagen
London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
DETAILS SHEET 4 - WHALE HEAD

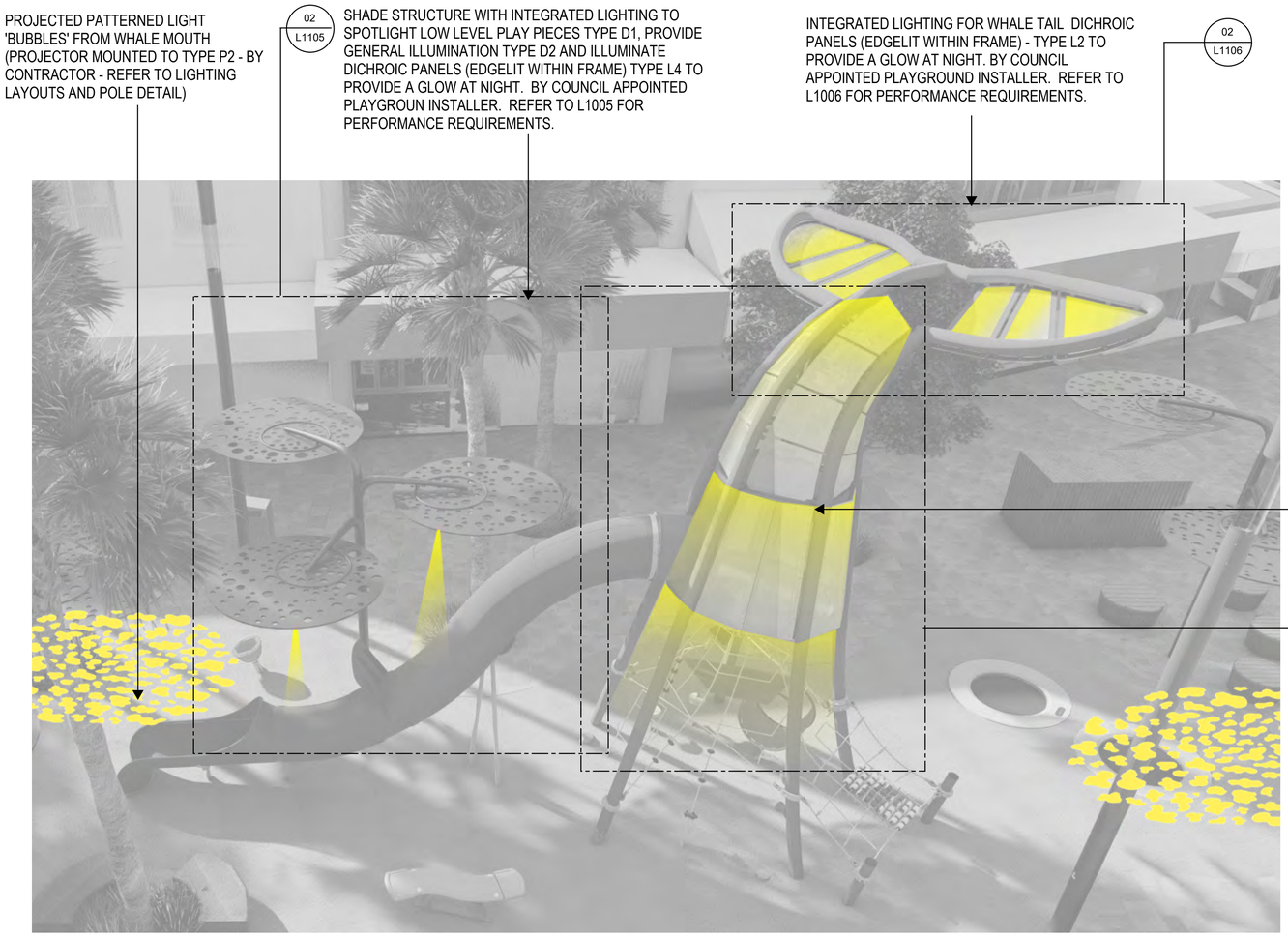
A1

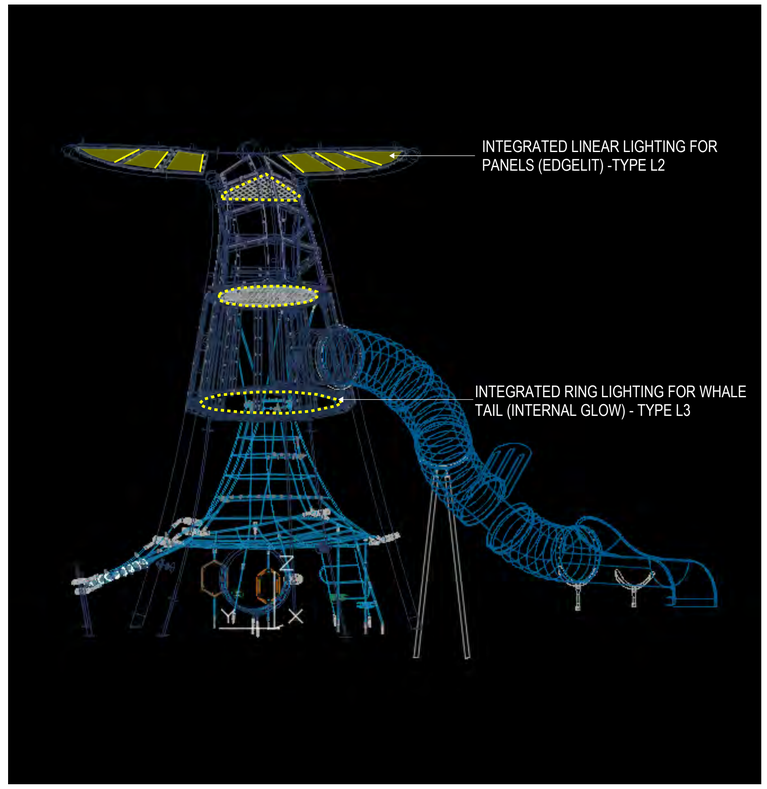
CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1103	A

NOTES:

1. PLAYGROUND INTEGRATED LIGHTING (TYPE L2 AND L3) IS TO BE PROVIDED AS PART OF THE PLAYGROUND WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER.
2. SHADE STRUCTURE LIGHTING (TYPE D1/D2 AND TYPE L4) IS TO BE PROVIDED AS PART OF THE SHADE STRUCTURE WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER.
3. PROJECTED LIGHT INDICATED IS PROVIDED FOR TYPE P2 LIGHTING POLES WITH PROJECTOR MOUNTED LUMINAIRES (BY CONTRACTOR).
4. PLAYGROUND AND SHADE INTEGRATED LIGHTING DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES AND INTEGRATION DETAILS SUBJECT TO PLAYGROUND AND SHADE STRUCTURE CO-ORDINATION WITH THE PLAYGROUND / SHADE STRUCTURE MANUFACTURER.
5. REFER TO LIGHTING LAYOUTS AND L1106 FOR REQUIREMENTS.
6. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRCUTRE, LOCATE AND INSTALL THE REMOTE LED CONTROL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION IN THE BASE OF AN ADJACENT LIGHTING POLE OR WITHIN AN ELECTRICAL PIT SUBJECT TO THE FINAL ARRANGEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO IP68 GELL-FILLED.
7. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRUITING.
8. REFER TO DRAWING L1107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
9. ALL CABLING WITHIN THE PLAYGROUND STRUCTURE IS TO BE EXTRA LOW VOLTAGE.
10. ALL LUMINAIRES WITHIN THE PLAYGROUND STRUCTURE ARE TO BE 'COOL TO TOUCH'.
11. ALL CABLE GLANDS WITHIN THE PLAYGROUND AND SHADE STRUCTURE ARE TO BE IP68 RATED TO PREVENT MOISTURE INGRESS WITHIN THE STRUCTURAL ELEMENTS.
12. PLAYGROUND AND SHADE MANUFACTURER TO PROVIDE SUITABLE INTERNAL ARRANGEMENT TO FACILIATE RETICULATION. ACCESS HATCHES TO BE IP68 SEALED WITH A GASKET AND LOCKED WITH TAMPER PROOF SCREWS. INTERNAL STRUCTURE WITH CABLE TO BE HOLLOW AND PROVIDED WITH DRAW WIRES.
13. PLAYGROUND AND SHADE MANUFACTURER TO FREE ISSUE LUMINAIRE DRIVER TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION ON-SITE.
14. PLAYGROUND MANUFACTURER AND SHADE MANUFACTURER TO PROVIDE SHOP DRAWINGS OF LIGHTING DETAILS FOR APPROVAL.
15. MOUNTING ARRANGEMENT, FINISH AND MATERIALS OF ALL EQUIPMENT TO BE SUITABLE FOR MARINE GRADE ENVIRONMENT.





