

# Shropshire Council Street Lighting Design Guide



Shropshire  
Council

## Document Control Sheet

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## 1. INTRODUCTION

This document has been developed in conjunction with and supports the following documents :-

- Shropshire Councils Street Lighting Policy Document; and
- Shropshire Councils Street Lighting Standard Detail Drawings.

Installing any type of street furniture on the public highway can cause problems; whether they are obstructions by trees, overhead lines, vehicular accesses or concerns from local residents.

This guide has been produced in order to overcome some of the general issues where they relate to street lighting, illuminated bollards or signs etc. However, it should not be viewed as a “be-all and end-all” guide as each site will have its own unique set of circumstances which will dictate the final scheme design.

## **2. DESIGN GUIDANCE**

### **2.1 General**

All materials shall be manufactured of fully recyclable materials conforming to current directives, including WEEE and RHOS Regulations.

### **2.2 Development Procedures for Highway Lighting**

Where the Developer requests the Authority to accept into the scope of the Service Apparatus which is in existence, or will be in existence, as a result of a new development, the Developer shall provide to the Authority a written notice stating :-

What development or scheme requires Adoption of the Apparatus;

Design Submission in line with the requirements as detailed in Appendix 7 – Designers Submission Checklist;

The identities of the parties involved; and

A copy of the Health & Safety File relating to all the aspects which affect the street lighting and illuminated signs installed on-site, further details of the requirements of the Health and Safety File are to be found in Appendix 1 to this Document.

Table 2.1 is intended to give general guidance on acceptable mounting height and lantern combinations but is not inclusive.

BS EN 13021-2 Category	Mounting Height (Max.)	Lantern Type (LED)
M2/M3	12m	Philips - LumiStreet Gen2 / DW Windsor - Kirium Pro / ASD Diamond
M4/M5	10m	Philips - LumiStreet Gen2 / DW Windsor - Kirium Pro / ASD Diamond
P2	10m	Philips - LumiStreet Gen2 / DW Windsor - Kirium Pro / ASD Diamond
P3	8m	Candela Luna / Thorn - Isaro Pro / ASD Diamond
P4	8m	Candela Luna / Thorn - Isaro Pro / ASD Diamond
P5	6m	Candela Luna / Thorn - Isaro Pro / ASD Diamond

Table 2.1

Table 2.2 gives the minimum desirable clearance from edge of carriageway to face of the columns.

Design Speed (mph)	Clearance
30	0.8m
50	Absolute minimum 1.0m (recommended minimum 1.5m)
60	Absolute minimum 1.5m
70	Absolute minimum 1.5m

Table 2.2





Table 2.3 Design Considerations Summary Table.

Category - Road Hierarchy	Shading	Lighting class	Colour Temp.	Dim/Part Night (PN) lighting (12am - 5.30am)	Max. Column Height	Column Type
Strategic Route	Red	M2/M3*	4000K	50% Dim	10/12m	Stepped Mild Steel - Galv. Finish
Main Distributor	Blue (Royal)	M2/M3*	4000K	50% Dim	10m	Stepped Mild Steel - Galv. Finish
Secondary Distributor	Brown	M3/M4/P2*	4000K	50% Dim	10m	Stepped Mild Steel - Galv. Finish
Link Road	Green	M4/M5/P4/P3*	3000K	50% Dim	8m	Stepped Mild Steel - Galv. Finish
Local Access Roads	Purple	P3/P4/P5	3000K	PN	8m/6m	Conical Brushed Aluminium
Minor Local Access Roads – generally not metalled	Dark Grey	P5	3000K	PN	6m	Conical Brushed Aluminium
Footpath	Yellow	P5	3000K	PN	6m	Conical Brushed Aluminium / Galv. Mild Steel R&L
District Centres		C2	2700 - 3000K	Varies	Varies	Varies
Village Centres		C3/C4*	2700 - 3000K	Varies	Varies	Varies
Conservation Areas		Varies	Varies	Varies	Varies	Stepped Mild Steel - Black Plastic Coating Finish
<b>NOTES : Conservation Areas and District/Village Centres require a scheme by scheme assessment and consultation with Stakeholders.</b>						
<b>Where there are access issues a mild steel R&amp;L column shall be utilised.</b>						
<b>Road Hierarchy information to be obtained from/agreed with Shropshire Council prior to any Design work being undertaken to establish required lighting design class.</b>						
<b>Any columns older thn 15yrs old would require some form of structural report for any proposed lantern conversion work.</b>						
<b>* Always go for the lowest level applicable (refer to the SC Street Lighting Design Guide for further guidance)</b>						

