DESIGN STANDARDS For URBAN INFRASTRUCTURE

STREET LIGHTING

SECTION 12
# 12 STREET LIGHTING

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12.1 Introduction

The purpose of this chapter is to provide the basis for the design of streetlighting used in public spaces including roads, car parks, pedestrian areas and cycleways.

It is to be used in conjunction with the Australian Standards and other referenced ACT Government guidelines. Particular attention is drawn to *ACT Government - Standard Specification for Urban Infrastructure Works – Streetlighting Section 14*

These guidelines require that the streetlighting design be carried out by a person or persons with relevant qualifications, having experience in the design of streetlighting using AS/NZS 1158 including all referenced standards, the application of compatible lighting design software and who have an understanding of the International Commission on Illumination, (CIE) streetlighting design principles.

The design processes in the relevant Australian Standard should be followed and records of the process kept. Refer particularly to Section 6 of *AS/NZS 1158.1.3 Design Process* for design checklists. Clarification shall be sought from Territory and Municipal Services, (TAMS) should any discrepancy exist between these design standards and Australian Standards.

12.2 Related standards and guidelines

The following documents are key references to use with this chapter on streetlighting. The Australian Standards provide most of the information required for streetlighting design. Design of streetlighting in the ACT shall meet the requirements and recommendations of these standards. No attempt has been made to repeat the information provided in the Australian Standards in this guideline, and on the contrary this has been avoided wherever possible.

12.2.1 Australian Standards:

*AS/NZS 1158.0*  
Road lighting. Part 0: Introduction.

*AS/NZS 1158.1.1*  

*AS/NZS 1158.1.3*  

*AS 1158.2*  
Road lighting. Part 2: Computer procedures for the calculation of light technical parameters for category A lighting.

*AS/NZ 1158.3.1*  
Road lighting. Part 3: Pedestrian area (Category P) lighting. Part 1: Performance and installation design requirements.
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AS 1158.4  Road lighting. Part 4: Supplementary lighting of pedestrian crossings.

AS 1158.6  Lighting for roads and public spaces. Luminaires

AS 1170.2  Minimum design loads on structures. Part 2: Wind loads

AS 1798  Lighting poles and bracket arms – Preferred dimensions

AS 2979  Traffic signal mast arms

AS 3000  Electrical Installations – Building, Structures and Premises (known as the SAA Wiring Rules)

12.2.2 Authority guidelines


12.2.3 ACT Government guidelines


ACTPLA City Centre Design Palette A copy will eventually be accessed on the web www.canberracentral.gov.au In the mean time, all enquiries can be made to:-

Canberra Central, 16 Challis Street, PO Box 1908, Canberra ACT 2601
T. 02 6207 2016, F. 02 6207 5513

Territory and Municipal Services draft Lighting Masterplans, currently for Deakin, Lyneham, Braddon, Dickson, O'Connor and Turner – See http://www.tams.act.gov.au/work/standards_and_procedures Copies attached Appendix F-1 to F-6 & Inner City Suburb Lighting Masterplan. – Draft at ACTPLA Canberra Central, 16 Challis Street, PO Box 1908, Canberra ACT 2601. T. 02 6207 2016, F. 02 6207 5513
### 12.3 Streetlighting design –

#### Streetlight Pole - Dimension limits

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimension</th>
<th>Outreach Arm</th>
<th>Height</th>
<th>Condition</th>
<th>Design Spec. clause reference</th>
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<td>1.5, 3, 4.5</td>
<td>4, 6.5, 9, 10.5, 12, 15</td>
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<td>12.3.2</td>
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<tr>
<td>“</td>
<td>B</td>
<td></td>
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<td>12.3.1</td>
</tr>
<tr>
<td>Pedestrian side column</td>
<td>C</td>
<td>0.5, 1.5</td>
<td></td>
<td></td>
<td>12.3.2</td>
</tr>
<tr>
<td>“</td>
<td>D</td>
<td></td>
<td>4, 6.5, 9, 10.5, 12, 15</td>
<td></td>
<td>12.3.1</td>
</tr>
<tr>
<td>Banner</td>
<td>E</td>
<td>0.5, 1.5</td>
<td></td>
<td>Only on poles &gt; 9 metres in height &amp; designed to withstand wind loadings</td>
<td>12.3.1, 12.3.3</td>
</tr>
<tr>
<td>“</td>
<td>F</td>
<td>2.4 minimum</td>
<td></td>
<td></td>
<td>12.3.1</td>
</tr>
<tr>
<td>“</td>
<td>G</td>
<td>6.0 maximum</td>
<td></td>
<td></td>
<td>12.3.1</td>
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Note: Column Heights in Parks, Cycleways, Walkways, Adjacent Underpasses & Adjacent Shopping Centers shall be a minimum of 6.5 Meters \( (12.3.1) \)
12.3.1 Columns

Lighting columns shall be of the types, heights and outreaches as shown on the Standard Drawings, and shall be of the make and type as described in Part 12.10, and shall conform with the requirements of the relevant Australian Standard(s). The height of the columns shall be such as to give vertical heights from ground level to the center of the luminaire spigot of 4.0, 6.5, 9, 10.5, 12, and 15m.

Lighting columns of 9m height or greater shall be of the frangible type, either slip base or impact absorbing. Where high-speed impact absorbing lighting columns are used a service pit as per standard drawing DS12-01 shall be incorporated adjacent to the column so as to provide capacity for cable disconnection if an accident damages the column. Slip base columns shall only be used where there are no designated path or cycleways within 5 metres of the installed column. Material shall be galvanized light gauge sheet steel or aluminium.

Allowance shall be made for use with luminaires of approximately 12kg weight with a projected windage area of 0.2 square metres. Category V columns shall be designed to permit banner installation between 2.4m and 6m maximum to a serviceability limit state loading of 1kN. No permanent deformation or excessive vibration should occur under Wind Loading of up to 160km/hr for repeated gusts of up to 10 minutes duration, generally as described in AS 1170.2: Minimum design loads on structures. Part 2: Wind Loads.

Should a designer propose to use an ‘equivalent’ manufacturer from those listed in Part 12.10, that proposal requires a specific approval request by the designer to TAMS at design stage. Note Proposals for ‘equivalents’ at construction stage will not be entertained.

12.3.1.1 Columns Heights in Parks, Cycleways, Walkways, Adjacent Underpasses & Adjacent Shopping Centres

Vandalism Statistics have shown that low poles at locations of parks, cycleways, walkways, adjacent to underpasses & adjacent to shopping centres are far more susceptible to vandalism damage than higher poles. Pole heights in these locations shall be at least 6.5 metres unless the designer can establish to the satisfaction of TAMS Asset Acceptance, that vandalism will not be a problem.

12.3.1.2 Columns / Luminaries in Proximity of Trees

In areas where trees are planted or are to be planted, the lighting design shall take into account the reduction of light levels that may be caused by trees.

Streetlights shall be placed so that the luminaires are below the mature tree canopy or are at least 2 metres clear of the mature tree canopy. Documentation shall be provided with the streetlight design to show the likely mature tree canopy footprint and lower level of canopy.

This will necessitate liaison between the landscape designer and streetlight designer to establish optimum spacing of trees and streetlights.

12.3.2 Luminare Outreach Arms

Luminare outreach arms shall be curved or straight, and on roadside of 1.5, 3.0, and 4.5m in length, and on Pedestrian side of 0.5 and 1.5m in length, and set at an installed angle horizontal to the pavement with a final uplift of not greater than 5°. The length of the outreach is the horizontal
distance from the vertical centre line of the column to the tip of the outreach, excluding the lamp mounting spigot. All outreach arms shall be secured to the column so that the outreach arm cannot be displaced from its intended position under wind loading of up to 160km/hr for repeated gusts of up to 10 minutes duration, generally as described in AS 1170.2: Minimum design loads on structures. Part 2: Wind Loads. Roundabout luminaires shall be mounted on either 3 way or four way outreach arms with 0.5m extensions. In plan the orientation of the outreach arm shall be at right angles to the traffic lane, or 90° to the tangent point of the curve.

12.3.3 Banner mounting

Banner installation is to be catered for on columns above 9m only. Banner serviceability loading is to be calculated using AS/NZS 4676 Appendix G using the following regional parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>p_d</td>
<td>Design horizontal wind pressure</td>
<td>1.0kPa</td>
</tr>
<tr>
<td>p_b</td>
<td>Regional wind pressure</td>
<td>0.9kPa</td>
</tr>
<tr>
<td>K_z</td>
<td>Terrain category, height factor</td>
<td>0.8</td>
</tr>
<tr>
<td>K_t</td>
<td>Topographical factor</td>
<td>1.0</td>
</tr>
<tr>
<td>C_D</td>
<td>Drag factor</td>
<td>1.3</td>
</tr>
</tbody>
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Each banner shall be attached top and bottom to prevent entanglement with the column, lighting luminaire, regulatory signs, guide signs etc. The total force of each banner will be calculated in accordance with AS/NZS 4676 Appendix G3.2.3 and in all cases shall not exceed 0.5kN per banner and be restricted to a maximum of two banners per column. Banners shall be mounted at a minimum height of 2.4m and at a maximum height of no greater than 6m. Banners shall have a quick release mechanism on the lower mounting that will ‘break away’ should the wind load exceed the design parameters.

12.3.4 Installation of lighting columns within the vicinity of overhead powerlines or chamber type substations

In the absence of any conflicting requirements of ActewAGL, the following minimum clearances between overhead powerlines and lighting columns shall be met for slip base and impact absorbing columns:

12.3.4.1 Slip Base Columns

When the conductors of overhead powerlines are parallel to the direction of travel of all vehicles along the road,

a) the distance between the column and the closest overhead electricity conductor shall exceed 0.6 times the height of the highest point on the lighting column.
b) When the conductors of overhead lines are not parallel to the direction of travel of all vehicles along the road the distance between the column and the closest overhead electricity conductor shall exceed 1.2 times the height of the highest point on the lighting column.

