



Commented [BK1]: Change graphic to "Version 2.0"

Commented [BK2]: Change graphic colourway (lime green) to differentiate updated 2019 version.  
An IPWEA decision in line with a similar change to the controls spec.

# Model LED Public Lighting Specification

STREET LIGHTING AND  
SMART CONTROLS PROGRAMME

Version 1.0

# Acknowledgements

IPWEA gratefully acknowledges the financial support of the Australian Commonwealth's Department of the Environment and Energy in producing the original edition of this model specification and of our corporate partners in producing this updated version. The intellectual contributions made to and assistance in reviewing drafts of this document by many Street Lighting and Smart Controls (SLSC) Programme partners is also gratefully acknowledged.

## SLSC Partners

Adelaide City Council	City of Ipswich	Signify
Australian Local Government Association	Ittron	Southern Sydney Regional Organisation of Councils
Brisbane City	Lighting Council New Zealand	Sunshine Coast
Broadspectrum	Light Source Solutions	Strategic Lighting Partners
City of Darwin	Logan City Council	Sylvania Connected Solutions
City of Sydney	NB Smartcities	Telematics Wireless
Elumenarti	Next Energy Lighting	Telensa
ENE.HUB	OrangeTek	Vinci Energies
Illuminating Engineering Society Australia & New Zealand	Pecan Ligting	VRT Systems
Institute of Public Works Engineering Australasia	Schröder	

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# 1 | Introduction

The need for a Model LED Public Lighting Specification was first recognised in 2016 stakeholder consultations during the establishment of IPWEA's public private partnership for the Street Lighting and Smart Controls Programme (SLSC) and is described on IPWEA's website [www.slsc.org.au](http://www.slsc.org.au) and [www.slsc.org.nz](http://www.slsc.org.nz). Stakeholders noted highly disjointed approaches to early LED procurement that suggested sub-optimal outcomes at a project-specific and at a broader national level.

Many buyers have been unfamiliar with LEDs for public lighting and thus have adapted guidance and procurement documents from a variety of local and international sources, often in an incoherent, inconsistent and internally contradictory manner.

This resulted in procurement processes that were costly for vendors to respond to and needlessly raised costs and the risks of inappropriate or poorly performing equipment for buyers, and overall, impeded the timely uptake of LEDs in public lighting despite the demonstrated advantages. A robust model specification can address these issues and raise overall confidence levels about the use of LEDs in public lighting.

The SLSC model specifications have been downloaded over 2000 times and an analysis early in 2019 by IPWEA showed that a large percentage of the Top 50 councils, road authorities, utilities and consultants have downloaded the model specifications. However, Version 1.0 was published in July 2017 and, in the two years since, then there has been much experience gained, and many technology improvements and standards updates have occurred.

Version 2.0 accommodates the 2019 changes in AS/NZS 1158 lighting design standards from the 2005 versions, in a range of significant areas, including:

- Terms and definitions
- LED (SSL) luminaire application
- Lighting subcategory descriptors
- Light loss factors
- Constant light output technology
- Light pollution and wildlife protection
- Discomfort glare index
- Adaptive lighting
- Energy performance assessment and reporting

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## 1.1 Purpose and Target Audience

This document is targeted at procurement and technical staff and is intended to facilitate the acceleration of the adoption of LEDs in public lighting. It expects to do this by assisting public lighting buyers, vendors, contractors, funders and advisors to efficiently and economically engage in procurement of LEDs for public lighting.

The objective of this model specification is to provide an informative structured template that is focused on the technical aspects for local governments, main road authorities and electricity

distribution utilities to help them prepare their own customised specifications within a structured procurement process, either as a Request for Proposal (RFP), a Request for Quote (RFQ), or as a Request for Tender (RFT).

This Model Specification provides outcome-based guidance which has been harmonised with both international and local standards and specification requirements for public lighting. It seeks to accommodate and encourage innovation within the bounds of compliance with prevailing design, safety and performance standards and specifications. It is configured to cover both Australian and New Zealand application under the AS and AS/NZS standards framework. Once customised to their own circumstances, a procuring entity can use the resulting specification to select suitable LED lighting with confidence in the outcome.

It is important to note that this Model Specification provides recommendations for established requirements and provides options for newer or higher specification parameters. These options are not recommendations. The parties that customise the document to suit their own purposes make the choice to include or not to include such options, whilst balancing the higher initial costs of new technologies and the emergent supply-chain availability.

## 1.2 The Aim of Model LED Public Lighting Specification

The aim of the Model LED Public Lighting Specification is to be:

1. Technically robust and current;
2. Compatible with AS/NZS standards and specifications and addressing gaps where AS/NZS guidance does not exist or is not suitably current;
3. Written concisely in easy to understand language;
4. Applicable to large and small projects in urban and rural applications;
5. Structured to include a range of selectable options to be chosen by the user to deliver a customised specification meeting their needs;
6. A living document, subject to ongoing review as the technology and market evolves; and
7. Widely and freely available to reduce barriers to uptake of LEDs and dramatically increase the likelihood of procurement and application.

Suggestions for improvements are welcomed. Please forward suggestions to the IPWEA head office using the contact details provided at [www.ipwea.org](http://www.ipwea.org).

## 1.3 Why good public lighting design and smart controls are important

LEDs and smart controls have advanced greatly in recent years and provide many features and advantages that improve amenity, environmental, safety and financial outcomes in towns and cities. There are however some potentially adverse human and ecological impacts from all artificial lighting at night which good lighting design and the use of smart controls can help manage and minimise. These lighting requirements will need to be identified as part of the project description.

Artificial lighting can have an impact on human sleep patterns and the feeding, breeding and migratory patterns of some endangered species, in particular sea turtles, penguins and certain species of sea birds. Different LED spectral distributions and smart controls systems (see related model specification) have the ability to greatly mitigate such adverse impacts by eliminating some parts of the lighting spectrum that have an impact on these species and, by selectively and flexibly

dimming or turning off lighting at sensitive times such as during seasonal breeding or migration periods. Specialist technical and ecological advice is recommended on such matters.

#### 1.4 Document Guidance

This model specification is a multi-choice general guidance document targeted to assist procurement organisations to develop their own customised specification tailored to the exact needs and circumstances of the applicable region and organisation. The selectable content is divided into three categories, plus guidance notes (to be deleted after customisation):

1. Suggested text for inclusion in the tender document by **all** users is presented as mandatory requirements identified in normal black text;
2. Alternative options considered suitable for **some** users, is presented as an optional requirement to be chosen by the purchasing organisation are shown in ***Bold Green Italic***; and
3. Where text is used to instruct user action, this is identified by **bold blue coloured and/or by square brackets []**.