Table 2.3

Notes:-

- 1 All Control Gear shall have electronic, dimmable ballasts enabled for connection to the fitted control device (Central Management System (CMS), Bluetooth, NFC) but able to be connected to standard electronic photocell controls as specified.
- 2 For the avoidance of doubt, where an Ra value of greater than Ra60 is specified for a P Class lighting category the tables above have already taken into account any reduction in lighting class and the Designer shall design to the lighting class as set out in the relevant Table;
- 3 All lighting classes, where dimmed or part night, shall be operated from midnight to 5.30am, unless instructed otherwise by the Authority

## 2.3 Environmental Considerations

General guidance on whether lighting should, or should not, be installed can be found in the Street Lighting Policy Document.

The following Tables indicate the lighting levels to be achieved in Zones E1-4.

Environmental Zones E1 to E4 Lighting Classes				
Classes determined by CEN/TR13201-1:2004, BS EN 13201-2-4:2015, BS 5489-1:2013				
E1 – Intrinsically Dark, e.g. National Parks & E2 – Low District Brightness e.g. Rural or Small Villages				
Type of Road	Lighting Class	Minimum Ra Value	Column Height (max)	Maximum Bracket length (metres) /Luminaire inclination (degrees)
Strategic Route ('A' and all Dual Carriageways) – traffic flow >15,000	M3	60	10m	1.5/0
Main Distributor (Other 'A') – traffic flow >15,000	M3	60	10m	1.5/0
Secondary Distributor ('B' and 'C' Class)	M4/P2	60	8m	0.75/0
Road linking main and secondary roads	P4	60	6m	0.5/0
Subsidiary Roads – high night-time crime & high traffic flow	P5	60	6m	0.5/0
Subsidiary Roads – high night-time crime & normal traffic flow	P5	60	6m	0.5/0
Subsidiary Roads – high night-time crime & low traffic flow	P5	60	6m	0.5/0
Footpaths / Cycle paths – high night-time crime	P5	60	6m	0.5/0
Village Centres	C4	60	6m	0.5/0

All low crime roads and un-adopted Parish/Town Lighting	P5/P6	60	6m	0.5/0
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Table 2.4

E3 – Medium District Brightness, e.g. Small Towns / Urban Centres				
Type of Road	Lighting Class	Minimum Ra Value	Column Height (max)	Maximum Bracket length (metres) /Luminaire inclination (degrees)
Strategic Route ('A' and all Dual Carriageways) – traffic flow>15,000	M2	60	12m	1.5/5
Main Distributor (Other 'A') – traffic flow >15,000	M3	60	10m	1.5/5
Secondary Distributor ('B' and 'C' Class)	M4/P2	60	10m	1.5/5
Link roads, generally 'C' roads	M5/P3	60	8m	0.75/5
Subsidiary Roads – high night-time crime & high traffic flow	P4	60	8m	0.75/5
Subsidiary Roads – high night-time crime & normal traffic flow	P4	60	6m	0.5/5
Subsidiary Roads – high night-time crime & low traffic flow	P5	60	6m	0.5/5
Footpaths / Cycle paths – high night-time crime	P5	60	6m	0.5/5
Village Centres	C3/C4	60	6m	0.5/5
All low crime roads and un-adopted Parish/Town Lighting	P5/P6	60	6m	0.5/5

Table 2.5

E4 – High District Brightness, e.g. Town Centres of High Night-time Activity				
Type of Road	Lighting Class	Minimum Ra Value	Column Height (max)	Maximum Bracket length (metres) /Luminaire inclination (degrees)
Strategic Route ('A' and all Dual Carriageways) – traffic flow>15,000	M2	60	12m	1.5/0
Main Distributor (Other 'A') – traffic flow >15,000	M2	60	10m	1.5/0
Secondary Distributor ('B' and 'C' Class)	M3	60	10m	1.5/0
Link roads, generally 'C' roads	M4	60	10m	1.5/0
Subsidiary Roads – high night-time crime & high traffic flow	P3	60	8m	0.75/0
Subsidiary Roads – high night-time crime & normal traffic flow	P3	60	6m	0.5/0
Subsidiary Roads – high night-time crime & low traffic flow	P4	60	6m	0.5/0
Footpaths / Cycle paths – high night-time crime	P4	60	6m	0.5/0
Town Centres	C2	60	8m	0.5/0
Subways shall be lit utilising a light source with $R_a \geq 80$	Day $E_{ave}$ 350	Day $E_{min}$ 150	Night $E_{ave}$ 100	Night $E_{min}$ 50