Note that at a roadway intersection, some traffic will be travelling normal to powerlines when the powerlines run parallel to one road or the other.

12.3.4.2 Impact Absorbing Columns

The distance between the column and the closest overhead electricity conductor shall exceed 0.6 times the height of the highest point on the lighting column.

12.3.4.3 Chamber Type Substations

An earthing ring is installed round chamber type substations. Any streetlight columns must be clear of the earthing ring, which is at a distance dependent upon the ground resistivity. A streetlight column clearance of 4.75 metres from the outer perimeter of the Chamber Type Substation shall be maintained unless prior written approval is obtained from the Electricity Utility. (ActewAGL).

12.3.5 Installation of lighting columns set back from kerb

12.3.5.1 Cat P Minor Collector, Local road, Cul-de-sacs etc

The setback distance shall be 1.7m from the back of kerb, and a minimum 1.5m clearance from vegetation, driveways, footpaths and all other structures, etc. Columns shall be located halfway between individual proposed or existing tree canopies. For maintenance personnel safety, column access hatches shall be placed either facing away from the road or to the side facing away from the oncoming traffic. Place columns on the line of boundaries between blocks. Seek Territory and Municipal Services approval of all other locations before design acceptance.

12.3.5.2 Rear entrance alleyways.

Columns placed in these locations may be situated 1 metre from the back of kerb providing the column is adequately protected from damage by vehicles e.g. bollards of sufficient strength to prevent vehicular impact. Without exception a 1 metre clearance must be maintained within the road reserve, around the column, at all times, to permit maintenance and replacement as required. Column access hatches shall be placed either facing away from the roadway or away from the oncoming traffic. Where a column is within 1 meter of a property boundary the column access hatch shall be placed away from the oncoming traffic.
12.3.5.3 Major Collector, Arterial Roads Cat V and Cat P.

Where vehicle speeds exceed 50kmh, setback columns 3m from the back of kerb or the edge of the pavement (outside the impact zone AS/NZS 1158.1.3). All columns shall be frangible in accordance with AS/NZS 1158.1.3 as amended. Columns used adjacent to foot or cycle paths or where residential blocks abut the roadway shall be of the frangible impact absorbing type. Frangible slip base columns shall not be used in situations that pose significant risk to pedestrians. (See 12.4.2 Prescriptive Criteria).

12.3.6 Installation of Decorative Strings and Fibre Optic Lighting

Overhead catenary and tree branch (bud lighting) shall use lighting columns designed to accept the catenary loadings or alternatively free standing columns with a minimum catenary mounting height of 4.5m in pedestrian areas and 7m over roadways. Freestanding columns shall be rag bolt mounted with hold down bolts stopping below the finished level. All overhead decorative lighting shall be 24-volt extra- low voltage design. Decorative lighting in public places shall have a minimum clearance of 3m from the finished level or any climbable object in non trafficable areas. In trafficable areas or over roadways clearances shall be in accordance with the Utilities Act requirements. Optical fibre installations shall utilise standard HID metal halide lamps and shall be installed without colour wheels and motor drives. Optical driver units shall be installed in an environment where lamp heat is dissipated effectively and moisture ingress into the lamp chamber is avoided.

12.3.7 Relocation or removal of existing columns.

A design review of the lighting installation may be required if the relocation of an existing column/s is of a significant nature (greater than 5m). All major roadway lighting columns above 8m in height will require redesign before relocation is permitted. Relocation of columns to an adjacent block will require written approval from the affected lessee. Standard distances shall be maintained from vegetation, roadways and driveways. Columns cannot be removed without written authorisation from Territory and Municipal Services. Where the removal is temporary suitable alternative lighting shall be installed to compensate. All relocation or removed columns shall be recorded on Work as Executed, (WAE) drawing and submitted to Roads ACT to enable the spatial mapping to be updated and the energy billing to be adjusted where necessary. In all cases any column relocated any distance must comply with all electrical standards applicable at the time.
12.3.8 Earthing

Earthing shall be provided to meet the requirements of the Electricity Utility and ACT Planning and Land Management Authority (ACTPLA).

Earthing of lighting columns shall comply with ACTPLA Electrical Note 2, *Electrical Installation of Street Lights, Traffic Lights, Combination Street and Traffic Lights and Street Area Lighting*.

Earth electrodes shall be installed in accordance with AS/NZS 3000.

All exposed conductive parts, including metallic parts of all fittings, shall be earthed in accordance with AS/NZS 3000.

12.3.9 Performance criteria

The streetlighting performance shall be achieved to the recommendations of the Australian Standards using the methods described in the Standards. The design however shall also comply with the additional prescriptive and performance guidelines set out herein. These added requirements are to ensure that the design is:

- Consistent with policy objectives of the ACT Government.
- Compatible with existing infrastructure and can be maintained economically.
- Meets the requirements of the local electricity utility.
- Carried out in consultation with other relevant authorities where applicable.

12.3.10 Prescriptive requirements

The following is a list of prescriptive requirements that apply to streetlighting generally. Additional specific prescriptive requirements may be found in each lighting category type.

**12.3.10.1 Complementing Traffic Control Device Design**

One aim of the ACT Government is to minimise streetscape clutter. During the streetlight design process the streetlight designer shall negotiate with the Traffic Control Device (TCD) designer to establish common placement of TCD and guide signage onto streetlight columns where ever practicable.

**12.3.10.2 Power Supply**

The designer shall make arrangements with the electrical utility (where the existing street light network is incapable of supplying the proposed streetlighting scheme) to provide a point of supply for
the streetlighting sub-mains. This will be undertaken at the preliminary design stage. Generally the power supply will be unmetered. The electricity utility will need to be advised with (as a minimum) the following preliminary design information:

- Number of lights per sub-main
- Wattage of each light
- Voltage drop to last light
- Proposed point of supply
- Proposed lighting layout

The designer shall obtain from the electricity utility details of the adjacent lights as needed for the design process.

Once a preliminary design has been completed it is to be presented to the electricity utility for connection assessment. All costs associated with the establishment of preliminary design information and approval will be at the expense of the designer.

Evidence of electricity utility supply approval (Request For Service form [RFS]) shall be presented with the completed design to Territory and Municipal Services Asset Acceptance for final design acceptance. This shall occur prior to any onsite streetlighting works commencing.

**12.3.10.3 Category V (Arterial & Major roads) and area lighting**

Connection of new streetlighting at the point of supply shall be via sub-main protection. Supply of the initial service protection device (service fuses) and final connection to the distribution network shall be the responsibility of the electricity utility.

**12.3.10.4 Category P (Minor collector & local roads) and other streetlighting types**

Columns in new underground electricity serviced subdivisions are to be supplied from the closest electricity utility minipillar. Supply of the initial service protection device (service fuse) and final connection to the distribution network shall be the responsibility of the electricity.
Where this type of connection is to occur in an established area, the electricity utility will determine the type of connection. Where a minipillar or utility supply is distant the point of supply must be agreed with the electricity utility prior to design work being finalised.

Where proposed category P streetlighting is to be installed in existing overhead supply areas the streetlights shall be connected directly to the distribution network utilising PE cells for individual luminaire control. Final connection to the electricity utility distribution network shall be the responsibility of the electricity utility.

12.3.10.5 Circuit Protection

This will be completed in accordance with the requirements of AS/NZS 3000 Electrical Installation (Wiring Rules) and Electrical Note 2

12.3.10.6 Cable Types

For new installations three phase sub-mains shall be used for streetlighting, except that single phase sub mains may be used for local road and area lighting when electricity utility mini pillars are present.

Each lighting column shall have individual automatic circuit breaker protection fitted inside the column. A maximum of three sets of terminations shall be made at any column.

Subject to compliance with AS/NZS 3008, cable sizes and types shall be in accordance with TAMS Standard Specification for Urban Infrastructure Works Street Lighting Section 14 clause 14.5 Materials. A minimum of a 4 core 16mm² multi strand copper cable shall be used for Cat V lighting sub-mains supplied from a control point. A minimum of 16mm² multi strand copper cable shall be used for area lighting sub-mains supplied from a control point. A minimum of a single core 6mm² multi strand copper cable may be used from the electricity utility mini pillars to an individual street light. Earthing arrangements shall comply with Electrical Note 2. Ensure that the same neutral source is used for the entire sub-main length. Cabling shall be XLPE insulated/PVC sheathed or equivalent installed in heavy duty Category A rigid PVC conduit. When slip base columns are used provision shall be made for disconnect plugs and flex assemblies in the base of each column in accordance with Drawing DS12 Category 01

Connections made in cable pits shall be designed for full submersion. All connectors used for aluminium cable shall be the fully sealed insulation piercing connector (IPC) type. Where insulated
cables terminate in an outdoor open air environment (e.g. pole top) weather loops shall be adopted to prevent water ingress.

**12.3.10.7 Cable Route**

Cable route shall be in accordance with *Design Standard 4 Road Verges*. The designer shall contact Dial Before you Dig on 1100 and request all existing utility asset information to determine their effects on the proposed design.

Should the need arise to utilise the utility shared trench system; authorisation shall be sought by the designer from the ACT utilities shared trench committee prior to design acceptance. The committee secretariat is at Agility Management P/L Fyshwick Attention Jim Dawson http://www.agility.net.au/Agility/, or James.Dawson@agility.net.au, Phone 02 6295 5444. A typical shared trench detail (for Franklin Estate) is shown in Appendix E. In all cases install cabling in Cat A conduit. In the case of a shared trench arrangement provide a separate layer in the shared trench to maintain working and maintenance clearances from all other utility assets.