**Note:** Explanatory text to guide user customisation is in burgundy coloured text boxes (as per this example) **which is intended to be deleted after Users have finished compiling their own Customised Specification**.

*This Model LED Public Lighting Specification document has been compiled and formatted in Microsoft Word V16.28. Formatting is very important to facilitate comprehension of a necessarily complex and comprehensive subject so we recommend that Microsoft Word 2017 or later is used.*

#### 1.5 User Customised Specification - Source Acknowledgement

This IPWEA model specification is free-issued publicly in editable Word document format to allow for ease of customisation and general user convenience. Updated versions will be issued in future by IPWEA, as and when required on the [SLSC Website](#). When undertaking the compilation of a Customised Specification, Users should ensure that they are using the most current model specification version.

When compiling a customised specification IPWEA requests that:

1. Users maintain the completeness and structural integrity of the Model Specification document and customise only the user selectable options. Users should acknowledge the source of their Customised Specification e.g. "Based on IPWEA Model LED Public Lighting Specification Version 2.0 (or later if available)". This approach should improve procurement familiarity and assist Tenderers, Vendors and Users to reduce procurement time and costs;
2. If the Model Specification is materially altered, Users must not state or imply that the document is based wholly on the IPWEA Model LED Public Lighting Specification. **Users must clearly indicate which part of the Model Specification has been materially altered.** Ideally IPWEA should be notified so that if the material change is one which would benefit the industry, it could be included in the next version of the Model Specification; and
3. Any excerpts of sections of the Model Specification should acknowledge IPWEA as the source.

## 1.6 Disclaimer

Although the information in this publication is believed to be correct at the time of printing, the Institute of Public Works Engineering Australasia (IPWEA), and its agents, contractors, directors, employees, subcontractors and officers, do not accept any contractual, tortious or other form of liability (including in negligence) arising from the information contained herein, to the extent permitted by law. The information included in this publication is intended as a general guide only, and is not tailored to your needs and circumstances. People using the information contained herein should apply, and rely upon, their own skills and judgement to the particular lighting installation they are considering, and seek appropriate professional lighting design and engineering advice as needed.

This document is not a substitute for specialist, professional advice.

## 1.7 Document Information

Version 2.0 October 2019

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## 2 | Information for Tenderers

*Note: This section makes recommendations about information to be provided to vendors about the procurement timetable, the project being tendered, the required responses and how bids will be evaluated. The contents below are normally included in the 'Information for Tenderers' section of procurement documentation.*

### 2.1 Procurement Process Timetable

The indicative timetable for this procurement process is as follows:

**Table 1 Procurement Process Timetable**

STAGE	DATE
Tender release	DATE
Tender close	DATE & TIME
Short-listing notification	DATE
Short-listed candidates' deadline for response with additional information requested	DATE – Suggested as 1-2 weeks from short-listing notification
Tender award date	DATE
Initial luminaire delivery date	DATE - Required delivery date of initial order. Procuring bodies should note that almost all LED luminaires are manufactured overseas in whole or in part. Typical delivery lead times are 12-16 weeks for most vendors.
Targeted end date for the project	DATE

*Note: It is strongly suggested that a clear procurement process timetable as per the approach above is included as an introductory part of any public lighting tender. This serves to increase vendor confidence that they are participating in a robust process and compels vendors, in later sections of this tender, to identify whether they can meet delivery timetables.*

### 2.2 Project Description

This tender specification is for the supply of [Insert luminaire quantity / contract duration] LED luminaires for: [Insert Project Name].

[Insert concise 50-100-word project description e.g., "This project involves the selection of a luminaire able to meet the lighting requirements of AS/NZS 1158.3.1 subcategories PR5/PR6 for general use on residential roads in the local government area over the next X years with an anticipated volume of XXX luminaires per year." or "This project involves the relighting of two pathways in ABC Park to AS/NZS 1158.3.1 subcategory PP2 as part of an upgrade of the park's infrastructure. Anticipated total volume is XXX to XXX luminaires."]

The general form-factor of luminaire/s sought is [Insert concise luminaire description e.g., "...an inverted conical style for a pathway designed for column-top mounting." or "...a slim style for roadways with side-entry."]

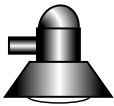
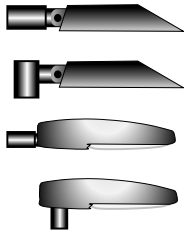
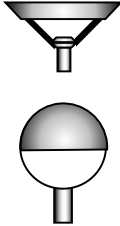
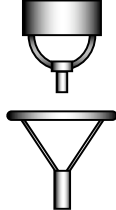


[The project description should also outline environmental management considerations that will need to be accommodated e.g. “Lighting design, selection of luminaire type, location and light distribution shielding should consider the presence of astronomical and ecologically sensitive areas.”]

*Note: The use of one or more images of an indicative shape or shapes that would be acceptable is also advised. See Table 1 below.*

**Table 1: Sample form factors and descriptions**

*Note: Delete all but relevant indicative images prior to tender release or insert own image(s) of relevant indicative form factor(s)*

			
<i>Street/Road Decorative Hat-shaped traditional style for street, road, pathway and cycleway lighting with side or top-entry mounting</i>	<i>Street/Road Functional Slim style for street/road/path /cycleway lighting with side-entry or column-top mounting</i>	<i>Park Light - Path Light Inverted conical square or spherical style for park/path/cycleway lighting with column- top or side mounting</i>	<i>Park Light – Area Light Square or round style for area lighting of parks/carparks/plaza s/precincts with column-top or side mounting</i>

Beyond a general description of the form factor sought, this tender does not prescribe a detailed luminaire configuration but is outcomes-focused with the objectives being to deliver:

- Energy efficient public lighting;
- Public lighting with low light pollution and light nuisance;
- Low maintenance public lighting;
- Lowest public lighting costs over the asset life cycle; and
- The ability to use Central Management Systems (CMS) with networked controls for current or future additional services that enhance city and town safety, functionality, liveability and quality of life.

This tender specification does not represent a guarantee that procurement in the volume indicated above will eventuate or will actually be required. This procurement process is undertaken in good faith, but with no explicit or implicit obligation until contracts are offered and accepted.

