

## **GENERAL NOTES**

### **1 PREAMBLE**

The specification sheets indicating the lighting design requirements for specific areas within this project form part of this document and should be read in conjunction with these preambles and LDP's relevant drawings, and associated sketches.

This specification supersedes all previous issues.

The Bidding Contractor shall satisfy themselves for the necessary completeness of the provided information prior to submitting the final pricing.

Luminaires that require specialized installation kits will be priced inclusive of these even if the specification does not expressly call for them.

All prices will include delivery to an approved location at site.

All prices will be quoted in the currency requested by the client inclusive of all duties and taxes. The Bidding Contractor may choose to identify these separately for consideration by the Client.

All Luminaires will be quoted inclusive of the necessary lamps and control gear. The Bidding Contractor may choose to provide a breakdown of these prices separately.

In the event of any discrepancy the decision of the Client is final.

### **2 SAMPLES & PROTOTYPES**

If requested, the Contractor will supply a sample of the offered luminaire, or prototype of a special luminaire or variant of a standard luminaire and its cost shall be incorporated in the tender price.

Any such sample prototype or variant shall comply with the lighting design specification, and shall be submitted to the Lighting Consultant, together with full photometric and dimensional data in the format requested, to enable both its accurate assessment and the detailing of any adjustments deemed necessary prior to the commencement of full production or installation.

An approved sample shall be retained by the Client for the duration of execution.

### **3 STANDARDS COMPLIANCE**

All equipment supplied shall comply with the relevant standards currently in force in locally.

The cost of obtaining any necessary approvals shall be included in the tender price, and detailed as a separate item.

### **4 PROTECTION**

All equipment shall be supplied with adequate means of protection to ensure its preservation during transport to site and any subsequent storage prior to installation.

A removable film applied prior to dispatch shall further protect all vulnerable finished parts liable to scratching or other abrasion during handling and installation.

### **5 GUARANTEES**

All equipment and components supplied shall be guaranteed against failure due to poor workmanship, materials, or luminaire design, for a period of not less than 18 months from the date of delivery to site or 12 months from the date of practical completion, whichever is the sooner, with the exception of lamps which shall be covered only by their manufacturer's normal assurances as to life expectancy and performance

LED luminaires with manufacturer mounted LED sources will come with a minimum 5-year system warranty.

LED luminaires with ZHAGA compliant LED modules will be provided with a minimum 3-year system warranty.

System warranty will include all electronics, LES, mechanical and optical components.

The successful bidder will be required to submit proof of all guarantees to the client.

## 6 LUMINAIRES

Equipment offered must be a standard item from a particular manufacturer's range and meet the specification criteria with a view to performance, optics, maintenance, quality, aesthetics etc.

Should alternative equipment be offered, full technical and photometric data shall be supplied to the LDP in the specified format to enable its accurate assessment. If any variants of standard luminaires are required, the manufacturer of the standard luminaire shall develop these, unless otherwise specifically stated, and shall be manufactured to the same standards as the equivalent standard luminaire.

If specified, two copies of all working drawings of proposed variants, dimensioned in mm, shall be supplied to LDP for approval prior to fabrication.

Notwithstanding the above, the manufacturer shall remain responsible for ensuring compliance with relevant standards, the accuracy of the information shown on his drawings at all times and for ensuring that the equipment shown fulfills the requirements of this specification.

If any special luminaires and associated equipment are required, these will be the subject of a separate specification, a copy of which will be enclosed with this document.

LDP cannot accept responsibility for installation of non-approved luminaires.

The final location of each luminaire and where relevant its integration with the architecture shall be as detailed on the construction issue drawings. The LDP cannot accept responsibility for luminaires installed in a manner other than intimated in the relevant drawings or as otherwise agreed and minuted.

Special accessories as required by the luminaire specification have been designed and discussed with the specified manufacturer to perform specific tasks. Where required, these accessories have been detailed in the appropriate luminaire specification.

LDP's design intent drawing(s) detail the performance and aesthetic parameters of the luminaire(s). The Manufacturer shall design, develop and manufacture the luminaire(s) generally in accordance with these drawing(s), and in a way which achieves these parameters.

The successful Manufacturer shall submit two copies of all working drawing(s) to the Lighting Consultant, (dimensioned in mm) for necessary approvals prior to fabrication.

Materials shall be chosen with regard to their suitability for the use to which they will be put, particularly in respect of their thermal mechanical strength and durability.

The luminaire shall be designed to facilitate ease of cleaning, routine maintenance, lamp changing etc, when

All mounting details shall be clearly shown on the working drawing(s) including electrical cable entry and the weight of the luminaire in kg.

Where a luminaire is specified for use externally, its design and manufacture shall ensure its suitability for this

## 7 OPTICAL SYSTEM AND PERFORMANCE

The optical systems shall generally be designed and developed to achieve the performance requirements of the luminaire, as specified on the relevant luminaire specification and as detailed on the relevant lighting layouts.

Detailed photometric data shall be supplied to LDP for assessment.