For cabling that emanates from a control point such as Category V and non-residential Category P design sub-main conductors shall loop in and out of large (suitable for 4 core 16mm² conductors minimum) terminal links provided in the base of columns. When slip base columns are used provision shall be made for disconnect plugs and flex assemblies in the base of each column in accordance with Drawing DS12-Category 01

The preferred method of control in residential areas is by individual photo-electric cell control integral with each luminaire. A control point cubicle shall supply category V and Category P open area lighting. It may be necessary in other situations where distribution supply is remote to establish a control cubicle for multiple luminaire control. Where this method is proposed, approval shall be sought from the electricity utility. Streetlight main switchboards (control cubicles) shall be free standing and shall not be located within electricity utility substations (indoor or pad mounted) or buildings but shall be located in a publicly accessible position suitable for 24hr maintenance access. Control cubicle design shall be in accordance with Drawing DS12 Category 01 and 02. Unless specific written permission is granted by the electricity utility & the Department of Territory and Municipal Services, only electrical supply for streetlighting may be taken from the street light side of the cubicle.
12.3.10.8 Leased Land

Where overhead or underground streetlighting cables are proposed on or over leased land an easement shall be established. Easement width for overhead cabling shall extend 1.5m either side of each of the outermost conductors. Underground easements shall be a minimum easement width of 2m with the proposed conduit and cabling established along the centre line of such an easement.

Whenever currently unleased land is to be gazetted as leased land by the ACT government, existing streetlight assets within the new lease that are required to be retained in order to maintain streetlighting on adjacent unleased land shall be relocated outside the lease or have an easement placed over them. The cost of the relocation or easement shall be borne by the lessee.

12.3.10.9 Streetlighting Fixed to Buildings

Where streetlighting is proposed to be fixed to buildings that will become the assets of the Territory (Power and Maintenance at the cost of the Territory) an appropriate deed shall be prepared and approved by the Government Solicitor and registered on the Territory Lease. The design shall provide external access to luminaries, cabling and control isolation for the Streetlight Maintenance Contractor 24 hours/day 7 days/week. The cost of the deed shall be borne by the lessee.

12.3.10.10 Environmental design requirements.

Consideration shall be given to the provision of the most energy efficient design. The use of metal halide or high pressure sodium lamps is preferred to provide minimum illumination levels consistent with the requirements of AS/NZS1158. (See also Clause 12.3.10.12.)

12.3.10.11 Other design requirements

Designs within the city centre precinct shall be in accordance with the city centre design palette and lighting master plan. This plan is available from the ACT Planning and Land Authority (ACTPLA).

Territory and Municipal Services have completed lighting master plans for many inner suburbs. Lighting design shall be in accordance with the applicable suburb master plan when available. Designers should contact Territory and Municipal Services for applicable lighting Master Plans.

Lighting in heritage areas shall be designed, constructed and maintained using only the materials described in the Territory and Municipal Services Heritage Procedure in Appendix A.
Column setback dimensions from kerbs, vegetation, driveways, footpaths etc are found under clause 14.01.17 of *TAMS Territory and Municipal Services Street Lighting Specification Section 14*.

### 12.3.10.12 Design certification

When the Department of Territory and Municipal Services is required to review the streetlighting design, designs shall be submitted to Territory and Municipal Services Asset Acceptance with the following information:-

- Point of supply.
- Method of control of the lights.
- Voltage drop at the light positions at the end of every run (including ends of branches).
- The categories (as defined by the relevant Australian Standard) of lighting included in the design.
- For vehicular traffic (Category V) lighting, the information listed in Appendix C of *AS 1158.1.1 “Documentation Required for Demonstrating Compliance with this Standard”.*
- For lighting in accordance with *AS/NZ 1158.3.1* (Category P) provide installation design data in accordance with Clause 4.2 of *AS/NZS 1158.3.1*.
- Electricity utility connection signed approval.

### 12.3.10.13 Approved Luminaires, lamps and columns

Refer to the list in Appendix A and clause 12.10 for the approved luminaires, lamps and columns for streetlighting in the ACT. The luminaires and lamps used in the design shall be a type from the list. **Should a designer propose to use an ‘equivalent’ manufacturer from those listed in Part 12.10, that proposal requires a specific approval request by the designer to TAMS at design stage. Note Proposals for ‘equivalents’ at construction stage will not be entertained.**

The selected luminaires have been determined based on luminaire performance, minimal upward light waste ratio, whole of life costs, Australian content as well as form that is complementary to the various ACT streetscapes. Territory and Municipal Services permit no other type of luminaire, lamps or columns without assessment and approval by Territory and Municipal Services. There are special areas of consideration that should be specifically noted;

**Heritage Listed areas**
Within Heritage listed areas luminaries, lamps and columns shall be in accordance with Territory and Municipal Services procedure in Appendix A

**Canberra Airport and South Care Heliport**

The requirements of the Civil Aviation Safety Authority (CASA) shall be taken into account in the design of streetlighting within the vicinity of the Airport. Refer to the CASA document titled “Lighting in the Vicinity of Airports – Advice to Designers”.

**City Centre Precinct**

The requirements of the ACTPLA City Centre Consultative committee design palette shall be complied with when installing lighting within the city precinct. See section 12.2.3, and map of area of influence Appendix D.

High pressure sodium lamps shall be used for Category V lighting (Arterial Roads and Major Roads) and metal halide lamps for Category P lighting (Minor Collector Roads and pedestrian areas). See attached maps of designated road classifications. Appendix C. There will be some exceptions. The main exceptions are as follows:

**Category V lighting adjacent shopping centres**

Where Category V lighting is required along a road between a shopping precinct and an adjacent car park, metal halide lamps shall be used for the Category V lighting and luminaires with full cut-off to light distribution above the horizontal shall be used. Car parks and bus interchange areas shall be illuminated using metal halide lamps.

**Adjacent to Mt Stromlo observatory**

Lighting within a 5km radius of Mount Stromlo Observatory shall utilise high pressure sodium lamps. This restriction also includes the entire proposed development of Molonglo.

**National Capital Authority designated land.**
The requirements of the National Capital Authority shall be taken into account for all types of streetlighting within areas under their planning control. Refer to the National Capital Authority when working in these areas. An indication of NCA designated lands is shown on map Appendix B.

**Existing Suburb lighting.**

Where existing suburb lighting does not have a master plan covering its upgrade, lamp types shall be complimentary to the existing lamps within the suburb i.e.

- where low pressure sodium vapour exist, high pressure sodium maybe installed
- where mercury vapour lamps exist, metal halide may be installed.

**12.3.10.14 Asset numbers**

Asset numbers shall be requested from the electricity utility on successful design connection approval. The designer or contractor shall pay for the provision of asset numbers at the time of issue. Asset numbers shall appear on the design when submitted to Territory and Municipal Services Asset Acceptance for approval. The Contractor shall fix the numbers to the asset in accordance with *TAMS Territory and Municipal Services Street Lighting Specification Section 14* clause 14.5.8.

**12.4 Lighting for traffic routes (Category V lighting)**

**12.4.1 Performance criteria**

Refer particularly to *AS/NZS 1158.1.1 Road lighting. Part 1.1: Vehicular traffic (Category V) lighting – Performance and installation design requirements*, *AS/NZS 1158.1.3 Road lighting. Part 1.3: Vehicular traffic (Category V) lighting – Guide to design, installation, operation and maintenance* and *AS 1798 Lighting poles and bracket arms – Preferred dimensions*. Ensure that the design and installation is carried out in accordance with these standards.
12.4.2 Prescriptive criteria

Arterial roads shall be illuminated to V3 classification unless otherwise directed by Territory and Municipal Services. Lighting for Arterial Roads and Major Roads shall generally be carried out using nominal mounting height 9m, 10.5m or 12m high galvanised steel columns with 150 watt, 250watt or 400watt high pressure sodium lamps.

The preference for lighting roundabouts is from the centre of the roundabout which may require column heights greater than 12m.

Aeroscreen configurations shall be used where appropriate and where prescribed by these guidelines and shall generally be restricted to the following locations:

- Proximity to the Canberra airport and South Care Heliport.
- Streets immediately between shopping centres and adjacent carparks.
- Car parks
- Within 5km of Mt Stromlo observatory
- Where glare otherwise caused by conventional luminaires may be of particular concern.
- Roundabouts

Luminaires shall generally be mounted on outreach arms of 3m or 4.5m (0.5m for roundabouts).

Luminaires shall have integral control gear and shall be power factor corrected to 0.9 pf. Preferred control method of streetlighting on Arterial roadways is from a centralised control point with single PE cell control.

Columns shall be complete with access hatches for access to terminals and individual circuit breakers. Access covers shall be designed to face away from oncoming traffic to permit installers and maintenance personnel peripheral vision of traffic activities when working on the streetlight columns.

Frangible columns of the slip-base type shall generally be used on Arterial roads except where there is risk of injury to pedestrians (high pedestrian activity areas in close proximity to columns) in which case high speed impact absorbing frangible column types shall be used. Refer to AS/NZS 1158.1.3 for further guidance. Slip-base columns shall have a mounting base and concrete foundation rather than a direct buried mounting stub refer drawing DS12 Category 02 and 03.
12.5 Lighting for pedestrian area (Category P)

12.5.1 Performance criteria

This section is applicable to roads and other outdoor public areas where the visual requirements of pedestrians are dominant. Refer particularly to *AS/NZS 1158.3.1 Road Lighting. Part 3.1: Pedestrian area (Category P) lighting – performance and installation design requirements.* Refer also to *Crime prevention and urban design resource manual – ACT Territory and Municipal Services Planning and Land Management and various Territory and Municipal Services suburb master plans.* Ensure that the design and installation is carried out in accordance with these standards and guidelines.

12.5.2 Prescriptive criteria

12.5.2.1 Collector and local roads

Collector and local roads (those defined to be lit in Category P3 and P4 of *AS/NZS 1158.3.1*) shall be illuminated using luminaires with integral control gear and that comply with *AS 1158.6* and *AS/NZS 1158.3.1*. Obtrusive lighting requirements of AS4282–1997 shall be complied with. In particular table 2.1 shall be considered. Integrated individual PE Cells shall control luminaires. Where a separate control point is installed the luminaires shall have bridging units installed in place of where the photo-electric cell control unit would otherwise be fitted.