PLAYGROUND LIGHTING DESIGN INTENT - FOR INFORMATION

FOR TENDER

THIS IS NOT A WORKSHOP DRAWING

NOT FOR CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE CONSTRUCTIONAL DIMENSIONED WORKSHOP DRAWINGS IN ACCORDANCE WITH THE RELEVANT SECTIONS IN THE SPECIFICATION

TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

Copenhagen
London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
DETAILS SHEET 5 - WHALE TAIL

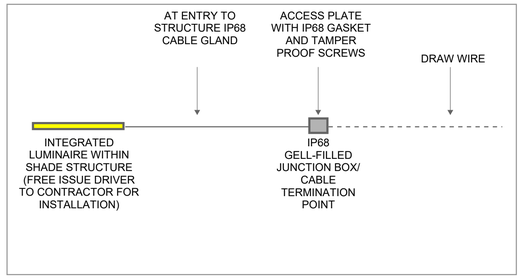
A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

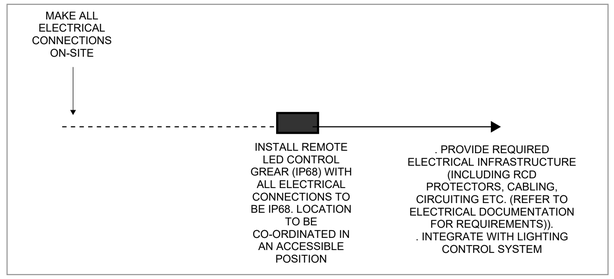
NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1104	A

NOTES:

1. SHADE STRUCTURE INTEGRATED LIGHTING (TYPE D1, D2, L4) IS TO BE PROVIDED AS PART OF THE SHADE STRUCTURE WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER.
2. DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES AND INTEGRATION DETAILS SUBJECT TO SHADE STRUCTURE CO-ORDINATION WITH THE MANUFACTURER.
3. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRCUTRE, LOCATE AND INSTALL THE REMOTE LED CONTROL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION ABOVE THE STRUCTURE, WITHIN THE STRUCTURAL POLE OR IN AN ADJACENT LIGHTING POLE OR ELECTRICAL PIT, SUBJECT TO THE FINAL ARRANGEMENT AND SHADE STRCUTURE PLACEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO IP68 GELL-FILLED.
4. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRUITING.
5. REFER TO DRAWING L1107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
6. ALL CABLE GLANDS WITHIN THE STRUCTURE ARE TO BE IP68 RATED TO PREVENT MOISTURE INGRESS WITHIN THE STRUCTURAL ELEMENTS.
7. SHADE STRUCTURE MANUFACTURER TO PROVIDE SUITABLE INTERNAL ARRANGEMENT TO FACILIATE RETICULATION.
8. ACCESS HATCHES TO BE IP68 SEALED WITH A GASKET AND LOCKED WITH TAMPER PROOF SCREWS. INTERNAL STRUCTURE WITH CABLE TO BE HOLLOW AND PROVIDED WITH DRAW WIRES.
9. SHADE STRUCTURE MANUFACTURER TO FREE ISSUE LUMINAIRE DRIVER TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION ON-SITE.
10. SHADE STRUCTURE MANUFACTURER TO PROVIDE SHOP DRAWINGS OF LIGHTING DETAILS FOR APPROVAL.
11. MOUNTING ARRANGEMENT, FINISH AND MATERIALS OF ALL EQUIPMENT TO BE SUITABLE FOR MARINE GRADE ENVIRONMENT.



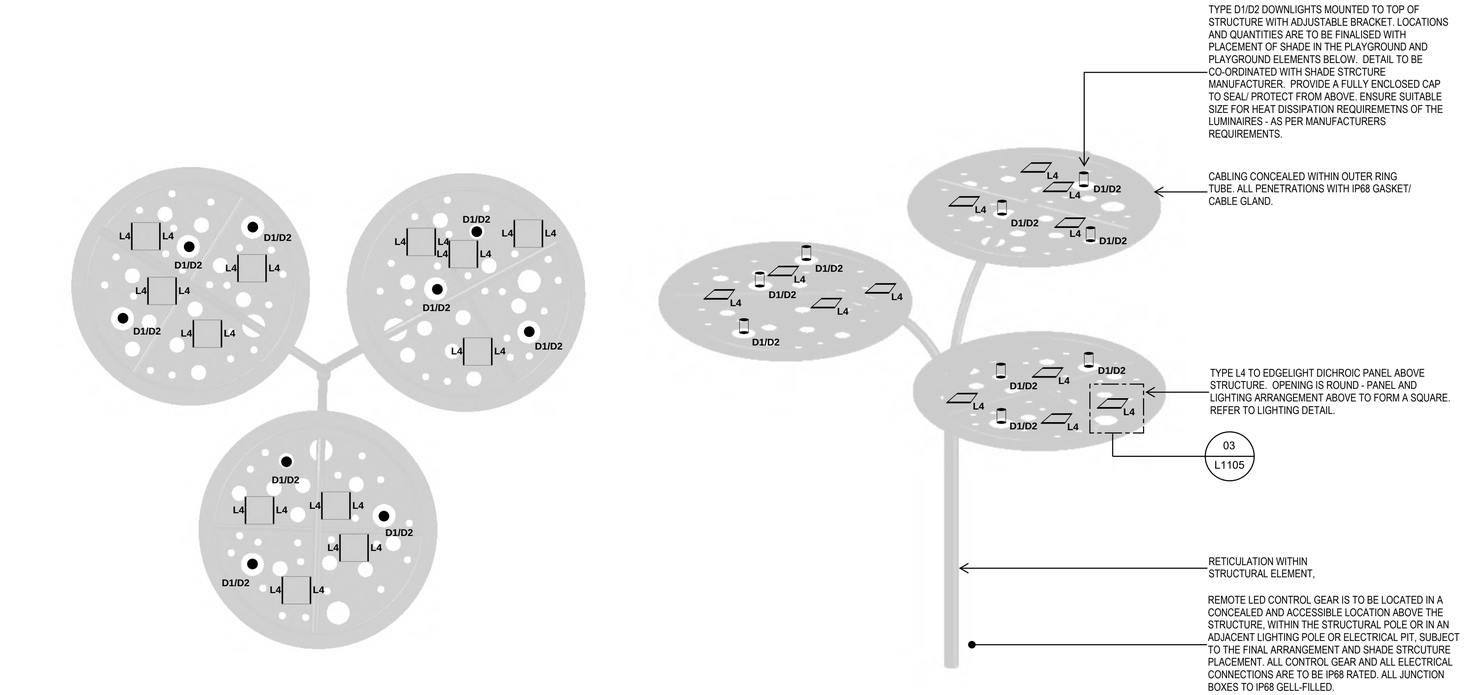
SUPPLY, INSTALLATION, TESTING, CERTIFICATION BY COUNCIL APPOINTED PLAYGROUND INSTALLER.