### 2.3 Tender Response

In responding to this tender, tenderers need to provide the following completed schedules:

- a. Schedule A - LED Luminaires and Luminaire Performance
- b. Schedule B - Pricing Information
- c. Schedule C – Vendor Information and Referees
- d. Schedule D - Warranty Information *& Other Performance Guarantees (Optional)*
- e. *Schedule E – Statutory Declaration (Optional)*

## 2.4 Tenderer Assessment Criteria

*Note: The criteria below are provided for information only and show a recommended list of assessment criteria for the User to make an evaluation of the suitability of the tender offer and the Vendor.*

*The weighting of these criteria and the results of the tender assessment will normally remain confidential.*

The criteria to be used in assessing this tender are as follows:

### Mandatory Assessment Criteria

1. Financial and commercial trading integrity
2. Ability of the tenderer to attend site(s) as and when requested
3. Demonstrated capacity to fulfil the work health & safety requirements
4. Adherence to environmental management, sustainability and procurement guidelines
5. A minimum of [X] Vendor referees from appropriate reference projects
6. LED luminaire performance attributes and functionality as assessed against the project specification

### Selective Assessment Criteria

7. LED luminaire manufacturer capacity (including qualifications and experience of local technical staff), resources and track record
8. LED luminaire distributor capacity (including qualifications and experience of local technical staff) and resources (if applicable)
9. Total value represented, considering:
  - i. Net Present Value (NPV) of the tender proposal over the asset lifetime, including initial tender price, energy consumption, maintenance requirements and the cost of any consumables; and
  - ii. Strength of warranty and any other performance guarantees offered

## 3 | Specification

### 3.1 Associated Standards and Specifications

The luminaires (and their application-based performance) offered in this tender shall comply with all relevant aspects of the following latest published versions of standards and specifications except where specific exemptions are noted. The use of undated document references is in accordance with IEC and other standards organisation practice).

- AS/NZS 1158 Series (Parts 0-5) - Lighting for Roads and Public Spaces
- AS/NZS 4282 Control of the Obtrusive Effects of Outdoor Lighting
- AS/NZS 3000 Electrical Installations (Wiring Rules), and all appropriate regional application codes and requirements
- AS/NZS 60598.1 Luminaires - General requirements and tests
- AS/NZS 60598.2.3 Particular requirements - Luminaires for road and street lighting
- AS/NZS CISPR 15 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
- IESNA LM-79, LM-84, TM-28
- IEC 61643-11 Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods
- ISO 14064-1 Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals
- ANSI C136.2 American National Standard for Roadway and Area Lighting Equipment-- Dielectric Withstand and Electrical Transient Immunity Requirements
- EN13201-5 Road Lighting Part 5: Energy Performance Indicators
- *SA/SNZ Technical Specification 1158.6 Amdt1: Lighting for roads and public spaces - Luminaires – Performance*
- *IEC 62386 Series - Digital Addressable Lighting Interface (DALI)*
- *Zhaga Book 18 Specification Edition 2.0 - Zhaga Consortium*
- *D4i Specification - Digital Illumination Interface Alliance (DiiA)*
- *Distribution Network Service Provider requirements (if applicable)*
- *Department of the Environment and Energy - National Light Pollution Guidelines for Wildlife –December 2019*

Non-compliance with any relevant requirements of the above are to be explicitly stated in a table of non-conformance.

### 3.2 Lighting Design Specification

The lighting design requirements for this installation are as per the table(s) below.

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**Table 2a: Street/Road/Path/Cycleway - Lighting Design Requirements**

*Note: Use this table only for light along streets/roads/paths/cycleways. Note that a new table as per below is needed for each lighting design variant (e.g. different lighting subcategory, mounting height, outreach, overhang, road/path width change)*

ITEM	REQUIREMENTS
1. AS/NZS 1158 Design Subcategory	<p>[e.g., PR1-PR6, PP1-PP5, V1-V5]</p> <p>If CMS controls are required for the project state:</p> <p><i>For Subcategory P Application:</i>  <i>Respondents shall design the AS/NZS 1158 lighting scenario application with a lighting reserve capacity above the lumens required to deliver the minimum required AS/NZS 1158 average horizontal illuminance values. The respondent shall indicate the % of lighting reserve capacity achievable with the nominated luminaire.</i></p> <p>and/or</p> <p><i>Subcategory V Application:</i>  <i>Respondents shall design the AS/NZS 1158 lighting scenario application with a lighting reserve capacity above the lumens required to deliver the minimum required AS/NZS 1158 average horizontal luminance values. The respondent shall indicate the % of lighting reserve capacity achievable with the nominated luminaire.</i></p> <p><i>Note: The lighting reserve capacity may be used to provide asset management simplification functions or for occasional and temporarily increased light levels. Some potential reasons are:</i></p> <ol style="list-style-type: none"> <li><i>1. To facilitate the use of fewer luminaire physical Stock Keeping Unit (SKU) variants for procurement economics and operational management simplicity. This could mean procuring higher lumen capacity luminaires than the minimum required for baseline operation (defined by AS/NZS 1158 subcategory), and to use the CMS controls to trim down to optimise exactly the lumens required on a semi-permanent basis (and thus deliver the required on-road light levels according to the AS/NZS 1158 subcategory).</i></li> <li><i>2. To allow for temporarily adapted (increased) light levels for safety and amenity in the case of adverse weather events, accidents, incidents, and special public events (e.g. for traffic management on roads around festivals, concert venues, sports stadia etc).</i></li> </ol> <p><i>The lighting reserve capacity % value acceptable is a professional judgement decision for the appropriate Local Government</i></p>

ITEM	REQUIREMENTS
	<p>decisionmakers, and will vary according to the specific application circumstances.</p> <p>The additional marginal cost of higher capacity luminaires needs to be assessed and weighed against the anticipated advantages.</p> <p>These adaptive techniques are now being employed internationally and by some Local Government CMS controls users in Australia and New Zealand.</p>
2. New or Existing Lighting Installation	<p>If new and without any restrictions on column locations and heights, state "New installation"</p> <p>or</p> <p>If there are preferred locations and heights, state "New installation with preferred column height of [X]m and preferred spacing of [Y]m."</p> <p>or</p> <p>If this is an existing installation with structurally sound columns that are to be re-used, state "Existing installation with column height of [X]m and spacing of [Y]m."</p> <p>If a GIS file of the site layout accompanies this tender, which is recommended, state "A GIS file of this site accompanies this tender for information purposes. Its file name is [File Name]."</p>
3. Site Geometry	<p>Road reserve width (Category P) or carriageway lighting design width (Category V) = [X]m</p> <p>[If applicable, insert other aspects of roadway geometry such as curb-to-curb distance, number of carriageways etc]</p> <p>Offset of columns = [Y]m from road reserve or carriageway edge</p> <p>Outreach length = [Z]m as measured from column</p> <p>Mounting height = [W]m of existing or desired if new installation</p> <p>Tilt angle = [x]° of existing bracket or desired if new installation</p> <p>If a GIS file of the site layout accompanies this tender, which is recommended, state "A GIS file of this site accompanies this tender for information purposes. Its file name is [File Name]."</p>
4. Preferred Installation Geometry	[Preferred installation geometry (e.g. "single-sided", "double-sided", "staggered" or other arrangement as per to AS/NZS 1158.2, Table 5.1 & Figure 5.1] at a preferred mounting height of [X]m
5. Preferred Luminaire Mounting Approach	<p>[Preferred luminaire mounting approach (e.g. "side-entry", "column-top" or "top-entry")]</p> <p>[For existing installations, specify outer diameter of existing mounting spigot, particularly if at variance with standard diameters used in AS 1798 (eg side-entry: 34mm - 42mm OD spigots and top-entry: 76mm OD spigots)]</p>
6. Light Loss Factor (LLF)	<p>[Choose from suggested options below]</p> <p>[Rural] Assume a cleaning frequency of 6 years, corresponding to a luminaire dirt depreciation factor (LDD) of 0.92. Calculate a system design light loss factor (LLF) for the purpose of performing</p>