Local roads (Category P4) shall be illuminated using streetlights consisting of luminaires with 70 Watt metal halide lamps mounted on direct buried galvanised steel columns, 6.5 metres above the ground level on a 1.5 metre outreach. Higher wattage metal halide lamps or High Pressure Sodium (HPS) (150 watt) may be necessary to comply with the standard at locations of local area traffic management devices, collector roads etc. An exception to the use of metal halide is the area within the 5km radius of the Mount Stromlo Observatory (including all of the proposed Suburb of Molonglo) where luminaires using high pressure sodium lamps shall continue to be used for local roads.
12.5.2.2 Pathways for pedestrians or cyclists

Where pathways form part of local roads, no special lighting requirements apply as suggested by the Australian Standards providing P3 levels are maintained from property boundary to property boundary. Attention shall be paid to the effects of mature vegetation planting adjacent to the pathways. Off road path types shall generally not be illuminated.

The following exceptions apply:

- **Shopping Centre Precincts**
  
  Provide pedestrian lighting consistent with crime prevention and amenity (P2). Light trunk paths on approaches to and through shopping centres.

- **Underpass**
  
  Illuminate where paths pass under roadways preferably by using column mounted lights adjacent to the approach and exits of the underpass and luminaires within the underpass as nominated in Section 12.10.11. Within the underpass the ceiling and upper wall sections should be a light colour and illuminated to P8.

- **Medium density and cluster housing**
  
  Where there is significant night time pedestrian movement from this type of development to shopping centres/restaurants (P2) lighting should be considered. Generally lighting shall be designed in accordance with the provisions of AS/NZS 1158.3.1, Section 2.5.3.4 Part (a) where spill light could become problematical.

    In general luminaires should be a “cut-off” type, mounted a minimum of four and one half (4.5) metres above ground level and should have high impact U.V. stable lenses. At this mounting height house shields shall be installed. Column design should be without a shoulder unless the luminaire is mounted at a minimum height of 6.5 metres and should preferably be an unpainted corrosion protected finish outside the shopping precinct. The columns may be direct buried or base plate mounted. The column shall be of adequate diameter at the base to provide sufficient rigidity and sufficient space for looping and terminating 16mm² single phase conductors and providing individual circuit breaker protection behind a flush mounted access hatch.
Lamps providing “white light” shall be used. The preferred lamp types are 70 watt and 150 watt metal halide (permissible luminaire types for 150W are limited). Where paths are in close proximity to residential housing luminaires with in built house shields designed to control glare shall be used.

- **Open pedestrian areas, malls, arcades, town squares.**

Areas primarily for pedestrian movements shall be illuminated to P7. Luminaires should be a “cut-off” type, mounted a minimum of 4.5 metres above ground level and should have high impact U.V. stable lenses. Column design should be without a shoulder unless the luminaire is mounted at a minimum height of 6.5 metres. The columns shall be base plate mounted. The column shall be of adequate diameter at the base to provide sufficient rigidity and sufficient space for looping and terminating 16mm² single phase conductors and providing individual circuit breaker protection behind a flush mounted access hatch with security screw attachment. See Section 12.10

Lamps providing “white light” shall be used. The preferred lamp types are 70 watt and 150 watt metal halide (permissible luminaire types for 150W are limited). Where paths are in close proximity to residential housing luminaires with in built house shields designed to control glare shall be used.

- **Carparks**

Carparks shall generally be illuminated to Categories P11(b) and P12 for dedicated disabled parking spaces of AS/NZS 1158.3.1. *(Note that there may be instances where it is more appropriate to use Category 11(a) and this shall be stated in the design information provided).*

Luminaires should be a “cut-off” type mounted a minimum of 6.5 metres above ground level. Column type should be preferably unpainted galvanised steel finish, base plate and foundation mounted. Where carparks are situated in prestige locations decorative luminaires and columns indicated in TAMS Urban Infrastructure Street Lighting Specification Section 14 may be used. Column base sections shall be of adequate diameter to provide space for looping and terminating 16mm² three phase conductors and providing individual circuit breaker protection behind a flush mounted access hatch.
Lamps providing “white light” shall be used. The preferred lamp types are 150W and 250W metal halide. *(Note previous requirement of for the use of high pressure sodium lamps in the vicinity of Mt Stromlo and in the new Molonglo suburb).*

12.6 Lighting of pedestrian crossings

12.6.1 Performance criteria

Where a design is required for an uncontrolled (non-signalised) pedestrian crossing, illumination shall be provided in accordance with *AS 1158.4 Supplementary lighting at pedestrian crossing*.

12.6.2 Prescriptive criteria

Pedestrian crossing lighting shall be installed in accordance with AS/NZS 1158.

12.7 Roundabouts

12.7.1 Performance criteria

Roundabouts shall be illuminated. The preferred design arrangement for the illumination of roundabouts with a radius of 6m or more is to use a central column with outreach bracket lengths of 0.5 or 1.5 metres. i.e., 4 x 0.5m, or 4 x 1.5m brackets as appropriate.

12.7.2 Prescriptive criteria

Bracket lengths exceeding 0.5 metres shall not be used on a central pole. A centre-hinged column (either slip-base or energy absorbing) is preferred to a standard rigid column. A center-hinged rigid column may only be used where the radius of the roundabout exceeds 6m. Rigid non-hinged poles may be installed on roundabouts of 6m radius and greater for the purpose of installing joint use streetlight and communications towers where the responsibility for maintenance has been accepted by the communications authority.
Where central columns cannot be installed (generally on roundabout less than 6m radius) all peripheral columns installed on the departure sides of the roundabouts shall be installed at a minimum of 3m from the back of the kerb.

### 12.8 Luminaires and lamps used in the ACT

Luminaires shall comply with the requirements of AS 1158.6. They shall be integral control gear type, power factor corrected to 0.9pf and have integral photo-electric cell control capabilities. Luminaires shall have individual circuit breaker protection inside the column. Control gear shall be of the reactive type and not constant wattage. Stepped switching and voltage regulation optioned luminaires are preferred in Cat V road luminaires. Luminaires used for post-top installation may utilise external control equipment. As many luminaries have also been selected for their form as well as function, luminaire types are restricted to those listed in Part 12.10.

Should a designer propose to use an ‘equivalent’ manufacturer from those listed in Part 12.10, that proposal requires a specific approval request by the designer to TAMS at design stage. Note Proposals for ‘equivalents’ at construction stage will not be entertained.

#### 12.8.1 Special Cases

There are a number of areas that are considered to be special cases in the ACT. The designer shall seek advice from the Territory and Municipal Services when lighting design is required in these areas.

Special areas include:

- Heritage listed areas (ref Section 12.12 Appendix A).
- Lighting within a 5km radius of the Mount Stromlo observatory. All luminaries to incorporate cut off shields and be sodium.
- Lighting around Canberra airport. All luminaries to incorporate cut off shields.
- Lighting within the City precinct area (ref Section 12.15 appendix D). In accordance with ACTPLA CBD master plan.

#### 12.8.1.1 Communication columns.

Where there is an agreement between a communications carrier and the ACT Government represented by ACT Planning & Land Authority, and where the column site is taken over by the carrier, the
communications transmitters shall be located at a sufficient height above and away from the position of the streetlight equipment so as the communication system radiation propagation paths are clear of and enable safe work practices by streetlight maintenance personnel. Prudent design shall ensure that no part of streetlight maintenance plant, equipment or personnel shall need to encroach into the radiation path for normal streetlight maintenance activities.

Electrical separation between the communications systems and streetlights shall be maintained.

All communication columns shall have attached permanent contact information for the purpose of contacting the owners of the communications equipment should access be required for streetlight maintenance purposes.

12.8.1.2 Combined Traffic Signal Columns

The Territory and Municipal Services Traffic Signals Manager shall approve design of this type of lighting system. Wiring of this type of installation shall be in accordance with Electrical Note 2

Electrical Installation of Street Lights, Traffic Lights, Combination Street and Traffic Lights and Public Area Lighting.

Non-combined street light columns shall not be connected to the same sub-main as the traffic signal controller.

12.8.1.3 Electricity Utility Poles

Installation of streetlighting assets on electricity utility assets may not be undertaken without written permission of the electricity utility.

12.8.2 Energising

Note that prior to energising the streetlighting system, Territory and Municipal Services, and the Electricity Power supply utility require Works As Executed (WAE) drawings in accordance with TAMS document Ref-08 WAE Quality Records.