SUPPLY, INSTALLATION, TESTING, CERTIFICATION BY ELECTRICAL CONTRACTOR.

1 INTEGRATED SHADE STRUCTURE LIGHTING - REQUIREMETNS AND SCOPE DELINEATION DIAGRAM

NTS



2 SHADE STRUCTURE LIGHITNG - LIGHTING INTENT DIAGRAM

NTS

NOTES:
1. DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES, QUANTITIES AND INTEGRATION DETAILS SUBJECT TO SHADE STRUCTURE POSITION AND PLAYGROUND ELEMENTS AND CO-ORDINATION WITH THE SHADE STRUCTURE MANUFACTURE. SHADE STRUCTURE MANUFACTURER TO PROVIDE SHOP DRAWINGS FOR APPROVAL.
2. MOCK-UP TESTING/ PROTOTYPE OF EDGELIT DETAIL WITH DICHROIC PANEL IS REQUIRED FOR FINAL INSTALLATION DETAIL AND DOT FRIT ARRANGEMENT (TYPE L4)

3 INDICATIVE INTEGRATED SHADE STRUCTURE LIGHTING - TYPE L4 DETAIL

NTS

NOTES:
1. DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES, QUANTITIES AND INTEGRATION DETAILS SUBJECT TO SHADE STRUCTURE POSITION AND PLAYGROUND ELEMENTS AND CO-ORDINATION WITH THE SHADE STRUCTURE MANUFACTURE. SHADE STRUCTURE MANUFACTURER TO PROVIDE SHOP DRAWINGS FOR APPROVAL.
2. MOCK-UP TESTING/ PROTOTYPE OF EDGELIT DETAIL WITH DICHROIC PANEL IS REQUIRED FOR FINAL INSTALLATION DETAIL AND DOT FRIT ARRANGEMENT (TYPE L4)

FOR TENDER

THIS IS NOT A WORKSHOP DRAWING

NOT FOR CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE CONSTRUCTIONAL DIMENSIONED WORKSHOP DRAWINGS IN ACCORDANCE WITH THE RELEVANT SECTIONS IN THE SPECIFICATION

TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

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Copenhagen
London
Sydney
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New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT

CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE

LIGHTING DESIGN
DETAILS SHEET 6 - SHADE STRUCTURE

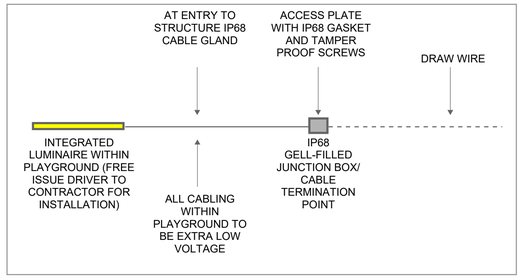
A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

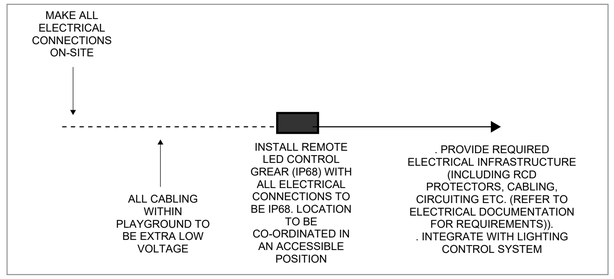
NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1105	A

NOTES:

1. PLAYGROUND INTEGRATED LIGHTING (TYPE L2 AND L3) IS TO BE PROVIDED AS PART OF THE PLAYGROUND WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER.
2. DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES AND INTEGRATION DETALS SUBJECT TO PLAYGROUND CO-ORDINATION WITH THE PLAYGROUND MANUFACTURER.
3. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRCUTRE, LOCATE AND INSTALL THE REMOTE LED CONTROL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION IN THE BASE OF AN ADJACENT LIGHTING POLE OR WITHIN AN ELECTRICAL PIT SUBJECT TO THE FINAL ARRANGEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO IP68 GELL-FILLED.
4. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRUITING.
5. REFER TO DRAWING L1.107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
6. ALL CABLING WITHIN THE PLAYGROUND STRUCTURE IS TO BE EXTRA LOW VOLTAGE.
7. ALL LUMINAIRES WITHIN THE PLAYGROUND STRUCTURE ARE TO BE 'COOL TO TOUCH'.
8. ALL CABLE GLANDS WITHIN THE STRUCTURE ARE TO BE IP68 RATED TO PREVENT MOISTURE INGRESS WITHIN THE STRUCTURAL ELEMENTS.
9. PLAYGROUND MANUFACTURER TO PROVIDE SUITABLE INTERNAL ARRANGEMENT TO FACILIATE RETICULATION. ACCESS HATCHES TO BE IP68 SEALED WITH A GASKET AND LOCKED WITH TAMPER PROOF SCREWS. INTERNAL STRUCTURE WITH CABLE TO BE HOLLOW AND PROVIDED WITH DRAW WIRES.
10. PLAYGROUND MANUFACTURER TO FREE ISSUE LUMINAIRE DRIVER TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION ON-SITE.
11. PLAYGROUND MANUFACTURER TO PROVIDE SHOP DRAWINGS OF LIGHTING DETAILS FOR APPROVAL.
12. MOUNTING ARRANGEMENT, FINISH AND MATERIALS OF ALL EQUIPMENT TO BE SUITABLE FOR MARINE GRADE ENVIRONMENT.



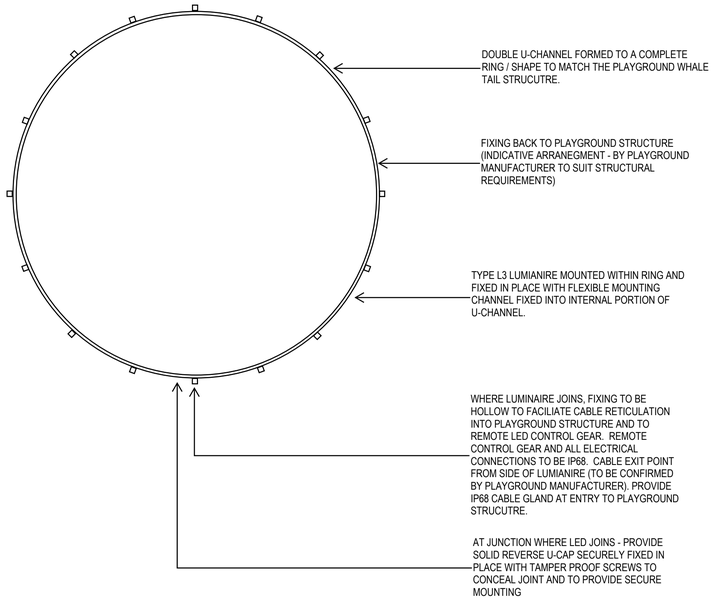
SUPPLY, INSTALLATION, TESTING, CERTIFICATION BY COUNCIL APPOINTED PLAYGROUND INSTALLER.

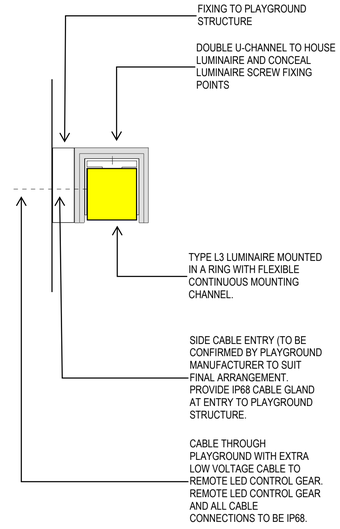


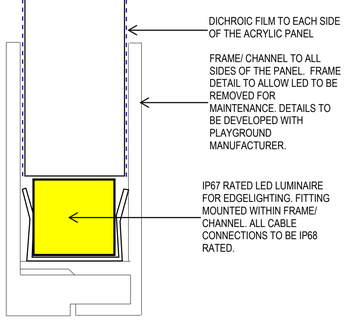
SUPPLY, INSTALLATION, TESTING, CERTIFICATION BY ELECTRICAL CONTRACTOR.