ITEM	REQUIREMENTS
	<p><i>spacing analysis by multiplying extrapolated IES TM-21-11 data at 88,000 hours (light source lumen depreciation (LLD) at 20 years) by the LDD of 0.92. Spacing analysis shall then be performed using this calculated LLF, i.e. <math>LLF = LDD \times LLD</math></i></p> <p style="text-align: center;"><i>or</i></p> <p><i>[Urban] Assume a cleaning frequency of 6 years, corresponding to a luminaire dirt depreciation factor (LDD) of 0.84. Calculate a system design light loss factor (LLF) for the purpose of performing spacing analysis by multiplying extrapolated IES TM-21-11 data at 88,000 hours (light source lumen depreciation (LLD) at 20 years) by the LDD of 0.84. Spacing analysis shall then be performed using this calculated LLF, i.e. <math>LLF = LDD \times LLD</math></i></p> <p style="text-align: center;"><i>or</i></p> <p><i>[Select a User-defined system design light loss factor as per AS/NZS 1158.3.1 or AS/NZS 1158.1.1].</i></p> <p><i>Note that with Power Supplies equipped with Constant Light Output (CLO) technology the LLD value will remain at unity (1) over the design life of the lighting scheme.</i></p> <p><i>Note: This section uses 2019 AS/NZS 1158 lighting design terminology which replaces the terms:</i></p> <p><i>“maintenance factor” with “light loss factor” (LLF),</i></p> <p><i>“luminaire maintenance factor” with “luminaire dirt depreciation factor” (LDD).</i></p> <p><i>“Lamp lumen maintenance factor” with “light source lumen depreciation factor” (LLD).</i></p>
7. Tilt Angle	<p><i>[Choose from suggested options below]</i></p> <p><i>[State “0°” to minimise light pollution, but if existing brackets are to be re-used, state current bracket tilt angle e.g., “Maximum of 5°” or “Maximum of 10°”. Where existing brackets are to be re-used, an option to minimise light pollution is the use of retrofit luminaires with negative inclination in which case “Maximum of -5°” or “Maximum of -10°” would need to be stated as the requirement.]</i></p> <p><i>Note: While many legacy brackets have higher tilt angles of 10 or more, use of high tilt angles is not desirable and efforts to minimise the angle should be made to mitigate light pollution and obtrusive light.</i></p>
8. Luminaire Discomfort Glare Index	<p><i>State the installed luminaire Discomfort Glare Index (DGI) calculated for Discomfort Glare Class DG 2.</i></p>

ITEM	REQUIREMENTS
	<i>Note: Although the calculated DGI figure shall comply with the AS/NZS 1158 maximum limits, it is useful to use the figure attained to rank and rate competing luminaires in a procurement process.</i>

**Table 2b: Park/Carpark/Plaza/Precinct - Area Lighting Design Requirements**

*Note: Use this table only for area-based lighting of parks/carparks/plazas/precincts. Note that a new table as per below is needed for each lighting design variant (e.g. different lighting category, mounting height or change in the fundamental geometry to be lit).*

ITEM	REQUIREMENTS
1. AS/NZS 1158 Design Subcategory	<p>[e.g., PA1-PA3, PC1-PC3]</p> <p>If CMS controls are required for the project state:  <i>Respondents shall design the AS/NZS 1158 lighting scenario application with a lighting reserve capacity above the lumens required to deliver the minimum required AS/NZS 1158 average horizontal illuminance values. The respondent shall indicate the % of lighting reserve capacity achievable with the nominated luminaire.</i></p> <p><i>Note: See note for item 1 in Table 2(a) above.</i></p>
2. New or Existing Lighting Installation	<p>If new and without any restrictions on column locations and heights, state <i>"New installation"</i></p> <p>or</p> <p>If there are preferred locations and heights, state <i>"New installation with preferred column height of [X]m and preferred spacing of [Y]m"</i></p> <p>or</p> <p>If this is an existing installation with structurally sound columns that are to be re-used, state <i>"Existing installation with column height of [X]m and spacing of [Y]m"</i></p> <p>If a GIS file of the site layout accompanies this tender, which is recommended, state <i>"A GIS file of this site accompanies this tender for information purposes. Its file name is [File Name]."</i></p>
3. Preferred Luminaire Mounting Approach	<p>[Preferred luminaire mounting approach (e.g. <i>"side-entry"</i>, <i>"column-top"</i> or <i>"top-entry"</i>)]</p> <p>[For existing installations, specify outer diameter of existing mounting spigot, particularly if at variance with standard diameters used in AS 1798 (eg side-entry: 34mm - 42mm OD spigots and top-entry: 76mm OD spigots)]</p>
4. Light Loss Factor (LLF)	<p>[Choose from suggested options below]</p> <p>[Rural] <i>Assume a cleaning frequency of 6 years, corresponding to a luminaire dirt depreciation factor (LDD) of 0.92. Calculate a system design light loss factor (LLF) for the purpose of performing</i></p>