12.8.3 Relocation of existing assets

A design review of the lighting installation is required if a column is being relocated. Relocation of columns to an adjacent block will require written approval from the affected lessee. Standard distances
shall be maintained from vegetation, roadways and driveways. Columns cannot be removed or relocated without written authorisation from Territory and Municipal Services. Where the removal is temporary suitable alternative lighting shall be installed to compensate. All relocation or removed columns shall be recorded on a WAE drawing and submitted to Road ACT to enable the spatial mapping to be updated and the energy billing to be adjusted where necessary.
## 12.9 Glossary of terms

<table>
<thead>
<tr>
<th><strong>Term</strong></th>
<th><strong>Definition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>aeroscreen</td>
<td>Type of luminaire with flat glass lens. All light is controlled and directed downwards by an internal reflector without the assistance of a refractor lens. Particularly low glare output. Typically used near airports. Disadvantage is that lights need to be located at closer spacings than other types to achieve acceptable uniformity.</td>
</tr>
<tr>
<td>asset number</td>
<td>Each street light needs to be recorded as an asset of the Territory and Municipal Services with relevant details of make, model, lamp type and wattage and full column details. A unique number is issued and fixed to the lighting column. The numbers are to be recorded on the as-installed drawings and entered into the database of the Territory and Municipal Services.</td>
</tr>
<tr>
<td>circuit breaker</td>
<td>A device included within each lighting column which will automatically trip and isolate one street light should there be an overload or short circuit caused by the installation within that lighting column.</td>
</tr>
<tr>
<td>base plate foundation</td>
<td>Term applies to a method of mounting lighting columns where there is a steel reinforced mass concrete footing with cast-in threaded fasteners. A steel base-plate is welded to the base of the column and the plate is bolted onto the mass concrete footing.</td>
</tr>
<tr>
<td>CORT</td>
<td>Refers to the ACT Government organisation Construction and Occupational Regulation Team.</td>
</tr>
<tr>
<td>Cad dwg</td>
<td>Refers to a computer aided drafting file storage format.</td>
</tr>
<tr>
<td>CASA</td>
<td>Refers to the Civil Aviation Safety Authority</td>
</tr>
<tr>
<td><strong>Conduit</strong></td>
<td>Duct used for the enclosure of wiring. Shall be category A type rigid heavy duty orange PVC for streetlighting applications.</td>
</tr>
<tr>
<td><strong>control gear</strong></td>
<td>Refers to the auxiliary equipment such as ballast, capacitor and ignitor required to operate with the lamp.</td>
</tr>
<tr>
<td><strong>control point</strong></td>
<td>A device to isolate a sub-main at the point of supply. See also service protection device.</td>
</tr>
<tr>
<td><strong>cut-off</strong></td>
<td>Luminaires which are provided with a reflector that shields the lamp so that it is not visible from those directions of view where glare could be a problem, are said to provide a cut-off feature.</td>
</tr>
<tr>
<td><strong>Cycleway</strong></td>
<td>Path provided for cyclist and pedestrian use &gt;1.5 metres wide</td>
</tr>
<tr>
<td><strong>direct buried</strong></td>
<td>Term applies to describe a column mounting method whereby part of the length of the column is buried in the ground in order to provide stability for the column</td>
</tr>
<tr>
<td><strong>distribution network</strong></td>
<td>The system managed by the electricity utility responsible for the distribution network.</td>
</tr>
<tr>
<td><strong>Electricity utility</strong></td>
<td>The licensed entity that manages the electricity distribution network, previously known as Electricity Supply Authority.</td>
</tr>
<tr>
<td><strong>frangible column</strong></td>
<td>A column designed to fail on vehicle impact in a controlled manner. Two frangible column types are slip-base and impact absorbing.</td>
</tr>
<tr>
<td><strong>high pressure sodium lamp</strong></td>
<td>A high intensity discharge lamp producing light with a yellowish bias.</td>
</tr>
<tr>
<td><strong>impact absorbing column</strong></td>
<td>A column designed to deform around a vehicle upon impact and gradually slow the vehicle.</td>
</tr>
<tr>
<td><strong>integral control gear</strong></td>
<td>Control gear that is housed inside the luminaire.</td>
</tr>
</tbody>
</table>
Design Standards for Urban Infrastructure

lighting category  A lighting performance group with minimum requirements defined in AS/NZS 1158.

lighting sub-main  Power supply conductors originating from the one single circuit breaker or fuse located at a switchboard. A number of lights will be connected to the same sub-main.

low pressure sodium lamp  A lamp type producing monochromatic light of amber colour.

Luminaire  Light fitting

mercury vapour lamp  A high intensity discharge lamp producing white light (bluish), sometimes also referred to as high pressure mercury.

metal halide  A high intensity discharge lamp producing white light (bluish), containing metal halides.

NCA  National Capital Authority

outreach arm  Bracket extending out from lighting column on to which the luminaire is mounted.

photo-electric cell  A device which automatically switches on or off depending upon the ambient lighting levels.

point of supply  Or point of connection. Location in the power distribution where the electrical utility provides a connection point between the distribution network and the customers electrical installation.

Overhead line conductor  Aerial conductor used for the distribution of electricity.

PVC  Polyvinyl chloride insulating plastic

service protection device  a device at the point of power supply but does NOT include apparatus up to the service protection device at the point of supply. Includes fuse.

slip base column  A frangible lighting column designed to come away near the base
when hit by a vehicle.

**substation**
Location where a transformer steps down the voltage from high voltage to low voltage for distribution.

**uncontrolled pedestrian crossing**
A pedestrian (zebra) crossing where there are no traffic signals to control the flow of traffic.

**underpass**
A place where a path passes underneath a roadway.

**unmetered supply**
An electricity supply provided by the electricity utility which does not have electricity consumption metered.

**white light**
A term used loosely to describe the light coming from light sources that appear to have a balanced mix of the primary colours of the visible spectrum.

**XLPE**
Cross linked polyethylene, a higher temperature rated insulating plastic than PVC.
12.10 Column & Luminaire Types SPECIFIC REQUIREMENTS

12.10.1 Category V Lighting (Traffic routes)

12.10.1.1 Rexel Optispan

Manufacturer

*Luminaire:* Rexel

As this luminaire has only a single action clip, which is susceptible to the covers being opened by some birds, the luminaire shall be fitted with a double action clip or clamp such as “Protex - Model 27-1570”

*Column:* Vicpole, Ingal EPS or equivalent.

Materials

*Luminaire:* Rexel Optispan Major. 150 – 400W Metal Halide or High Pressure Sodium Vapour

*Column:* Column heights are 9, 10.5, 12 and 15 metres. Outreach arms shall be 3, 3.5 or 4.5m single or double.

This type of luminaire may also be mounted directly off a distribution wood or concrete pole utilising pole mounting brackets of 1.5, 3 and 4.5m in outreach

Refer Construction Dwg DS12 Category03 and 04
Category V Lighting (Traffic routes)

12.10.1.2 Sylvania Roadster

**Luminaire:** Sylvania

**Column:** Vicpole, Ingal EPS or equivalent.

**Materials**

**Luminaire:** Sylvania Roadster IP66 Optical Chamber. Integrated PE cell mounting. 150 – 400 Metal Halide or High Pressure Sodium Vapour

**Column:** Column heights are 9, 10.5, 12 and 15 metres. Outreach arms shall be 3 or 4.5m single or double.

This type of luminaire may also be mounted directly off a distribution wood or concrete pole utilising pole mounting brackets of 1.5, 3 and 4.5m in outreach.

Refer Construction Dwg DS12 Category03 and 04
12.10.2 Category V & P Major Collector (Traffic routes)
Dec. (Adj. to or within precinct areas)

12.10.2.1 Sylvania Clip 34 (Decorative)

Manufacturer

Luminaire: Sylvania

Column: Fyntrim Multipole.

Materials

Luminaire: Sylvania Clip 34 Category V shall be Metal Halide 150-400W. Cat P shall be Metal Halide 70 - 150W. Complete with integrated D2 type PE cell. IP 66 rated. Colour Dulux Anotec XT Silver Grey Dulux Colour No 51272

Column: Decorative column. Fyntrim ‘Canberra Prestige’ or equivalent aluminium rag bolt base mounted column. Column heights 9m and 6.5m. Colour anodised aluminium. For use within the City and Suburban Precinct areas.

Refer Construction Dwg DS12 Category03 and 04
Category P Major Collector (Traffic routes) and residential P3, P4. Decorative

**12.10.2.2 MV Technology Sky-Gen (Decorative)**

**Manufacturer**

*Luminaire:* GE General Electric Company (Distributed by MV Technology Australia)

*Note:- This Luminaire is for Canberra CBD only.*

*Column:* Fyntrim Multipole.

**Materials**

*Luminaire:* MV Technology Sky-Gen7001.

Category V shall be Metal Halide 150- 400W.

Category P shall be a MV Technology Sky-Gen Pro 7001 Metal Halide 70 - 150W.

MV Technology Sky Gen & Sky Gen Pro shall include IP 66 rated optical chambers and control gear to include thermal overload protection. Colour RAL7001 fitting to also include Canberra Central logo.

*Column:* Decorative column. Fyntrim ‘Canberra Prestige’ or equivalent aluminium rag bolt base mounted column. Column heights 9m and 6.5m. Colour anodised aluminium. For use within the City and Suburban Precinct areas.

Refer Construction Dwg DS12 Category 03 and 04
12.10.3 Category V & P Major Collector (Traffic routes)
Decorative.

12.10.3.1 Sylvania Parkville ‘Classical’ Mod A

Manufacturer

Luminaire: Sylvania

Column: Vicpole, or equivalent.

Materials

Luminaire: Sylvania Parkville Classical Mod A.

Category V shall be Metal Halide or High Pressure Sodium Vapour 150-400 W.

Cat P shall be Metal Halide 70 - 150W. Complete with integrated D2 type PE cell. IP 66 rated. Colour Heritage Green Dulux colour No 50068 (Aust std 2700 No G11).

Column: Vicpole ‘Boulevard’. Colour Heritage Green Dulux colour No 50068 (Aus Std 2700 Colour No G11) two-pack acrylic. Column heights are 9, 10.5 metres. Outreach arms shall be 3m

Refer Construction Dwg DS12 Category03 and 04
Category P Major Collector (Traffic routes) and residential P3, P4.

Decorative

12.10.3.2 Rexel Optisan Major

Manufacturer

*Luminaire:* Rexel

As this luminaire has only a single action clip, which is susceptible to the covers being opened by some birds, the luminaire shall be fitted with a double action clip or clamp such as “Protex - Model 27-1570”

Column: Vicpole, or equivalent.

Materials

*Luminaire:* Rexel Optisan Major Cat P Collector, Optispan minor. Complete with integrated D2 type PE cell.

Cat P. Major Collector shall be Metal Halide 150- 400W or High Pressure Sodium Vapour 150- 400 W.