1 INTEGRATED PLAYGROUND LIGHTING - REQUIREMETNS AND SCOPE DELINEATION DIAGRAM

NTS







2 INDICATIVE INTEGRATED PLAYGROUND LIGHTING - TYPE L2 DETAIL

NTS

NOTES:
1. DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES AND INTEGRATION DETAILS SUBJECT TO PLAYGROUND CO-ORDINATION WITH THE PLAYGROUND MANUFACTURER. PLAYGROUND MANUFACTURER TO PROVIDE SHOP DRAWINGS FOR APPROVAL.
2. MOCK-UP TESTING/ PROTOTYPE OF EDGELIT DETAIL WITH DICHROIC PANEL IS REQUIRED FOR FINAL INSTALLATION DETAIL AND DOT FRIT ARRANGEMENT.

3 INDICATIVE INTEGRATED PLAYGROUND LIGHTING - TYPE L3 DETAIL

NTS

NOTES:
1. DETAILS AND LUMINAIRE TYPES INDICATED ARE FOR INFORMATION FOR THE ELECTRICAL CONTRACTOR ONLY TO INDICATE DESIGN INTENT. LIGHTING TYPES AND INTEGRATION DETAILS SUBJECT TO PLAYGROUND CO-ORDINATION WITH THE PLAYGROUND MANUFACTURER. PLAYGROUND MANUFACTURER TO PROVIDE SHOP DRAWINGS FOR APPROVAL.
2. RING MAY BE TWO PARTS IF REQUIRED TO SUIT PLAYGROUND REQUIREMENTS. IF IN SECTIONS, PROVIDE SOLID END CAPS TO EACH CURVED PIECE.

FOR TENDER

THIS IS NOT A WORKSHOP DRAWING

NOT FOR CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE CONSTRUCTIONAL DIMENSIONED WORKSHOP DRAWINGS IN ACCORDANCE WITH THE RELEVANT SECTIONS IN THE SPECIFICATION

DESIGNED UNDER QUALITY SYSTEM CERTIFIED AS COMPLYING WITH ISO 9001 BY AN ACCREDITED CERTIFICATION BODY

TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

Copenhagen
London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
DETAILS SHEET 7 - PLAYGROUND DETAILS

A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1106	A

LIGHTING CONTROL:

1. THE CONTRACTOR IS TO PROVIDE A NEW INTELLIGENT LIGHTING CONTROL SYSTEM TO SUPPORT THE NEW CRONULLA MALL LIGHTING. THE CONTROL SYSTEM IS TO:
   - SUPPORT RELAY ON/OFF, MLV, DALI AND DMX DIMMING FUNCTIONALITY WITH INDIVIDUAL CONTROL TO EACH LIGHTING ELEMENT.
   - AUTOMATION OF VARIOUS SCENES THROUGHOUT THE EVENING AS WELL AS SUPPORT THE DYNAMIC LIGHTING ELEMENTS REFLECTING THE CONCEPTUAL NARRATIVE.
   - ALL DYNAMIC ELEMENTS MUST HAVE SMOOTH AND DEEP DIMMING FOR A SUCCESSFUL VISUAL OUTCOME
   - ALL LIGHTING DIMMING OR COLOUR CHANGE TRANSITIONS ARE TO HAVE A SMOOTH FADE RATE
2. THE SYSTEM DESIGN IS TO PROVIDE PROVISION/ CAPACITY TO EXTENT AND SUPPORT THE NEW CRONULLA TOWN SQUARE LIGHTING IN THE FUTURE FOR A COMPLETE FUNCTIONING SYSTEM CO-ORDINATED WITH THE ELECTRICAL STAGING.
3. THE SYSTEM IS TO FACILITATE WEB BASED REMOTE CONTROL FOR SUTHERLAND SHIRE COUNCIL VIA A 4G NETWORK.
4. THE SYSTEM IS TO FACILITATE FAULT FINDING.
5. THE SYSTEM IS TO HAVE A GRAPHICAL USER INTERFACE.
   FOR EVENT MODE, THE USER INTERFACE IS TO HAVE PRE-SET COLOUR SETTINGS FOR THE LIGHTING POLE BEACON ELEMENT. THE CONTRACTOR IS TO LIASE WITH COUNCIL FOR THE REQUIRED COLOUR SETTINGS.

   THE SYSTEM SPECIFICATION AND DESIGN IS BY THE ELECTRICAL CONSULTANT - REFER TO THE ELECTRICAL DOCUMENTATION.

LIGHTING CONTROL FUNCTIONAL DESCRIPTION:

THE FOLLOWING SCENES ARE TO BE PROGRAMMED WITH THE FINAL SETTINGS CONFIRMED IN COMMISSIONING.

SUNRISE - SUNSET :
- ALL EXTERIOR LIGHTING OFF

SUNSET - 9PM :
- ALL LIGHTING TO BE ON WITH DIMMING LEVELS SET TO ACHEVE A BALANCED LIGHTING OUTCOME.
- A RIPPLE OF LIGHT ONCE EVERY HALF HOUR TO CREATE SUPRISE AND ENGAGEMENT (SEE BELOW).
- SUBTLE, SLOW CHANGE IN INTENSITY AND WHITE LIGHT COLOUR TEMPERATURE (SHIFTING FROM WARM TO COOL WHITE) FOR PROJECTED GOBO LIGHTING (MOUNTED TO P2). THE COLOUR SETTINGS ARE TO HAVE A SUMMER AND WINTER MODE. SUMMER - COOLER WHITE TONES. WINTER - WARMER WHITE TONES. THE FINAL CCT AND INTENSITY SETTINGS ARE TO BE DETERMINED DURING COMMISSIONING.
- SHADE INTEGRATED DOWNLIGHTS (TYPE D1) TO DIM UP AND DOWN.

9PM - 11PM :
- AS ABOVE
- GENERAL PEDESTRIAN POLE LIGHTING TO REDUCE IN INTENSITY.

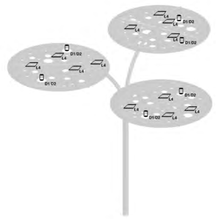
11PM - SUNRISE :
- TREE LIGHTING, BENCH LIGHTING, PLAYGROUND LIGHTING, SHADE STRUCTURE LIGHTING TO TURN OFF
- GENERAL PEDESTRIAN POLE LIGHTING TO STAY ON AND REDUCE IN INTENSITY
- GOBO LIGHTING TO STAY ON IN A STATIC MODE AND REDUCE IN INTENSITY
- POLE BEACON ELEMENT TO STAY ON AT A DIMMED LEVEL AND AMBER COLOUR TEMPERATURE

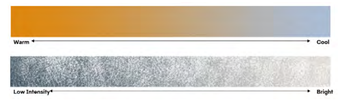
RIPPLE OF LIGHT
- EVERY HALF HOUR, A WATER RIPPLE OF LIGHT DOWN THE MALL TO CREATE SUPRISE AND DELIGHT
- POLE GOBO PROJECTOR LIGHTING: LIGHT TO DIM TO OFF. STARTING AT THE WHALE MOUTH, 'BUBBLES' OF LIGHT TURN ON MOVING UP THE MALL AS THE WHALE BLOWS WATER FROM IT'S MOUTH AND SPLASHES IN THE OCEAN, ENDING AT THE WHALE TAIL AND KINGSWAY END OF THE MALL. THE LIGHT INTENSITY AND COLOUR TO SHIFT AS PER THE SUNSET MODE.
- POLE BEACON ELEMENT: A SHIFT IN COLOUR TEMPERATURE FROM AMBER TO WHITE MOVING FROM THE WHALE HEAD TO THE WHALE TAIL FOLLOWING THE GOBO LIGHTING. AT THE SAME TIME, THE INTENSITY SHOULD DIM TO A LOW LEVEL THEN INCREASE TO FULL OUTPUT.
- D1 SPOTLIGHTS WITHIN THE SHADE STRUCTURE TO DIM TO OFF. STARTING AT THE WHALE MOUTH, THE LIGHTS ARE TO DIM UP TO FULL INTENSITY FOLLOWING THE GOBO LIGHTING.