ITEM	REQUIREMENTS
	<p><i>spacing analysis by multiplying extrapolated IES TM-21-11 data at 88,000 hours (light source lumen depreciation (LLD) at 20 years) by the LDD of 0.92. Spacing analysis shall then be performed using this calculated LLF, i.e. <math>LLF = LDD \times LLD</math></i></p> <p><i>or</i></p> <p><i>[Urban] Assume a cleaning frequency of 6 years, corresponding to a luminaire dirt depreciation factor (LDD) of 0.84. Calculate a system design light loss factor (LLF) for the purpose of performing spacing analysis by multiplying extrapolated IES TM-21-11 data at 88,000 hours (light source lumen depreciation (LLD) at 20 years) by the LDD of 0.84. Spacing analysis shall then be performed using this calculated LLF, i.e. <math>LLF = LDD \times LLD</math></i></p> <p><i>or</i></p> <p><i>[Select a User-defined system design light loss factor as per AS/NZS 1158.3.1].</i></p> <p><i>Note that with Power Supplies equipped with Constant Light Output (CLO) technology the LLD value will remain at unity (1) over the 20 year life of the lighting scheme.</i></p> <p><i>Note: This section uses 2019 AS/NZS 1158 lighting design terminology which replaces the terms:</i></p> <ul style="list-style-type: none"> <li><i>a) "maintenace factor" with "light loss factor" (LLF)</i></li> <li><i>b) "luminaire maintenace factor" with "luminaire dirt depreciation factor" (LDD)</i></li> <li><i>c) "Lamp lumen maintenance factor" with "light source lumen depreciation factor" (LLD).</i></li> </ul>
5. Tilt Angle	<p><i>[Choose from suggested options below]</i></p> <p><i>[State "0°" to minimise light pollution but if existing brackets are to be re-used, state current bracket tilt angle e.g., "Maximum of 5°" or "Maximum of 10°". Where existing brackets are to be re-used, an option to minimise light pollution is the use of retrofit luminaires with negative inclination in which case "Maximum of -5°" or "Maximum of -10°" would need to be stated as the requirement.]</i></p> <p><i>Note: While many legacy brackets have higher tilt angles of 10 or more, use of high tilt angles is not desirable and efforts to minimise the angle should be made to mitigate light pollution and obtrusive light.</i></p>
6. Luminaire Discomfort Glare Index	<p><i>State the installed luminaire Discomfort Glare Index (DGI) calculated for Discomfort Glare Class DG 1.</i></p>



### 3.3 Luminaire Requirements

For clarity and ease of response, the detailed luminaire technical requirements and units in which responses must be provided are shown in Returnable Schedule A.

*Note: Detailed luminaire technical requirements from Schedule A can be repeated here if desired.*

### 3.4 Warranty Requirements [& Other Performance Guarantees]

All LED luminaires tendered shall be covered by a single-source written replacement warranty covering material and workmanship for a minimum period of 10 years.

This shall provide a full replacement luminaire product warranty for a minimum period of 10 years from the date of the purchase invoice on a return-to-base basis. Where products have been superseded by newer models, acceptance of an equivalent replacement product will be at the sole discretion of the client.

At a minimum, the return-to-base warranty shall include:

1. Failure of any electrical, optical and mechanical components (including with respect to all the performance requirements and tolerances included in this specification);
2. Partial LED failure resulting in more than 15% loss of the initial lumen output;
3. Failure of any ingress protection or componentry resulting in ingress protection failure; and
4. Failure of any protection method or componentry resulting in vibration failure.

While vendors are encouraged to propose stronger than minimum warranty terms, it is understood that a full replacement return-to-base warranty does not include:

1. Any site removal or reinstallation costs or expenses, including labour; and
2. Improper handling, misuse, abuse, improper installation, vandalism, accidents, negligence or network transient voltages (including lightning strikes) as evidenced by failure of surge protection devices.

Signed warranty certificates shall be provided to the client immediately upon completion of installation.

Unless specifically agreed with the tenderer, these warranty conditions take precedence over any vendor warranty provisions or terms and conditions of sale.

All mandatory maintenance required to maintain the terms of the warranty are to be specified in the table in returnable Schedule D.

*Note: If, due to the size of the proposed contract, your organisation also requires a Parent Company Guarantee, Bank Guarantee or an on-shore insurance bond in addition to a warranty, this should be explicitly stated here and a response allowed for at the location indicated in Schedule D.*

## 4 | Returnable Schedules

### SCHEDULE A – LED Luminaires and Luminaire Performance

The tenderer shall submit the schedule below for each of the luminaire types listed above for which they wish to tender.

The tenderer shall submit sufficient information to describe all materials that comprise the luminaires including housing, optical materials, colour, etc.

Tenderers shall provide product information as below in **Microsoft Excel Spreadsheet or other User-specified** format for each luminaire type submitted:

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
1. Maximum spacing achievable in meeting lighting design specification	See Section 3.2	m
2. Name, organisation and qualifications of lighting designer who undertook design calculations and details of design package used (eg Perfect Lite, AGi32, Lighting Reality).	Signed off by a qualified lighting designer with MIESANZ (or equivalent) as a minimum credential.	Description in text
3. Luminaire – Brand, Type & Model No.	NA	Description in text
4. Luminaire System Wattage	Total Wattage of LED Module and Power Supply	W
5. Luminaire Initial Lumen Output	NA <i>Note: See note for item 1 in Table 2(a) and Table 2(b) above.</i>	lm
6. Luminaire Efficacy (As per LM-79) inc Power Supply	NA <i>Note: Whilst useful as a quick early stage energy performance evaluation metric luminaire efficacy is not recommended as a full procurement criterion. Overall energy performance of a lighting scheme design, luminaire, installation and operation is best determined with PDI and AEI metrics.</i>	lm/W
7. Power Density Indicator (PDI) of lighting system	<i>Optional: State the AS/NZS 1158 calculated Power Density Indicator (PDI)</i>	W/lux/m <sup>2</sup>

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
	<p><i>value achieved in meeting the lighting design specification (Section 3.2) above.</i></p> <p><i>Note: Add if desired. This is an optional requirement of AS/NZS 1158.3.1:2019. This calculated figure will allow the objective comparison of systemic energy performance for different luminaires and optics under the same design, installation and operating conditions.</i></p>	
8. Annual Energy Consumption Indicator (AECI) of lighting system.	<p><i>Optional: State the AS/NZS 1158 calculated Annual Energy Consumption Indicator (AECI) value achieved in meeting the lighting design specification (Section 3.2) above.</i></p> <p><i>Note: Add if desired. See burgundy text box comment as per item 7 above.</i></p>	kWhr/lux/m <sup>2</sup> /yr
9. Annual carbon emissions of lighting system.	<p><i>Optional: State the calculated annual tCO<sub>2</sub>e emissions as a result of the generation of purchased electricity (Scope 2 emissions as defined by ISO 14064-1) as a result of the AECI achieved in item 8 above. State the purchased electricity CO<sub>2</sub>e conversion factor used in the calculation.</i></p> <p><i>Note: Note: Add if desired. This calculated figure will allow the objective comparison and ranking of carbon performance for different luminaires and optics under the same design, installation and operating conditions.</i></p>	tCO <sub>2</sub> e/lux/m <sup>2</sup> /yr
10. LED Module – Brand, Type & Model	NA	Description in text
11. Rated Life of LED Module Hrs @L70	NA	Hrs@L70
12. Correlated Colour Temperature	<p><i>Nominally 4000K (if Category V) 3000K or 4000K (if Category P)</i></p> <p><i>Note: 4000K is recommended for all Category V installations while 3000K or 4000K is recommended for all Category P installations, noting human preference for lower colour temperatures at lower lighting levels and environmental risk mitigation</i></p>	K