Cat P residential shall be Metal Halide 70 - 150W (70W High Pressure Sodium permitted in existing LPS areas). Colour Charcoal Dulux Colour No 32999

*Column:* Vicpole ‘Forde’. Colour Charcoal Dulux Colour No 32999 two-pack acrylic. Column heights are 9, 6.5, & 4.5 metres. Outreach arms shall be 3, 4.5m for roadside & 1.5 metres outreach on the pedestrian side.

Refer Construction Dwg DS12 Category03 and 04
12.10.4 Category P3, P4 (Local roads)

12.10.4.1 Sylvania Urban

_Luminaire:_ Sylvania

_Column:_ Vicpole, Ingal EPS or equivalent.

**Materials**

_Luminaire:_ Sylvania Urban complete with integrated D2 type PE cell and optical chamber IP rating of IP64. Category P. Lamp type shall be 70 - 150W Metal Halide (70W High Pressure Sodium permitted in existing LPS areas).

_Column:_ Octagonal tapered steel. Column height for residential category P is typically 6.5m with a 1.5m (0.15m for laneways) outreach arm.

This type of luminaire may also be mounted directly off a distribution wood or concrete pole utilizing pole mounting brackets 1.5, 3 and 4.5m. Refer Construction Dwg DS12 Category03 and 04

_Note:_ This is the preferred construction in areas where there is a history of high levels of vandalism. Wire guard cages are also recommended.
Category P3, P4 (Local roads)

12.10.4.2 Rexel Optispan Minor

*Manufacturer*

Luminaire: Rexel

As this luminaire has only a single action clip, which is susceptible to the covers being opened by some birds, the luminaire shall be fitted with a double action clip or clamp such as “Protex - Model 27-1570”

Column: Vicpole, Ingal EPS or equivalent.

Materials

Luminaire: Rexel Optispan Minor Category P. Lamp type shall be 70 – 150W Metal Halide (70W High Pressure Sodium permitted in existing LPS areas).

Column: Octagonal tapered steel. Column height for residential category P is typically 6.5m with a 1.5m (0.15m for laneways) outreach arm.

Refer Construction Dwg DS12 Category03 and 04

Note: This is the preferred construction in areas where there is a history of high levels of vandalism. Wire guard cages are also recommended.
12.10.5 Category P3, P4 (Local roads decorative)

12.10.5.1 Sylvania Burkehill ‘Classical’ Mod A

**Luminaire:** Sylvania

**Column:** Vicpole, or equivalent.

**Materials**

*Luminaire:* Sylvania Burkehill ‘Classic’ Category P shall be 70 - 150W Metal Halide (70W High Pressure Sodium permitted in existing LPS). Colour Heritage Green Dulux colour No 50068 (Aust std 2700 no G11)

*Column:* Vicpole ‘Boulevard’ style columns. Colour Heritage Green Dulux colour No 50068 (Aust std 2700 no G11) two-pack acrylic. Column height for residential Category P is typically 6.5m with a 1.5m outreach arm.

Refer Construction Dwg DS12 Category03 and 04
Category P3, P4 P2 (Local roads and Pedestrian walkways, decorative)

12.10.5.2 Sylvania Clip 28

Manufacturer

Luminaire: Sylvania

Column: Fyntrim Multipole.

Materials

Luminaire: Sylvania Clip 28 complete with integrated D2 type PE cell. IP 66 rated. Category P shall be Metal Halide 70 - 150W. Colour Anotec XT Silver Grey Dulux Colour No 51272

Column: Decorative column. Fyntrim 6.5m. ‘Canberra Prestige’ or equivalent aluminium rag bolt base mounted column. Colour anodised aluminium. For use within the City and Suburban Precinct areas.

Refer Construction Dwg DS12 Category 03 and 04

#The use of these luminaire types shall be restricted to major shopping centre precincts where it is warranted to enhance the prestige of the area. Note Columns displayed show obsolete luminaires.
Category P3, P4, P2 (Local roads and Pedestrian walkways, decorative)

**12.10.5.3 MV Technology Sky Gen Pro (Decorative)**

**Manufacturer**

*Luminaire:* GE General Electric Company (Distributed by MV Technology Australia)

*Note:* This Luminaire is for Canberra CBD only.

*Column:* Fyntrim Multipole.

**Materials**

*Luminaire:* MV Technology Sky Gen Pro 7001. IP 66 rated. Category P shall be Metal Halide 70 - 150W. MV Technology Sky Gen Pro shall include IP 66 rated optical chamber and control gear to include thermal overload protection. Colour RAL7001 fitting to also include Canberra Central logo.

*Column:* Decorative column. Fyntrim 6.5m. ‘Canberra Prestige’ or equivalent aluminium rag bolt base mounted column. Colour anodised aluminium. For use within the City and Suburban Precinct areas.

Refer Construction Dwg DS12 Category 03 and 04.
12.10.6 Carparks (As for Category P11 and P12):

12.10.6.1 Sylvania Roadster aeroscreen

**Manufacturer**

*Luminaire:* Sylvania

*Column:* Vicpole, Ingal EPS or equivalent.

**Materials**

*Luminaire:* Sylvania Roadster aero screen. IP66 Optical Chamber. Integrated PE cell mounting. Pressure die cast aluminium body. Lamp type 150 – 400W Metal Halide or High Pressure Sodium Vapour

*Column:* Octagonal tapered steel. Column heights are 9, 10.5, 12 and 15 metres. Outreach arms shall be 3 or 4.5m single or double outreach.

Refer Construction Dwg DS12 Category03 and 04
Carparks (As for Category P11 and P12):

12.10.6.2 Sylvania Nightstar/ Nightstar compact (decorative)

**Manufacturer**

*Luminaire:* Sylvania

*Column:* Vicpole, Ingal EPS or equivalent.

**Materials**

*Luminaire:* Sylvania Nightstar and Nightstar compact full cut-off symmetrical and asymmetrical luminaire. Lamp type 70-150W (compact) 250-400W Metal Halide or High Pressure Sodium Vapour. Colour Charcoal Dulux Colour No 32999

*Column:* Minimum 6.5m column, Colour Charcoal Dulux Colour No 32999 two-pack acrylic. Post top mounting 76mm spigot.

Refer Construction Dwg DS12 Category03 and 04
Carparks (As for Category P11 and P12):

**12.10.6.3 Kim Archetype**

*Luminaire*: Kim

*Column*: Vicpole, Ingal EPS or equivalent.

**Materials**

*Luminaire*: Kim Archetype full cut-off symmetrical or asymmetrical luminaire. Lamp type 70 -400W Metal Halide or High Pressure Sodium Vapour. Colour Charcoal Dulux Colour No 32999.

*Column*: Minimum 6.5m column. Colour Charcoal Dulux Colour No 32999 two-pack acrylic. Post top mounting 76mm spigot.

Refer Construction Dwg DS12 Category03 and 04
12.10.7 Category P2, P6, P7 & P8 (Pedestrian and open area lighting)

Local street pathways, Town centres, shopping centre precincts, paths, cycleways as for Categories P2, P6 P7 P8:

12.10.7.1 Sylvania B2001 (ACT)

Manufacturer

*Luminaire*: Sylvania

*Column*: Vicpole, Ingal EPS or equivalent.

Materials

*Luminaire*: Sylvania B2001 (ACT) c/w house shield. Category P shall be 70W Metal Halide (70W High Pressure Sodium permitted in existing LPS areas). Colour Anotec XT Silver Grey Dulux Colour No 51272

*Column*: 4.5m NCC 2005 Post top, galvanised to 600gm/m².

Refer Construction Dwg DS12 Category03 and 04

Note: Due to the known risk of vandalism this type of column and luminaire shall only be installed when used as infill lighting within suburbs that have similar column type i.e. post top luminaire.
12.10.8 Category P2, P6, P7 & P8 (Pedestrian and open area lighting) (Heritage Listed Areas)

12.10.8.1 Rexel Darwin (ACT)

Manufacturer

*Luminaire*: Rexel

*Column*: Vicpole, Ingal EPS or equivalent.

Materials

*Luminaire*: Rexel Darwin (ACT) c/w house shield. Category P shall be 70W Metal Halide (70W High Pressure Sodium permitted in existing LPS areas). Colour Anotec XT Silver Grey Dulux Colour No 51272

*Column*: NCC 2005 Post top, galvanised to 600gm/m².

Refer Construction Dwg DS12 Category03 and 04

Note: Due to the known risk of vandalism this type of column and luminaire shall only be installed when used as infill lighting within suburbs that have similar column type i.e. post top luminaire.
Design Standards for Urban Infrastructure

Category P2, P6, P7 & P8 (Pedestrian and open area lighting)

12.10.8.2 Colonial Lighting  ALN 440

Manufacturer

*Luminaire:* International Lighting

*Column:* Vicpole, or equivalent.

Materials

*Luminaire:* ALN 440 Coach luminaire. Category P shall be 70 - 150W Metal Halide (70W High Pressure Sodium permitted in existing LPS areas). Colour Anotec XT Silver Grey Dulux Colour No 51272

*Column:* 4.5m NCC 2005 Post top, galvanised to 600gm/m².

Refer Construction Dwg DS12 Category03 and 04

Note: Due to the known risk of vandalism this type of column and luminaire shall only be installed when used as infill lighting within suburbs that have similar column type i.e. post top luminaire.

#The use of these luminaire types shall be restricted to major shopping centres or precincts where it is warranted to enhance the prestige of the area.
Category P2, P6, P7 & P8 (Pedestrian and open area lighting)

12.10.8.3 Bega 8081.5# & .7# & 8082.5# & .7#

Manufacturer

*Luminaire:* Bega

*Column:* Galvanised steel Vicpole, Ingal EPS or equivalent, Aluminium Fyntrim.

Materials

*Luminaire:* Bega 8081 and 8082 series symmetrical and asymmetrical post top luminaire c/w drop down refector. Category P shall be 70 - 150W Metal Halide. Colour Charcoal Dulux Colour No 32999 or Anotec XT Silver Grey Dulux Colour No 51272

*Column:* Colour Charcoal Dulux Colour No 32999 or Anotec XT Silver Grey Dulux Colour No 51272 two-pack acrylic. 4.5m and 6.5m post top rag bolt base mounted. Rag bolts to remain below finished surface level.