SPECIAL EVENTS
- FOR SPECIAL EVENTS, THE POLE BEACON ELEMENT HAS RGBW FUNCTIONALITY. A SPECIFIC COLOUR IS TO BE SELECTED THROUGH THE USER INTERFACE (PRE-SET OPTION OR COLOUR WHEEL). ALL BEACON ELEMENTS ARE TO BE THE SAME COLOUR THROUGHOUT THE MALL AND ALSO IN THE KINGSWAY. THE CONTROL SYSTEM IS TO ALLOW THE COLOUR OVER-RIDE TO BE SET FOR A PERIOD OF TIME, AFTER WHICH IT SHOULD THEN REVERT TO THE ORIGINAL SETTINGS. WHEN THE COLOUR MODE IS SELCTED, FOR THE RIPPLE OF LIGHT, THE BEACON IS TO DIM TO A LOW LEVEL, THEN INCREASE IN INTENSITY RATHER THAN SHIFT IN COLOUR.

POLE BEACON ELEMENT
- SETTING 1 - FOR THE GENERAL EVENING TO BE AMBER
- SETTING 2 - FOR THE RIPPLE OF LIGHT, AUTOMATED SHIFT IN CCT FROM AMBER TO WARM WHITE
- SETTING 3 - FOR EVENT MODE, RGBW FUNCTIONALITY SLECTABLE THROUGH THE USER INTERFACE.

RIPPLE OF LIGHT - START AT WHALE HEAD AND MOVE TOWARD WHALE TAIL





FOR TENDER

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TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

Copenhagen
London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
DETAILS SHEET 8 - LIGHTING CONTROL

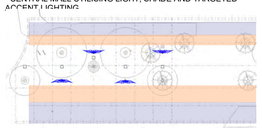
A1

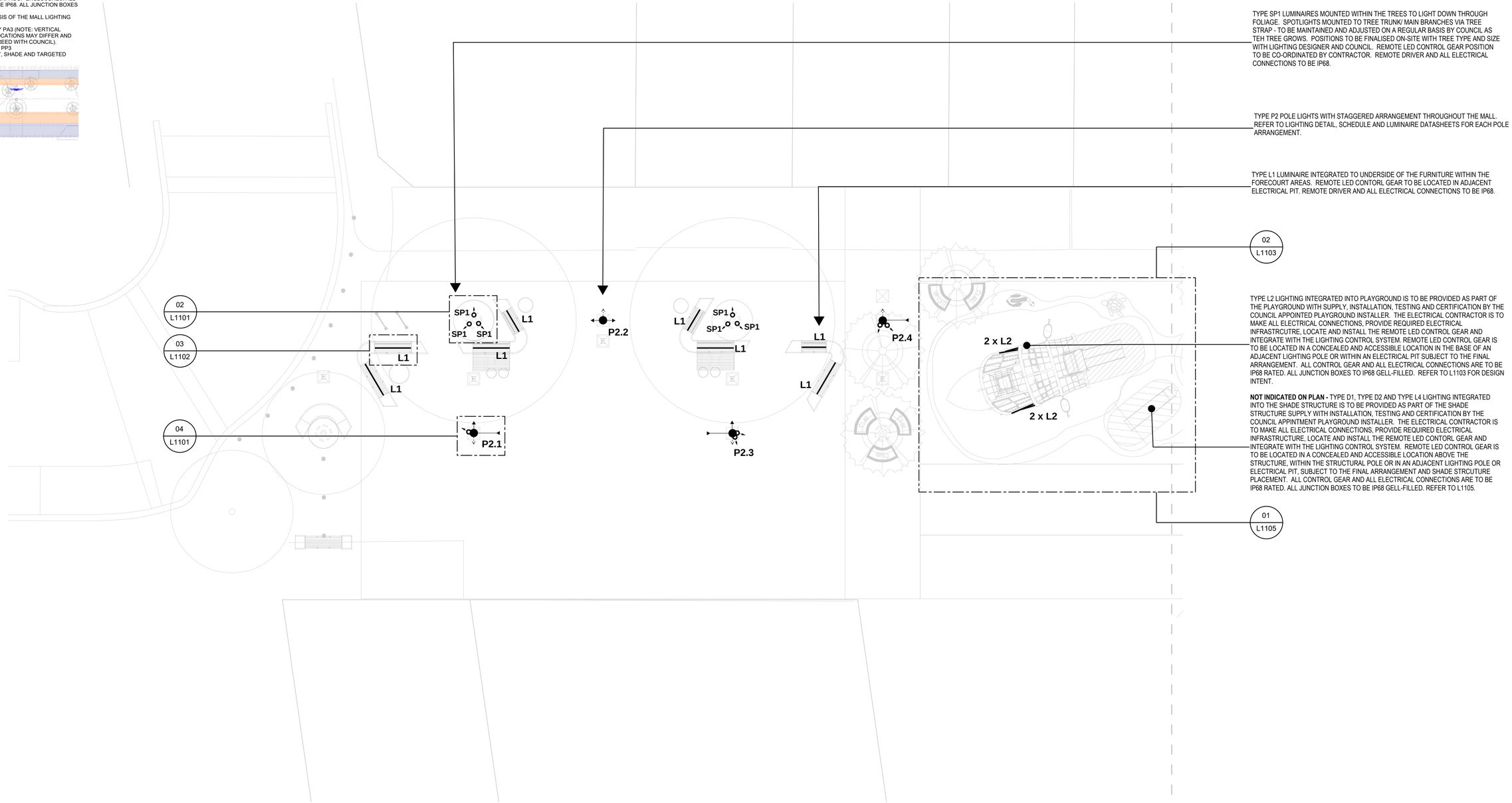
CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L1107	A

NOTES:

1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. CONTRACTOR TO PROVIDE NEW INTELLIGENT LIGHTING CONTROL SYSTEM TO FOR ALL NEW LIGHTING. REFER TO DRAWING L1107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
3. POSITIONS OF ALL REMOTE LED CONTROL GEAR TO BE CO-ORDINATED BY CONTRACTOR TO SUIT RETICULATION AND REQUIREMETNS CO-ORDINATED WITH ELECTRICAL PITS AND LIGHTING POLES. ALL REMOTE CONTROL GEAR TO BE IP68 RATED AND LOCATED IN WEATHERPROOF ENCLOSURES. ALL ELECTRICAL CONNECTIONS TO BE IP68. ALL JUNCTION BOXES TO BE GELL-FILLED IP68.
4. THE FOLLOWING FORMS THE BASIS OF THE MALL LIGHTING DESIGN:
   - MAIN CIRCULATION - CATEGORY PA3 (NOTE: VERTICAL LIGHTING POINTS IN SPECIFIC LOCATIONS MAY DIFFER AND ALIGN WITH PP1 AND PP2 AS AGREED WITH COUNCIL).
   - EDGE TREATMENT - CATEGORY PP3
   - CENTRAL MALL UTILISING LIGHT, SHADE AND TARGETED ACCENT LIGHTING





TYPE SP1 LUMINAIRES MOUNTED WITHIN THE TREES TO LIGHT DOWN THROUGH FOLIAGE. SPOTLIGHTS MOUNTED TO TREE TRUNK/ MAIN BRANCHES VIA TREE STRAP - TO BE MAINTAINED AND ADJUSTED ON A REGULAR BASIS BY COUNCIL AS TEH TREE GROWS. POSITIONS TO BE FINALISED ON-SITE WITH TREE TYPE AND SIZE WITH LIGHTING DESIGNER AND COUNCIL. REMOTE LED CONTROL GEAR POSITION TO BE CO-ORDINATED BY CONTRACTOR. REMOTE DRIVER AND ALL ELECTRICAL CONNECTIONS TO BE IP68.