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
	<i>benefits of lower colour temperatures. See SLSC Briefings for further discussion of on-going colour temperature and spectral debate. In areas in close proximity to turtle nesting and other threatened species habitats other colour temperatures (or more accurately, other spectral power distributions) may be more appropriate and specialist advice should be sought.</i>	
13. Colour Rendering Index	70+ Ra <i>Note: 70+ Ra is recommended for good colour definition without the loss of efficacy that may result from specifying a higher CRI.</i>	Ra
14. Chromaticity Tolerance - Average Chromaticity Shift ( $\Delta u'v'$ ) at 6,000 hours	As per SA/SNZ TS 1158.6 Table 5.3	$\Delta u'v'$ and tolerance
15. Spectral Power in the the 430-470nm (blue light) Spectral Power Distribution (SPD) band	<p><b>[In biologically or astronomically important areas]</b></p> <p>State the spectral power value (Watts) in the 430-470nm wavelength band. This will require a photometric lab test report of the absolute SPD curve (not the relative curve), and calculation of spectral power in the designated blue light band (i.e. the area under the curve).</p> <p><b>[Choose from suggested options below]</b></p> <p><i>Optional:</i> <b>[In non biologically or astronomically important areas]</b> <i>Delete</i></p> <p><i>Or</i> <i>Optional:</i> <b>[in non biologically or astronomically important areas]</b> <i>State the spectral power value (Watts) in the 430-470nm wavelength band. This will require a photometric lab test report of the absolute SPD curve (not the relative curve), and calculation of spectral power in the designated blue light band. (i.e. the area under the curve).</i></p>	W

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
	<p><i>Note: This SPD power value is important if the geographic region concerned has particular blue light sensitivities for astronomical or wildlife protection reasons. See the Draft Dept of the Environment and Energy (DoEE) National Light Pollution Guidelines, September 2019.</i></p> <p><i>The area under the SPD absolute graphical curve in the 430-470 nm band is the calculated value of the spectral power (Watts) in this range, and is a full and objective basis for comparative evaluation of luminaire blue light emissions.</i></p> <p><i>Note that the peak value of the absolute spectral energy curve in the 430-470 nm band (that is sometimes used in this context) is inadequate as it is only a partial indicator of luminaire blue light emissions.</i></p> <p><i>This spectral power calculation will require a photometric lab report that is additional to the LM-79 package of tests (Note that the lab process may not be NATA certified for this).</i></p> <p><i>The cost of this report should be minimal if undertaken along with a regular LM-79 test, but if required separately the cost may be close to that of a full LM-79 test.</i></p>	
16. Discomfort Glare Index (DGI).	<p>State Discomfort Glare Index (DGI) figure achieved for DG2 class or DG1 class in AS/NZS 1158 lighting design calculations.</p> <p><i>Note: DGI calculation is a new mandatory requirement of AS/NZS 1158 lighting design, and for compliance the index must be lower than the limits prescribed. Requesting disclosure of the actual calculated figure provides a useful performance comparison of luminaires, as products that meet lighting design standards with a lower DGI figure are preferable (lower glare).</i></p>	DGI figure

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
17. Power Supply (Driver) Brand, Type, Model	NA	Description in text
18. Power Supply Dimming & Constant Light Output Capability	<p>Dimmable power supply required</p> <p><i>Note: Suggested default approach is to request a dimmable power supply to allow not just for dimming but also brightening, trimming, constant lighting output and graduated start/finish with ramp-up and ramp-down.</i></p>	Y/N
19. Power Supply	<p>DALI-2 complying with IEC 62386-102, and with memory bank populated with luminaire asset management data complying with DiiA specification DALI-251 Memory Bank 1 Extension.</p> <p><i>Other options are:</i></p> <ol style="list-style-type: none"> <li><i>0-10V (Not recommended but was formerly a common approach).</i></li> <li><i>DALI-1 (Not recommended as superseded by DALI-2)</i></li> <li><i>DiiA D4i compliant Power Supply with DALI-2 and auxiliary IoT Device 24V DC power supply. For Power Supply, DiiA D4i certification is preferred.</i></li> </ol> <p><i>Note: The default approach is DALI-2 to enable better control of dimming regimes, two-way communication, and to enable automated population of an asset register via CMS controls system (note that the luminaire or power supply manufacturer must be asked to populate the power supply with key data in DALI-251 standardised format).</i></p>	Y/N
20. Surge Protection	<p>In-luminaire Surge Protection Devices (SPD) rated at:</p> <p><b>10 kV/5kA [most areas]</b> or <b>20kV/10kA [Extreme risk areas e.g. Northern Australia]</b></p>	kV/kA

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
	<p>Complying with ANSI C136.2-2018, and IEC 61643-11:2011 for risk categories and SPD test methods.</p> <p>SPD's with operational status indication facility are preferred.</p> <p><i>Note: The recommended approach is based on ANSI C136.2-2018 which establishes risk categories and test methods for surge protection devices and IEC 61643-11:2011 which requires surge protection devices to be able to withstand at least fifteen incidents at their rated threshold. There may also be additional longevity benefits in using surge protection devices based on gas discharge tubes and/or surge protection devices having thermal cut-offs that protect the rest of the luminaire if surge protection fails.</i></p>	
21. Ambient Operating Temp Range	NA	-X°C & +Y°C
22. Rated Life of Power Supply	NA	X hrs with y% total failure rate
23. Predicted Power Supply Failure Rate	<p>0.2% per 1000 operating hours</p> <p><i>Note: Mean Time Between Failure (MTBF) calculations are widely used in the electronics and telecommunications industries as a primary predictor of reliability of complex electronic systems. One of the key long-term failure risks with LED luminaires is the electronic power supply. Telcordia SR-332 is the most common method of calculating an MTBF and is recommended. An alternative is MIL-HDBK 217 and care should be taken to confirm which method has been used as the two are not directly comparable.</i></p>	% failure expected per 1000 hours (Based on Telcordia SR-332)
24. LED Drive Current	NA	mA
25. IP Rating – Optical Module	IP66 preferred, IP65 minimum	IPXX
26. IP Rating – Gear Chamber	IP24 minimum	IPXX