Refer Construction Dwg DS12 Category03 and 04

Alternative decorative column design Fyntrim ‘Canberra Prestige’ aluminium rag bolt base mounted column. Rag bolts to remain below finished surface level. Column height 4.5m Colour anodised aluminium. Kerb setback is 1.7m. Driveway and footpath setback is 1.2m. Refer Construction Dwg DS12 Category03 and 04

#The use of these luminaire types shall be restricted to major shopping centres or precincts where it is warranted to enhance the prestige of the area.
Category P2, P6, P7 & P8 (Pedestrian and open area lighting)

12.10.8.4 Schreder Allura #

Manufacturer

Luminaire: Schreder

Column: Galvanised steel Vicpole, Ingal EPS or equivalent, Aluminium Fyntrim.

Materials

Luminaire: Allura symmetrical and asymmetrical post top luminaire. Category P shall be 70 - 150W Metal Halide. Colour Charcoal Dulux Colour No 32999 or Anotec XT Silver Grey Dulux Colour No 51272

Column: Galvanised to 600gm/m². Colour Charcoal Dulux Colour No 32999 or Anotec XT Silver Grey Dulux Colour No 51272 two-pack acrylic. 4.5m and 6.5m post top rag bolt base mounted. Rag bolts to remain below finished surface level.

Refer Construction Dwg DS12 Category03 and 04

Alternative decorative column design Fyntrim ‘Canberra Prestige’ aluminium rag bolt base mounted column. Rag bolts to remain below finished surface level. Column height 4.5m. Colour anodised aluminium. Kerb setback is 1.7m. Driveway and footpath setback is 1.2m.

Refer Construction Dwg DS12 Category03 and 04

#The use of these luminaire types shall be restricted to major shopping centres or precincts where it is warranted to enhance the prestige of the area.
Category P2, P6, P7 & P8 (Pedestrian and open area lighting)

12.10.8.5 Louis Polsen Kipp#

Manufacturer

Luminaire: Louis Polsen

Column: Galvanised steel - Vicpole, Ingal EPS or equivalent, Aluminium - Fyntrim.

Materials

Luminaire: Kipp symmetrical and asymmetrical post top luminaire. Category P shall be 70 - 150W Metal Halide. Colour Charcoal Dulux Colour No 32999 or Anotec XT Silver Grey Dulux Colour No 51272

Column: Galvanised to 600gm/m². Colour Charcoal Dulux Colour No 32999 or Anotec XT Silver Grey Dulux Colour No 51272 two-pack acrylic. 4.5m and 6.5m post top rag bolt base mounted. Rag bolts to remain below finished surface level.

Refer Construction Dwg DS12 Category03 and 04

Alternative decorative column design Fyntrim ‘Canberra Prestige’ aluminium rag bolt base mounted column. Rag bolts to remain below finished surface level. Column height 4.5m. Colour anodised aluminium. Kerb setback is 1.7m. Driveway and footpath setback is 1.2m.

Refer Construction Dwg DS12 Category03 and 04

#The use of these luminaire types shall be restricted to major shopping centre precincts where it is warranted to enhance the prestige of the area.
12.10.9 Pedestrian under awning lighting (high mount)

12.10.9.1 Sylvania Sylmaster/Sylmaster SM (surface mount)

**Luminaire:** Sylvania

**Column:** N/A

**Materials**

**Luminaire:** Surface or recess mounted luminaire symmetrical high performance floodlight for heights up to 6m. Lamp type, 250 – 400W Metal Halide. Colour Charcoal Dulux Colour No 32999.

**Column:** This type of luminaire is designed to be mounted under building awnings or building fly over structures to enable Territory and Municipal Services to service covered pedestrian and vehicle pavement areas. All buildings where this type of luminaire is mounted shall have the Territory lease title amended to ensure the luminaires, associated wiring and equipment are not interfered with and continued access is made available to the Territory and Municipal Services maintenance contractor.
Pedestrian under awning lighting (low mount)

**12.10.9.2 Sylvania Condor S33306 (Recessed)**

*Manufacturer*

**Luminaire:** Sylvania

**Column:** N/A

**Materials**


*Column:* This type of luminaire is designed to be flush mounted under building awnings to enable Territory and Municipal Services to service covered pedestrian pavement areas. All buildings where this type of luminaire is mounted shall have the Territory lease title amended to ensure the luminaires, associated wiring and equipment are not interfered with and continued access is made available to the Territory and Municipal Services maintenance contractor.
12.10.10 Pedestrian crossings

12.10.10.1 Rexel Sentry PX (Shield option also available)

Manufacturer

Luminaire: Rexel

Column: Vicpole, Ingal EPS or equivalent c/w spigot mounting adaptor.

Materials

Luminaire: This is an asymmetrical floodlight suitable for pedestrian crossing applications. Lamp type 250 – 400W Metal Halide. Obtrusive light shields available for residential applications.

Column: Octagonal tapered steel. Galvanised to 600gm/m². Column height is typically 6.5m – 9m with a 1.5m – 3m outreach arm.

Refer Construction Dwg DS12 Category03 and 04
Pedestrian crossings

12.10.10.2 Sylvania Sylflood AS

**Luminaire:** Sylvania

Vicpole, Ingal EPS or equivalent c/w spigot mounting adaptor.

**Materials**

*Luminaire:* This is an asymmetrical floodlight suitable for pedestrian crossing applications. Lamp type 250 – 400W Metal Halide.

*Column:* Octagonal tapered steel. Galvanised to 600gm/m². Column height is typically 6.5m – 9m with a 1.5m – 3m outreach arm.

Refer Construction Dwg DS12 Category03 and 04
12.10.11 Pedestrian underpasses

12.10.11.1 Sylvania Sylproof stainless.

Luminaire: Sylvania

Column: N/A.

Materials

Luminaire: Sylvania stainless construction with polycarbonate protection over fluorescent tubes. Lamp type, twin 24W T5 fluorescent tubes.

Column: This luminaire is designed to be mounted in pedestrian underpasses where there is a significant risk of vandalism. Attention shall be taken to the manner in which this type of luminaire is mounted to ensure both the luminaire and the mounting arrangement remain secure.
Pedestrian underpasses

12.10.11.2 Versalight Rhino

Luminaire: Versalux

Column: N/A

Materials

Luminaire: Vandal resistant polycarbonate construction with cast aluminium base. Lamp type, twin 24W T5 fluorescent.

Column: This luminaire is designed to be mounted in pedestrian underpasses where there is a significant risk of vandalism. Attention shall be taken to the manner in which this type of luminaire is mounted to ensure both the luminaire and the mounting arrangement remain secure.
12.10.12 Roundabouts Cat V

12.10.12.1 Sylvania Roadster aerosceened

Luminaire: Sylvania

Column: Vicpole, Ingal EPS or equivalent.

Materials

Luminaire: Sylvania Roadster IP66 Optical Chamber. Integrated PE cell mounting. Pressure die cast aluminium body. Lamp type 150 – 400W Metal Halide or High Pressure Sodium Vapour (HPS lamps shall be used on non NCA designated Arterial). Aeroscreen option shall be used on roundabouts to minimise obtrusive light.

Column: Octagonal tapered steel. Column heights are 9, 10.5, 12 and 15 metres. Outreach arms shall be 1.5 or 2.0m. Where the column height is significant and the roundabout dimension size permits, hinged mounted columns shall be used.

Refer Construction Dwg DS12 Category03 and 04
Roundabouts Cat V

12.10.12.2 Rexel Optispan Major aeroscreened

*Luminaire:* Rexel

As this luminaire has only a single action clip, which is susceptible to the covers being opened by some birds, the luminaire shall be fitted with a double action clip or clamp such as “Protex - Model 27-1570”

*Column:* Vicpole, Ingal EPS or equivalent.

**Materials**

*Luminaire:* Rexel Optispan Major. Lamp type, 150 – 400W Metal Halide or High Pressure Sodium Vapour (HPS lamps shall be used on non NCA designated Arterial Roads). Aeroscreen option shall be used on roundabouts to minimise obtrusive light.

*Column:* Octagonal tapered steel. Column heights are 9, 10.5, 12 and 15 metres. Outreach arms shall be 1.5m or 2.0m. Where the column height is significant and the roundabout dimension size permits, hinged mounted columns shall be used.

Refer Construction Dwg DS12 Category03 and 04
Roundabouts Cat P

12.10.12.3 Sylvania Urban aeroscreened

**Luminaire:** Sylvania

**Column:** Vicpole, Ingal EPS or equivalent.

**Materials**

*Luminaire:* Sylvania Urban complete with integrated D2 type PE cell and optical chamber IP rating of IP64. Category P. Lamp type shall be 70 - 150W Metal Halide (70W High Pressure Sodium permitted in existing LPS areas). Aeroscreen option shall be used on roundabouts to minimise obtrusive light.

*Column:* Octagonal tapered steel. Column heights are 9, 10.5, 12 and 15 metres. Outreach arms shall be 1.5m or 2.0m. Where the column height is significant and the roundabout dimension size permits, hinged mounted columns shall be used.

Refer Construction Dwg DS12 Category 03 and 04
Roundabouts Cat P

12.10.12.4 **Rexel Optispan Minor aeroscreened**

**Luminaire:** Rexel

As this luminaire has only a single action clip, which is susceptible to the covers being opened by some birds, the luminaire shall be fitted with a double action clip or clamp such as “Protex - Model 27-1570”

**Column:** Vicpole, Ingal EPS or equivalent.

**Materials**

**Luminaire:** Rexel Optispan Minor Category P. Lamp type shall be 70 – 150W Metal Halide (70W High Pressure Sodium permitted in existing LPS areas). Aeroscreen option shall be used on roundabouts to minimise obtrusive light.