TYPE P2 POLE LIGHTS WITH STAGGERED ARRANGEMENT THROUGHOUT THE MALL. REFER TO LIGHTING DETAIL, SCHEDULE AND LUMINAIRE DATASHEETS FOR EACH POLE ARRANGEMENT.

TYPE L1 LUMINAIRE INTEGRATED TO UNDERSIDE OF THE FURNITURE WITHIN THE FORECOURT AREAS. REMOTE LED CONTORL GEAR TO BE LOCATED IN ADJACENT ELECTRICAL PIT. REMOTE DRIVER AND ALL ELECTRICAL CONNECTIONS TO BE IP68.

TYPE L2 LIGHTING INTEGRATED INTO PLAYGROUND IS TO BE PROVIDED AS PART OF THE PLAYGROUND WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRCUTRE, LOCATE AND INSTALL THE REMOTE LED CONTROL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION IN THE BASE OF AN ADJACENT LIGHTING POLE OR WITHIN AN ELECTRICAL PIT SUBJECT TO THE FINAL ARRANGEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO IP68 GELL-FILLED. REFER TO L1103 FOR DESIGN INTENT.

NOT INDICATED ON PLAN - TYPE D1, TYPE D2 AND TYPE L4 LIGHTING INTEGRATED INTO THE SHADE STRUCTURE IS TO BE PROVIDED AS PART OF THE SHADE STRUCTURE SUPPLY WITH INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPINTMENT PLAYGROUND INSTALLER. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRUCTURE, LOCATE AND INSTALL THE REMOTE LED CONTORL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION ABOVE THE STRUCTURE, WITHIN THE STRUCTURAL POLE OR IN AN ADJACENT LIGHTING POLE OR ELECTRICAL PIT, SUBJECT TO THE FINAL ARRANGEMENT AND SHADE STRCUTURE PLACEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO BE IP68 GELL-FILLED. REFER TO L1105.

FOR TENDER

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TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

Copenhagen
London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
CRONULLA MALL LIGHTING LAYOUT - SHEET 1

0 5m 10m

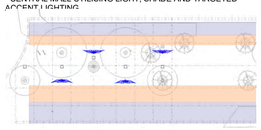
A1

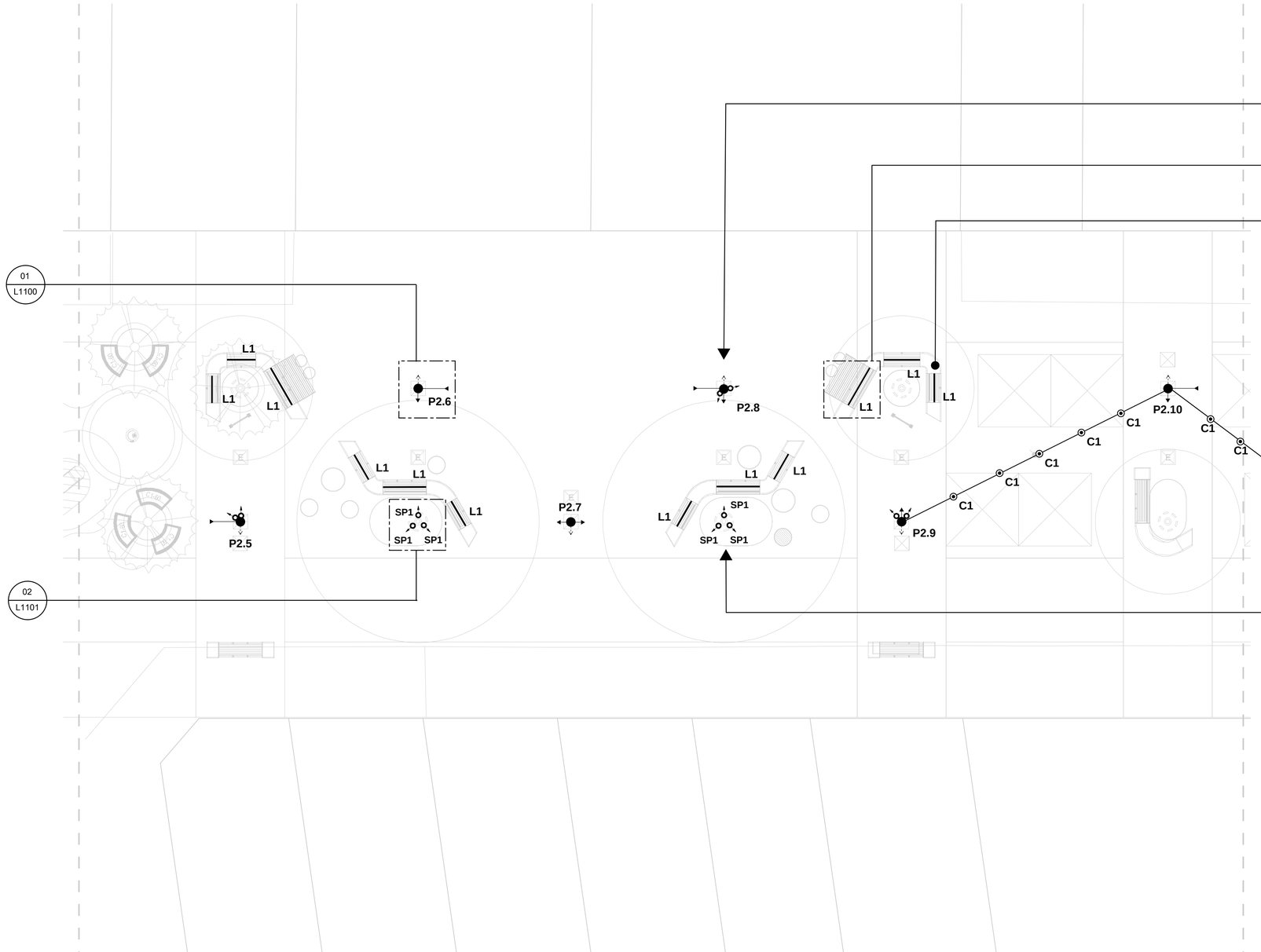
CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	1:100

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L3300	A

NOTES:

1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. CONTRACTOR TO PROVIDE NEW INTELLIGENT LIGHTING CONTROL SYSTEM TO FOR ALL NEW LIGHTING. REFER TO DRAWING L1107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
3. POSITIONS OF ALL REMOTE LED CONTROL GEAR TO BE CO-ORDINATED BY CONTRACTOR TO SUIT RETICULATION AND REQUIREMETNS CO-ORDINATED WITH ELECTRICAL PITS AND LIGHTING POLES. ALL REMOTE CONTROL GEAR TO BE IP68 RATED AND LOCATED IN WEATHERPROOF ENCLOSURES. ALL ELECTRICAL CONNECTIONS TO BE IP68. ALL JUNCTION BOXES TO BE GELL-FILLED IP68.
4. THE FOLLOWING FORMS THE BASIS OF THE MALL LIGHTING DESIGN:
   - MAIN CIRCULATION - CATEGORY PA3 (NOTE: VERTICAL LIGHTING POINTS IN SPECIFIC LOCATIONS MAY DIFFER AND ALIGN WITH PP1 AND PP2 AS AGREED WITH COUNCIL).
   - EDGE TREATMENT - CATEGORY PP3
   - CENTRAL MALL UTILISING LIGHT, SHADE AND TARGETED ACCENT LIGHTING