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
27. IP Rating – Power Supply	<p>IP66 preferred, IP65 minimum, unless power supply is located within a Gear Chamber that is IP 65 or greater.</p> <p><i>Note: IP65 is the minimum requirement for either the Gear Chamber or the Power Supply. Non IP rated Power Supplies are suitable for installation if the control gear chamber is IP65 or greater.</i></p>	IPXX
28. Cable Gland Rubber Bush (for electrical supply input cable)	<p>To achieve the intended systemic IP performance the rubber bush housed within the plastic gland is to be dimensionally aligned with the shape of the electrical input supply cable selected i.e. round-form cable shall use a round-form bush and vice-versa for oval-form components.</p> <p><i>Note: This item relates to the historic use of oval-form TPS in-pole cable by some installers, mating with a round-form luminaire gland bush. Such poor practices can impair the IP rating of the luminaire.</i></p>	Y/N
29. Luminaire Body - Aluminium Alloy – Max Copper Content	As per as per SA/SNZ TS 1158.6 2.3.1	%
30. Luminaire Body - Surface Finish – State metal pre-treat and powder coat process	NA	Description in text
31. Luminaire Body Colour	<p>NA</p> <p><i>Note: State closest AS 2700 colour reference to desired colour (e.g. N23 Neutral Grey and N61 Black). Alternative option is RAL Colour Classic Standard expressed as 4 digit colour.</i></p>	AS 2700 Colour ref.
32. Luminaire Dimensions	NA	L x W x H in mm
33. Luminaire Mass	<p><b>7 kg [Category P non-post top] or 15 kg [Category V non-post top]</b></p> <p><i>Note: Maximum recommended mass is as per SA/SNZ TS 1158.6: 7kg max for Cat P non-post top and 15kg max for Cat V non-</i></p>	kg



ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
	<i>post top. In a replacement situation involving an outreach arm, if the luminaire mass is appreciably greater than that of the one being removed, maximum loading may require sign-off by a structural engineer.</i>	
34. Luminaire IK Rating	IK04  <i>Note that where higher impact resistance rating is needed (e.g. to address vandalism risk particularly at low mounting heights) specify IK06 for medium risk and IK08 for high risk situations as per SA/SNZ TS 1158.6 Table 2.1 otherwise, as per AS/NZS 60598.2.3</i>	IK0X
35. Spigot Dimensions to be Accommodated (if an existing installation or columns have already selected for a new installation)	[X] mm diameter [Y] mm length	Y/N
36. Smart Controls - Control device receptacle.	Central Management System (CMS) control device receptacle to be NEMA/ANSI C136.41 7-pin, with shorting cap included in the tender price. Mounting of the receptacle on the top or the bottom of the luminaire is acceptable.  <i>Other Options are:</i>  <i>a) Zhaga Book 18 Edition 2.0 Connectivity - Two Zhaga Book 18 Edition 2.0 receptacles – One top mounted for CMS controls device and one bottom mounted for non-lighting IoT device (both receptacles with sealing caps included). For Luminaires with this option, DiiA Zhaga-D4i certification is preferred.</i>  <i>b) Hybrid Connectivity - One NEMA/ANSI receptacle top mounted for CMS controls device, and one Zhaga Book 18 Edition 2.0 receptacle bottom mounted for non-lighting IoT device. (NEMA/ANSI receptacle with shorting cap and Zhaga 18 with</i>	Y/N

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
	<p><i>sealing cap included). For luminaires with this option, DiiA Zhaga-D4i certification is preferred.</i></p> <p><i>Note: Note the new option of Zhaga-compliant interfaces where one or two Zhaga Book 18 Edition 2.0 receptacles can be specified for each luminaire (with sealing caps included in the tender price). A DiiA D4i compliant Power Supply (with auxiliary power supply for non-lighting devices of 24V DC 4W maximum) must be specified to use this two-receptacle approach.</i></p>	
37. RoHS 2 Hazardous substance environmental compliance	NA	Y/N
38. Luminaire packaging materials	<p><i>Optional: Luminaire packaging materials to be free of any plastic resins (Plastic Codes 1,2,3,4,5,6,7), singly or in combination with one or more of these plastics, or in combination with any non-plastic material.</i></p> <p><i>Optional: Luminaire packaging to be free of plastic materials that are not practical to effectively reuse or recycle in the (Add region) region.</i></p> <p><i>Note: These options will vary according to the regulatory requirements or the stated council or road authority solid waste reduction commitment in the geographic region concerned.</i></p>	Y/N
39. Product Sustainability Statement	<p><i>Optional: Provide a vendor statement regarding the luminaire attributes in the following areas:</i></p> <ol style="list-style-type: none"> <li><i>1. Serviceability (of luminaire)</i></li> <li><i>2. Replaceability (of main components)</i></li> <li><i>3. Disassembly (of luminaire)</i></li> <li><i>4. Recyclability (of main materials)</i></li> </ol>	Y/N

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
	<i>Note: This optional aspect applies to the preferences of road authority in the geographic region concerned. These topics are intended to be IEC standardised for luminaires in future (and AS/NZS?), with objective metrics introduced for rating and benchmarking.</i>	
40. Does the luminaire have an existing entry on the Australian Energy Market Operator's National Electricity Market Load Tables for Unmetered Connection Points?	NA	Y/N (If N, state willingness to apply for approval)
41. Does the luminaire have an existing approval for use under the <b>[Choose as applicable: NSW Energy Savings Scheme / Victorian Energy Efficiency Target Scheme/Delete this item if not in NSW or VIC]</b> ?	NA	Y/N (If N, state willingness to apply for approval)
42. Luminaire optic/lens UV stabilisation method substantiating that degradation is insignificant over useful lifetime	NA	Description in text
43. Glare Shielding Accessory Options Available	NA	Description in text
44. Confirm that the following documentation and supporting material (with test reports from a NATA accredited laboratory or a laboratory, whose accreditation is recognised by NATA under the mutual recognition scheme) is available <b><u>if your product is short listed:</u></b>  1. Product brochures and technical data sheets (Excerpts only, as applicable to the specific product. Do not provide full range catalogue.) 2. IESNA LM-79 test report	NA	Indicate Y/N for each item