## 8 CONTROL GEAR

All necessary control gear and transformers shall be mounted within the luminaire unless specified as being located remotely. All such gear shall be of good quality construction, shall comply with all relevant statutory regulations, shall be compatible with the lamps specified, and shall be mounted and wired in accordance with the manufacturers' Where appropriate, the Bidding Contractor shall also liaise with the selected lighting control system manufacturer to ensure compatibility between control gear and the control system. He shall also provide all necessary data regarding gear losses etc, to enable dimmers/contactors to be sized correctly.

Unless otherwise stated, all transformers shall be electronic and suitable for dimming on their primary side via a thyristor controlled remote lighting control system.

Where gear or transformers are installed remotely, care should be taken to ensure that any audible sounds generated by control gear, or by lamp filaments via control gear are kept to a minimum. Where this is particularly crucial, detailed acoustic requirements are included.

Control gear for discharge lamps will be electronic wherever possible.

When dimmable ballasts are called for LED and fluorescent lamps in the specification, they will use a digital dimming protocol permitting dimming of LEDs and fluorescents to a minimum level of 2% without flickering.

All remote (standalone and shared) LED control gear will have the lifetime stated in system warranty.

All equipment shall be protected from unexpected mains failure, and mains borne interference.

All control gear, ballasts, and transformers will be from reputed manufacturers. The following list is indicative of the brands to be used:

- 8.1 Osram
- 8.2 Tridonic
- 8.3 Philips
- 8.4 Vossloh Schwabe

Other manufacturers may be suggested by the Contractor accompanied by full electrical characteristics as an alternative for consideration and approval.

## 9 LAMPS

LED lamps shall match the optical and spectral criteria as specified. These lamps shall have a minimum life expectancy of 45000 hrs as defined in L70. If the luminaire uses integral control gear, its lifetime will be the lesser of the LED and integral Control gear. Manufacturers will provide necessary NATA accredited lab test data to substantiate technical parameters.

LEDs will be procured from reputable sources with full manufacturer's technical specification available for review. Recommended manufacturers include Osram, Lumiled, Cree, Nichia, Bridgelux, Samsung and Seoul Semiconductor LEDs will be binned within 2 SDCM of stipulated CCT.

Thermal dissipation test data from NATA certified labs for LEDs will be provided

Fluorescent lamps shall match the optical and spectral criteria as specified. These lamps shall have a minimum life expectancy of 20000 hrs to 50% failure.

Arc-tube discharge lamps (metal halide) shall match the encapsulation and spectral criteria as specified. These lamps shall have a minimum life expectancy of 12000 hrs to 50% failure.

Incandescent and tungsten halogen lamps shall not be operated other than for initial testing, prior to final inspection.

Lamps are specified by manufacturer's name and reference number. These lamps have been selected for use within the luminaires specified.

Alternative lamps shall only be considered if possessing the same colour rendering, colour temperature, life expectancy, lumen output and general performance as the specified item.

## 10 INSTALLATION

All sub circuit cable sizes shall be determined by the Bidding Contractor in accordance with local standards. In the absence of a noted standard, Australian Standard AS3000 will apply.

Cabling and wiring from Remote gear to Luminaires will be included in the Bidding Contractor's scope of work. All such low voltage cables will be without joints or splices, unless approved and minuted by the Project Engineer.

All ducts buried direct in ground or concrete encased shall be Class 6 underground conduit and have a minimum compression rating category of "medium" (as defined in Australian Standard AS2053).

All surface mounted conduits shall be protected from ground level to a height of 1.8m by a suitable hot dipped galvanised steel channel or equivalent.

All metering enclosures shall comply with the requirements of the local Service & Installation rules.

All control equipment & enclosures shall comply with the requirements of AS3000 or its local equivalent. Mounting arrangements and enclosure size shall be determined by the Bidding Contractor.

Cutouts in ceilings for mounting of interior luminaires will be carried out by Interior contractor. The bidding contractor will locate and provide dimensions for all such cutouts. The Bidding contractor will include review and coordination of their location to ensure correct mounting of internal luminaires.

All brackets, suspenders, clamps and other accessories required for installation in the Interior will be included in the Mounting brackets for External fixtures will be provided by the Façade Contractor. The Bidding contractor will include review and coordination of their location to ensure correct mounting of external luminaires.

## 11 COMMISSIONING

The Lighting Installation will be commissioned prior to sign-off and transfer to the Client

This will include at a minimum the following steps;

11.1 Witnessing completion of conduiting, cabling, wiring terminations

11.2 Witnessing installation methodology of luminaires. A sample installation can be used to obtain approval

11.3 Verification of correct operation of luminaires

11.4 Verification of correct grouping of luminaires

11.5 Verification of smooth dimming of luminaires, where dimming is specified

11.6 Verification of correct operation of lighting automation sensors and controllers

Upon completion of witness and verification, the installation will be checked for compliance with design objectives. Any deviations shall be recorded and a root-cause analysis carried out.

The installation will be allowed to operate in final ambient environment (including designed air-conditioning and ventilation at a minimum) for a duration of 24hrs. Regular 3-hourly inspections of the installation will be carried out during this test.). Any failures shall be recorded and a root-cause analysis carried out.