**Column:** Octagonal tapered steel. Column heights are 9, 10.5, 12 and 15 metres. Outreach arms shall be 1.5m or 2.0m. Where the column height is significant and the roundabout dimension size permits, hinged mounted columns shall be used.. Colour Galvanised.

Refer Construction Dwg DS12 Category03 and 04
12.10.13 Heritage listed Areas

12.10.13.1 Colonial Lighting Waverly

Luminaire: Colonial Lighting

Column: Koppers, (wood) Rocla (concrete) or equivalent.

Materials

Luminaire: This luminaire is designed to replicate the original incandescent luminaires that are present in the Heritage listed suburbs of Canberra. Lamp type 70W Metal Halide.

Column:

This luminaire is directly mounted off a streetlight or distribution wood/concrete pole utilising purpose designed pole mounting brackets.
12.10 Streetlighting Standard Drawings

An index of the standard drawings is as shown below.

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<td>Pedestrian Lighting Bracket</td>
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<td>Mid Arm Mounting Bracket for Pedestrian Flood Lights</td>
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<td>0.5m Outreach Pole Mounted Bracket</td>
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<td>1.5m 4 way Pipe Outreach Arm</td>
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<td>VPACTOR750 R-2 Streetlight Outreach</td>
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<td>Dual 1.5m Outreach</td>
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<td>VPACTORW3.0D Dual 3m Outreach</td>
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<td>VPACTORW3.7D Dual 3.5m Outreach</td>
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<td>VPACTORW3.7D-90 Dual 3.5m Outreach 90 Degree</td>
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<td>VPACTORW3.75S 3.5m Single Outreach</td>
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<td>VPACTORW4.5D Dual 4.5m Outreach</td>
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<td>VPACTORW4.5D-90 Dual 4.5m Outreach 90 Degrees</td>
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### 12.11 Revision History

<table>
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<tr>
<th>Edition</th>
<th>Revision</th>
<th>Description</th>
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<td>1</td>
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<td>Rewritten to reflect current standards and practice</td>
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12.12 Appendix A  Heritage ACT Streetlighting Design and Maintenance Requirements

1. OBJECTIVE
The objective of this policy is to conserve remaining original heritage light fittings, posts and poles, and where replacement is necessary to nominate suitable modern fittings so as to achieve a uniformity of pedestrian lighting fixtures which are sympathetic to the style of original lighting in each precinct and which prevents an ad hoc approach to conservation, maintenance and replacement.

2. SCOPE
   
   2.1 This policy relates to the conservation and replacement of all streetlighting assets in the following residential precincts as listed in the ACT Heritage Places Register

<table>
<thead>
<tr>
<th>Alt Crescent</th>
<th>Corroboree Park</th>
<th>Reid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barton</td>
<td>Forrest</td>
<td>Tocumwal</td>
</tr>
<tr>
<td>Blandfordia 5</td>
<td>Kingston</td>
<td>Wakefield Gardens</td>
</tr>
<tr>
<td>Braddon</td>
<td>Red Hill</td>
<td></td>
</tr>
</tbody>
</table>

   2.2 This policy includes all streetlighting assets in any street bounding a residential heritage precinct.

3. PROCESS
   
   3.1 Streetlighting assets due for replacement or repair shall be checked against the Heritage Register. Items in residential heritage precincts or streets that are adjacent to heritage precincts will be identified and will trigger the use of this policy.
4. REFERENCES

4.2 R.D.Gossip Pty. Ltd., Street Furniture Assessment in Heritage Precincts, draft report to Territory and Municipal Services and Heritage Unit, Environment ACT, June 2002.

5 POLICY

5.1 Luminaires

5.1.1 All original light fittings shall be conserved in their existing locations.
5.1.2 Original fittings shall be properly maintained.
5.1.3. Every effort shall be made to repair existing fittings rather than replace them. Repairs shall not detract from overall appearance.
5.1.4 Every effort shall be made to upgrade existing fittings to modern technological or functional standards rather than replace them. Upgrading shall not detract from overall appearance.
5.1.5 Existing original fittings shall be replaced only where repair is technically or financially unreasonable. Replacement items shall be in accordance with the recommendations for each precinct as defined in Section 7.
5.1.6 Additional fittings deemed necessary for adequate pedestrian lighting shall be installed in accordance with this Policy.
5.1.7 Where existing original pedestrian lighting is inadequate for roadway illumination the existing fittings shall be conserved or replaced in accordance with this Policy and supplemented with modern outreach roadway lighting to meet illumination requirements.

5.2 Lamp Posts and Poles

5.2.1 Original lamp posts and poles shall be conserved in their existing locations.
5.2.2 Original fittings shall be properly maintained.
5.2.3 Every effort shall be made to repair existing fittings rather than replace them. Repairs shall not detract from overall appearance.
5.2.4 Every effort shall be made to upgrade existing fittings to modern technological or functional standards rather than replace them. Upgrading shall not detract from overall appearance.

5.2.5 Original fittings shall be replaced only where repair is technically or financially unreasonable. Replacement items shall be in accordance with the recommendations for each precinct.

5.2.6 Suitable National Capital (NC) Columns from outside heritage precincts shall be replaced with modern columns and stockpiled for use as replacements in heritage precincts where nominated below.

5.2.7 Where re-location of original NC Columns is judged infeasible replacement columns shall be 3.5m high tapered galvanised steel known as NCC 2005.

5.2.8 Original Federal Capital Commission (FC) Columns are extremely rare and shall be conserved in their existing locations for as long as possible. They are known to exist outside Manuka Pool (pair), Griffith, outside Screen Sound, Acton (pair) and one fitting in Murray Crescent, Griffith. When replacement is unavoidable stockpiled original NC Columns shall be installed. Where more than one original FC column is found at a particular place and one requires replacement, all columns shall be replaced regardless of condition.

5.2.9 Existing timber poles shall be retained and replaced, when necessary, with the same.

5.2.10 Existing non FC and NC columns shall be replaced, when necessary, with 3.5m high tapered galvanised steel known as NCC 2005. If higher than 3.5m then available columns of the required height shall be used.
6. FITTINGS SCHEDULE BY PRECINCT

The following schedule is the Policy for replacement of light fittings, posts and poles for each heritage precinct when replacement is permitted under this Policy.

Numbered alternatives indicate priorities described in 5.2.6 and 5.2.7.

<table>
<thead>
<tr>
<th>Precinct</th>
<th>Luminaire</th>
<th>Support</th>
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</thead>
<tbody>
<tr>
<td>Alt Crescent</td>
<td>Darwin Canopy Lantern</td>
<td>1. Relocated original NCC column</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. NCC 2005</td>
</tr>
<tr>
<td>Barton</td>
<td>Darwin Canopy Lantern</td>
<td>1. Relocated original NCC column</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. NCC 2005</td>
</tr>
<tr>
<td>Brassey House</td>
<td>Relocated original or reproduction brass lantern subject to approval by Heritage Council</td>
<td>Original NCC column</td>
</tr>
<tr>
<td>Blandfordia 5</td>
<td>Darwin Canopy Lantern</td>
<td>1. Original NCC column relocated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. NCC 2005</td>
</tr>
<tr>
<td></td>
<td>Modern outreach arm</td>
<td>Timber or steel pole depending on existing being replaced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conserve FCC column in Murray Crescent</td>
</tr>
<tr>
<td>Braddon</td>
<td>Reproduction Radial Wave on decorative steel bracket</td>
<td>Timber pole</td>
</tr>
<tr>
<td></td>
<td>Supplementary modern roadway lighting where Category V required</td>
<td>Steel outreach arm</td>
</tr>
<tr>
<td></td>
<td>Conserve reproduction lanterns at Gorman House</td>
<td>Relocated original NCC Columns</td>
</tr>
<tr>
<td>Precinct</td>
<td>Luminaire</td>
<td>Support</td>
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<tr>
<td>------------------</td>
<td>------------------------------------------------</td>
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</tr>
<tr>
<td>Corroboree Park</td>
<td>Reproduction Radial Wave on decorative steel bracket to park perimeter and opposite sides of bounding streets.</td>
<td>Timber pole</td>
</tr>
<tr>
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<td>Selected modern outreach arm elsewhere</td>
<td>Timber or steel pole</td>
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<tr>
<td>Forrest</td>
<td>Darwin Canopy Lantern</td>
<td>1. Original NCC column relocated</td>
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<td></td>
<td></td>
<td>2. NCC 2005</td>
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<tr>
<td></td>
<td>Selected modern outreach arm</td>
<td>Timber or steel pole</td>
</tr>
<tr>
<td>Kingston</td>
<td>Selected modern outreach arm</td>
<td>Timber or steel pole</td>
</tr>
<tr>
<td>Red Hill</td>
<td>Darwin Canopy Lantern</td>
<td>1. Original NCC column relocated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. NCC 2005</td>
</tr>
<tr>
<td></td>
<td>Selected modern outreach arm</td>
<td>Timber or steel pole</td>
</tr>
<tr>
<td>Reid</td>
<td>Reproduction Radial Wave on decorative steel bracket</td>
<td>Timber pole</td>
</tr>
<tr>
<td></td>
<td>Darwin Canopy Lantern</td>
<td>1. Original NCC column relocated</td>
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<td>2. NCC 2005</td>
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<td>Selected modern outreach arm</td>
<td>Timber or steel pole</td>
</tr>
<tr>
<td>Tocumwal</td>
<td>Darwin Canopy Lantern</td>
<td>1. Original NCC column relocated</td>
</tr>
<tr>
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<td>2. NCC 2005</td>
</tr>
<tr>
<td></td>
<td>Selected modern outreach arm</td>
<td>Timber or steel pole</td>
</tr>
<tr>
<td>Wakefield Gardens</td>
<td>Selected modern outreach arm</td>
<td>Timber or steel pole</td>
</tr>
</tbody>
</table>