Table 2.6

## 2.4 Columns and Brackets

The appropriate terrain category for Table 1 of EN 40-3-1 shall be Category II and the exposure co-efficient is to be calculated from Table 2 in the same document.

Lighting columns and brackets shall be designed, supplied and installed in compliance with BS EN40. Columns shall incorporate doors that are flush fitting, vandal resistant, weatherproof, and have stainless steel locking screws tri-headed, anti-vandal or other design subject to approval.

In general where columns do not exceeding 6m in height and the likelihood of having signage fixed, aside from 300mm repeater signs, to them is negligible then those columns shall be of aluminium construction. In all other cases the columns shall be of galvanised steel construction. Definitive requirements for each site should be obtained from the Street Lighting Engineer of Shropshire Council.

Post top columns will be used as the standard installation; however bracket arms may be employed where the surround ratio and uniformity on wide roads could be an issue. Bracket arms, where used, will form a complete lighting scheme and not contain a mixture of post top and brackets;

For Lighting Columns with brackets, at the point of intersection of shaft and bracket, the cross section of the bracket will equal that of the shaft, and the design of the connection will be such as to prevent the ingress of rain into the shaft;

The securing arrangement of the bracket arm to the column shall ensure that the arm does not rotate and shall be such that the bracket can be fixed on any one of 4 x 90° positions in relation to the column door opening. Bracket fixing screws shall be of stainless steel.

The mounting height and bracket projection from each column shall be as scheduled on the drawings. Each column shaft shall be suitable for use with the projection required by the design. Each column shaft shall have a base compartment large enough to offer easy access to the equipment housed therein. A baseboard of non-hygroscopic material, minimum thickness 15 mm, shall be securely fixed in each compartment and shall be of sufficient size to accommodate the cable terminations and isolator. A flush weatherproof door shall be provided for each opening and shall be interchangeable between columns of the same mounting height.

The doors shall be provided with 2 N<sup>0</sup> keys for between 1 and 10 N<sup>0</sup> columns and a further 1N<sup>0</sup> key for every multiple of 10N<sup>0</sup> columns thereafter.

Door openings shall be a minimum size consistent to house the cable terminations and isolation equipment. All control gear and photocell equipment must be housed within the lantern.

An 8 mm diameter brass earth terminal complete with two brass washers and a brass nut and locknut shall be provided in the base compartment, and therefore the requirements of BS EN 40 Part 5 shall apply. The terminal shall be positioned so as to be readily accessible through the door opening.

The cable entry slot shall be positioned directly below the door opening and have minimum dimensions of 50 mm x 150 mm and the lower edge of the slot shall be 500 mm below ground level. The slot shall be free from sharp edges and burrs.

Where columns are to be mounted on bridge parapets they shall be fitted with a door retaining device to ensure that the door cannot be dropped over the parapet. Any steel wire or chain used to achieve captivity shall be galvanised or stainless steel.

## 2.5 Column Colours

Columns will be Tubular/Conical with a factory produced protection system, spun brushed finish, Black thermoplastic coated or Galvanised finish. Care should be taken in handling, storage and erection of these columns to ensure that the applied coating is not scored or damaged below or above ground level.

In Conservation areas columns will be coloured Black thermoplastic coated finish.

## **2.6 Luminaries**

All luminaires shall have electronic, dimmable ballasts enabled for connection to the central management system (CMS) components but able to be connected to standard electronic photocell controls

The selection of luminaires is left to the Designer since the combination of luminaire, lamp, mounting height and bracket arrangement can result in a number of options. The development of luminaire technology, together with the production of new model types and obsolescence of older equipment does not lend itself to the use of a prescribed list of inclusive approved equipment (See table 2.4 for general guidance and currently approved lantern types).