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
3.	IESNA LM-80 and IES TM21 calculations and extrapolations	
4.	Lighting design calculations to AS/NZS1158 Part 3.1 or 1.1 as applicable (AGi32, Lighting Reality or similar, plus Perfect Lite) to provide evidence of luminaire performance declared (including for shielding options)	
5.	For column mount luminaires only, is luminaire compliant with SA/SNZ TS 1158.6 Technical Specification? State all exceptions	
6.	Test report or material batch evidence of aluminium alloy copper content	
7.	Ingress protection test report as per the requirements of AS/NZS60598.1	
8.	Resistance to external mechanical impact as per AS/NZS 60598.2.3	
9.	Impulse voltage test as per Clause 5.5 of SA/SNZ TS 1158.6	
10.	Thermal endurance and thermal testing requirements as per Clause 5.6 of SA/SNZ TS 1158.6	
11.	Lens material datasheets demonstrating UV stability	
12.	A luminous intensity distribution Table (I - Table) for the luminaire in CIE and IES file formats corresponding to the LM-79 report provided	

ITEM	MINIMUM REQUIREMENTS	RESPONSE (UNITS / FORMAT)
13. A polar diagram clearly identifying peak intensity at 70, 75 and 80 in cd		
14. Evidence of accreditation of the laboratory providing the photometric information		[State lead time]
15. One operational demonstration sample luminaire of the <u>exact specification</u> tendered, wired in an electrically safe manner with 3m of electrical flex and 3-Pin mains plug		

*Note: The tendering organisation should recognise that customisations to typical LED luminaire features may be contrary to international best practice and limit choice as well as increase costs and delivery lead times. This is particularly so as many LED luminaires are manufactured overseas to meet international standards and configurations. Some historic local practices, such as requesting remote power supplies, specific locations for photocells / controls receptacles and modifications of terminal blocks to incorporate internal fuses, may warrant reconsideration in this context.*

## SCHEDULE B: Price Information

Tenderers are to complete the following table of pricing for each luminaire type as indicated:

ITEM – Luminaire Type	QUANTITY	UNIT PRICE (\$ FIS Excl. GST)	ADDITIONAL COSTS (if any) (\$ Excl. GST)	DELIVERY LEAD TIME (Weeks)
<b>Type A:</b> [Descriptive name of luminaire type]	[Insert tendered order quantity]			
<b>Type B:</b> [Descriptive name of luminaire type]	[Insert tendered order quantity]			
<b>Type C:</b> [Descriptive name of luminaire type]	[Insert tendered order quantity]			
[Add or remove rows as needed depending on the number of different types of luminaires required]				

### Unit Pricing Notes:

Unit pricing shall include all customisation required to meet the tender specification in full (including spigot adapter, custom colour, power supply type, etc – as applicable)

Luminaire tender pricing quoted above shall be Free-Into-Store (FIS) at the following location(s):

[Tenderer to specify delivery location or locations]

Tender pricing to be on the basis of land or sea transport (not airfreight) for entire quantities listed:

[Tenderer to specify if split deliveries are required as these may have cost implications]

### Additional Costs Notes:

Vendor to state any additional per-unit costs for any options of relevance to this tender (e.g. glare shields).

## SCHEDULE C: Vendor Information & Referees

Please provide the following details separately for both the entity making the tender proposal (typically a distributor Vendor) and the manufacturer (if not the same company) for the exclusive purpose of evaluating tenders:

### Tenderer's Information

ITEM	RESPONSE
1. Tenderer's Name	
2. Location (Physical address)	
3. ABN / NZ Company No.	
4. Website	
5. Number of Employees	
6. Approximate Annual Financial Turnover	[Like all other information submitted, this will remain confidential to the Evaluation Panel and its adviser]
7. Relationship to Manufacturer (if not the same company)	[Clarify whether distribution rights are exclusive, whether the manufacturer has shareholding in the distributor etc]
8. Competencies in LED Luminaires	[Brief company CV – Max half page]
9. List of reference sites / customers	[List recent relevant reference sites /customers and approximate number of luminaires for each. Local reference sites preferred but international reference sites may also be relevant, particularly if involving the same luminaire]
10. Competencies of key ANZ-based staff	[Brief one-paragraph CVs of key technical or customer-facing personnel]
11. Ability to support site visits	[Name of customer service representative and location]

### Manufacturer's Information

[Tenderer to delete table below if tenderer and manufacturer are the same company]

ITEM	RESPONSE
1. Manufacturer Name	
2. Location (Physical address)	
3. ABN / NZBN (if applicable)	
4. Website	
5. Number of Employees	
6. Approximate Annual Financial Turnover	[Like all other information submitted, this will remain confidential to the Evaluation panel and its advisers]
7. Competencies in LED Luminaires	[Brief company CV – Max half page]
8. Competencies of key ANZ-based staff (if applicable)	[Brief one-paragraph CVs of key technical or customer-facing personnel]
9. Ability to support site visits	[Name of customer service representative and location if applicable]

### Referees

The tenderer shall provide a minimum of [X] referees from recent reference projects (local if possible). Tenderers should provide a client contact for each who is able to act as a referee for this tender and has given their permission to be contacted. Information about referees and their projects should be provided in the tables below:

**Referee 1**

ITEM	RESPONSE
Referee Name	
Organisation	
Location of Referee (Physical address)	
Telephone	
Email	
Project Description	[Brief one-paragraph description of project type, location, size and completion date]

**Referee 2**

ITEM	RESPONSE
Referee Name	
Organisation	
Location of Referee (Physical address)	
Telephone	
Email	
Project Description	[Brief one-paragraph description of project type, location, size and completion date]

*Note: Tendering organisation to insert additional tables below if additional referees are required at initial tender stage]*



## SCHEDULE D: Warranty [*& Other Performance Guarantees*]

### Warranty Details

ITEM	RESPONSE
All LED luminaires tendered are be covered by a single-source written replacement warranty covering material and workmanship for a minimum period of 10 years meeting at least the requirements outlined Section 3.4 of this tender	Y/N
Signed warranty certificates shall be provided to the client immediately upon completion of installation	Y/N
Mandatory maintenance required to maintain the terms of the warranty are as follows:	[Vendor to list any mandatory maintenance requirements to maintain terms of warranty]

*Note: If, due to the size of the proposed contract, your organisation also requires a Parent Company Guarantee, Bank Guarantee or an on-shore insurance bond in addition to a warranty, a returnable table allowing the tenderer to respond to your requirements should be added here.*

### **SCHEDULE E: Statutory Declaration** *[Optional]*

*Note: Tendering organisations have the option of inserting a standard form of statutory declaration relevant to the jurisdiction of the tendering organisation allowing the vendor to attest to the truthfulness of their tender submission. Perhaps most importantly, vendors would be attesting that the list of substantiating documentation is available in precisely the format requested and with appropriate certifications from accredited independent laboratories.*



**Commented [BK6]:** Add thumbnail image of the updated 2019 IPWEA Mode Public Lighting Controls Specification.

**Commented [BK7]:** Add thumbnail image of the 2019 IPWEA Model Business Case Specification



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