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TENDER DESIGN

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01	TENDER DESIGN	20/02/2023

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London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
CRONULLA MALL LIGHTING LAYOUT - SHEET 2

0 5m 10m

A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	1:100

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L3301	A

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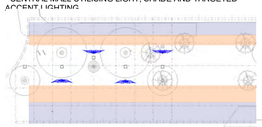
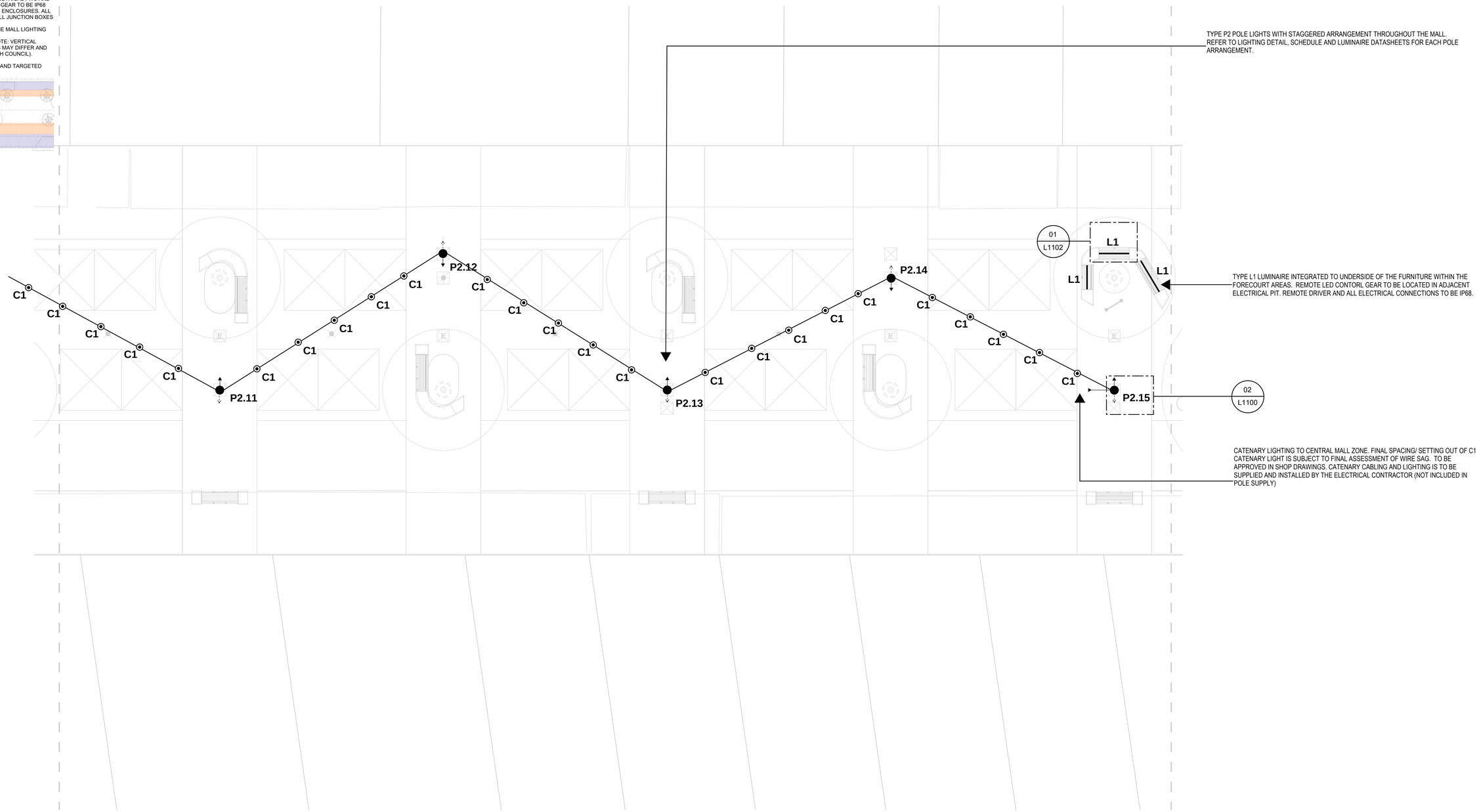
NOTES:

1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. CONTRACTOR TO PROVIDE NEW INTELLIGENT LIGHTING CONTROL SYSTEM TO FOR ALL NEW LIGHTING. REFER TO DRAWING L1107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
3. POSITIONS OF ALL REMOTE LED CONTROL GEAR TO BE CO-ORDINATED BY CONTRACTOR TO SUIT RETICULATION AND REQUIREMETNS CO-ORDINATED WITH ELECTRICAL PITS AND LIGHTING POLES. ALL REMOTE CONTROL GEAR TO BE IP68 RATED AND LOCATED IN WEATHERPROOF ENCLOSURES. ALL ELECTRICAL CONNECTIONS TO BE IP68. ALL JUNCTION BOXES TO BE GELL-FILLED IP68.
4. THE FOLLOWING FORMS THE BASIS OF THE MALL LIGHTING DESIGN:
   - MAIN CIRCULATION - CATEGORY PA3 (NOTE: VERTICAL LIGHTING POINTS IN SPECIFIC LOCATIONS MAY DIFFER AND ALIGN WITH PP1 AND PP2 AS AGREED WITH COUNCIL).
   - EDGE TREATMENT - CATEGORY PP3
   - CENTRAL MALL UTILISING LIGHT, SHADE AND TARGETED ACCENT LIGHTING





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TENDER DESIGN

AMENDMENTS

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01	TENDER DESIGN	20/02/2023

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Sydney
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Sydney, NSW, 2000, Australia
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t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
CRONULLA MALL LIGHTING LAYOUT - SHEET 3

0 5m 10m

A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	1:100

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L3302	A

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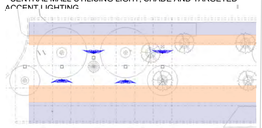
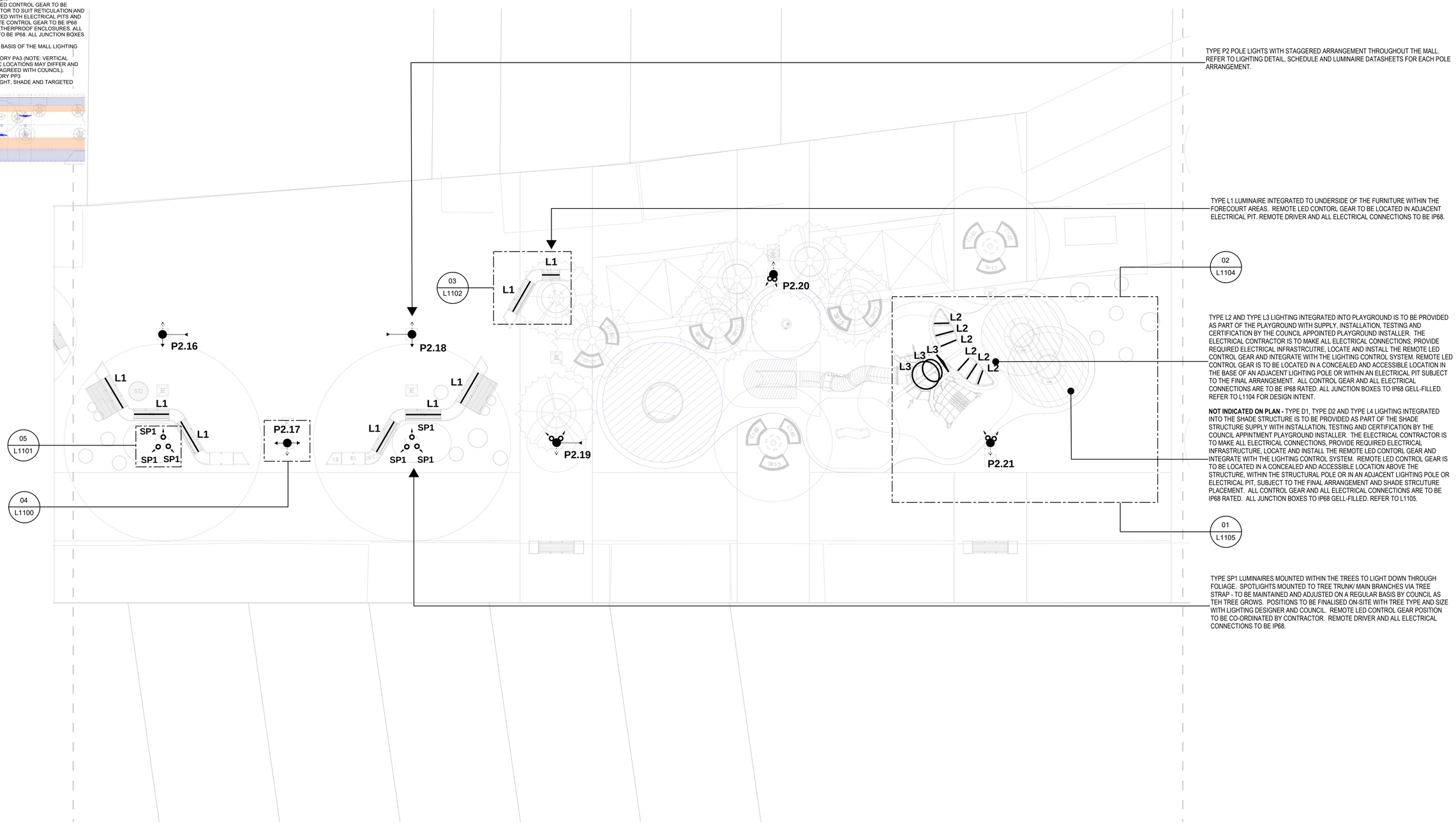
NOTES:

1. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION FOR POWER, RETICULATION AND CIRCUTING.
2. CONTRACTOR TO PROVIDE NEW INTELLIGENT LIGHTING CONTROL SYSTEM TO FOR ALL NEW LIGHTING. REFER TO DRAWING L1107 FOR FUNCTIONAL CONTROL DESCRIPTION. CONTROL SYSTEM DESIGN AND SPECIFICATION BY ELECTRICAL CONSULTANT. REFER TO ELECTRICAL CONSULTANT DOCUMENTATION.
3. POSITIONS OF ALL REMOTE LED CONTROL GEAR TO BE CO-ORDINATED BY CONTRACTOR TO SUIT RETICULATION AND REQUIREMETNS CO-ORDINATED WITH ELECTRICAL PITS AND LIGHTING POLES. ALL REMOTE CONTROL GEAR TO BE IP68 RATED AND LOCATED IN WEATHERPROOF ENCLOSURES. ALL ELECTRICAL CONNECTIONS TO BE IP68. ALL JUNCTION BOXES TO BE GELL-FILLED IP68.
4. THE FOLLOWING FORMS THE BASIS OF THE MALL LIGHTING DESIGN:
   - MAIN CIRCULATION - CATEGORY PA3 (NOTE: VERTICAL LIGHTING POINTS IN SPECIFIC LOCATIONS MAY DIFFER AND ALIGN WITH PP1 AND PP2 AS AGREED WITH COUNCIL).
   - EDGE TREATMENT - CATEGORY PP3
   - CENTRAL MALL UTILISING LIGHT, SHADE AND TARGETED ACCENT LIGHTING





TYPE P2 POLE LIGHTS WITH STAGGERED ARRANGEMENT THROUGHOUT THE MALL. REFER TO LIGHTING DETAIL, SCHEDULE AND LUMINAIRE DATASHEETS FOR EACH POLE ARRANGEMENT.

TYPE L1 LUMINAIRE INTEGRATED TO UNDERSIDE OF THE FURNITURE WITHIN THE FORECOURT AREAS. REMOTE LED CONTORL GEAR TO BE LOCATED IN ADJACENT ELECTRICAL PIT. REMOTE DRIVER AND ALL ELECTRICAL CONNECTIONS TO BE IP68.

TYPE L2 AND TYPE L3 LIGHTING INTEGRATED INTO PLAYGROUND IS TO BE PROVIDED AS PART OF THE PLAYGROUND WITH SUPPLY, INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPOINTED PLAYGROUND INSTALLER. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRCUTRE, LOCATE AND INSTALL THE REMOTE LED CONTROL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION IN THE BASE OF AN ADJACENT LIGHTING POLE OR WITHIN AN ELECTRICAL PIT SUBJECT TO THE FINAL ARRANGEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO IP68 GELL-FILLED. REFER TO L1104 FOR DESIGN INTENT.

NOT INDICATED ON PLAN - TYPE D1, TYPE D2 AND TYPE L4 LIGHTING INTEGRATED INTO THE SHADE STRUCTURE IS TO BE PROVIDED AS PART OF THE SHADE STRUCTURE SUPPLY WITH INSTALLATION, TESTING AND CERTIFICATION BY THE COUNCIL APPINTMENT PLAYGROUND INSTALLER. THE ELECTRICAL CONTRACTOR IS TO MAKE ALL ELECTRICAL CONNECTIONS, PROVIDE REQUIRED ELECTRICAL INFRASTRUCTURE, LOCATE AND INSTALL THE REMOTE LED CONTORL GEAR AND INTEGRATE WITH THE LIGHTING CONTROL SYSTEM. REMOTE LED CONTROL GEAR IS TO BE LOCATED IN A CONCEALED AND ACCESSIBLE LOCATION ABOVE THE STRUCTURE, WITHIN THE STRUCTURAL POLE OR IN AN ADJACENT LIGHTING POLE OR ELECTRICAL PIT, SUBJECT TO THE FINAL ARRANGEMENT AND SHADE STRCUTURE PLACEMENT. ALL CONTROL GEAR AND ALL ELECTRICAL CONNECTIONS ARE TO BE IP68 RATED. ALL JUNCTION BOXES TO IP68 GELL-FILLED. REFER TO L1105.

TYPE SP1 LUMINAIRES MOUNTED WITHIN THE TREES TO LIGHT DOWN THROUGH FOLIAGE. SPOTLIGHTS MOUNTED TO TREE TRUNK/ MAIN BRANCHES VIA TREE STRAP - TO BE MAINTAINED AND ADJUSTED ON A REGULAR BASIS BY COUNCIL AS TEH TREE GROWS. POSITIONS TO BE FINALISED ON-SITE WITH TREE TYPE AND SIZE WITH LIGHTING DESIGNER AND COUNCIL. REMOTE LED CONTROL GEAR POSITION TO BE CO-ORDINATED BY CONTRACTOR. REMOTE DRIVER AND ALL ELECTRICAL CONNECTIONS TO BE IP68.

FOR TENDER

THIS IS NOT A WORKSHOP DRAWING

NOT FOR CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE CONSTRUCTIONAL DIMENSIONED WORKSHOP DRAWINGS IN ACCORDANCE WITH THE RELEVANT SECTIONS IN THE SPECIFICATION

TENDER DESIGN

AMENDMENTS

REV	DESCRIPTION	DATE
01	TENDER DESIGN	20/02/2023

NOTES

Copenhagen
London
Sydney
Hong Kong
New York

8, 9 Castlereagh St.
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

PROJECT
CRONULLA TOWN CENTRE PUBLIC DOMAIN

DRAWING TITLE
LIGHTING DESIGN
CRONULLA MALL LIGHTING LAYOUT - SHEET 4

0 5m 10m

A1

CREATED	DRAWN	DESIGNED	CHECKED	APPROVED	SCALE
FEB'23	NL	NL	AEK	AEK	1:100

NORTHPOINT	PROJECT No.	DRAWING No.	REVISION
	227034	L3303	A

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