The luminaire shall be equipped with Class II wiring with control gear mounted on removable nylon tray, cable guidance and cable restraint for incoming supply cable. There shall be a cover interlock mechanism to isolate the lantern canopy upon opening of the canopy.

All luminaires offered shall have an adjustable optical system in terms of rotation, tilt and toe.

Whilst each Luminaire will incorporate the control gear for the lamp within the lantern housing, control gear shall be separated from the lamp housing by a heat resistant screen. The control gear module shall be designed for ease of access for maintenance purposes and be completely removable for replacement.

All luminaire bowls shall be manufactured from toughened glass, polycarbonate or similar approved vandal resistant materials.

For assistance, a list of the most common types of equipment installed on the County's Network may be found in Appendix 2 to this document.

## **2.7 Lamps (LEDs)**

Lamps shall have a minimum written guaranteed life of 100,000 hours which will commence at the time of the initial acceptance of the installation.

Lamps shall be indelibly marked with the month and year of manufacture.

For assistance details for the minimum Lumen Output for each type of lamp may be found in Appendix 3 to this document.

## **2.8 Control Gear**

Lanterns will be fitted with dimmable DALI electronic ballast, NFC enabled across the entire range of lanterns with the available options for Bluetooth or CMS.

Control gear should incorporate a fail-safe device in the event of lamp failure or open circuit.

Control gear shall be capable of:

- generating breakdown voltage.
- to act as a thermal ballast i.e. to restrain lamp current to maintain operation in the negative resistance region of the lamp.
- to correct power factor within the inductive part of the circuit.

Gear casing shall be earthed via a proprietary earth stud in order to achieve no loss of earth continuity.

Further detailed Control Gear Specification can be found in Appendix 4 to this document.

**2.9 Isolation**

Lockable double pole isolators must be used which must act upon phase and neutral poles. Circuit protective conductors must achieve continuity at all times.

All isolators must be of modular construction and accept din-rail mounted accessories. All isolators must comply with BS 7654 and BS EN 60947-1, the Low Voltage Directive (LVD/73/223/EEC and the Electro-magnetic compatibility Directive (EMC/336/EEC).

Isolators shall be suitable for 2, 3 & 4 Din rail mounting modules.

Isolators shall be constructed to achieve a rated insulation voltage of 440V ac. Terminal blocks shall be made of brass with tin plating.

Isolator enclosures shall be constructed to achieve IP4L4 ingress rating when the fuse cover is in place and IP2X when the fuse cover is removed. All live terminals must be shrouded to avoid the danger of shock.

**2.10 Fuses**

All fuses shall be of the High Rupturing Capacity (HRC) type and be in accordance with BS 7671 Parts 1&5.

Fused links shall comply with BS 88 and BS EN 60269. Notes 1 & 2 of Paragraph 5.3 of BS 88-6 shall be taken to be the required current ratings.

Fuse ratings shall be in accordance with Table 2.7 below:

Lamp Type	Fuse Rating (Amps)
LED lanterns 4 – 100w	6

Table 2.7

Fuse discrimination must be designed to ensure over-current protection, in accordance with Regulation 531 of BS 7671.

**2.11 Central Management System**

Each luminaire shall be fitted with a 7 pin nema socket for future proofing and option to add CMS.

**2.12 Photo-Electric Cell Control**

Shropshire Council operates a Policy of part-night lighting, as detailed in the companion document in this series of documents - Street Lighting Policy. Details of the exemption criteria used in determining whether a street light is to follow a part-night regime or one of an all-night lighting regime may be found in Section 5.3 of that Policy document. Further assistance, should it be needed, in determining which lights should operate as part-night lighting may be obtained by contacting the Street Lighting Section.

Photo-electric control units (PECU) shall comply with the requirements of BS 5972 and shall be certified to all current emission, immunity and vibration requirements.

The PECU shall be guaranteed by the manufacturer/supplier for a minimum of 8 years from the date of installation.

Units shall be solid state incorporating technology to control and reduce high inrush currents by switching when the cycle is at zero.

The photo-electric sensor shall be a filtered silicon diode with a zero sensor shift over a ten year period. Switch-on shall be at 35 lux and switch-off at 18 lux.

The power consumption shall be no more than 0.25w and uniform operation shall be achieved throughout a temperature range of -20°C to +80°C.

The switching load shall be capable of controlling a reactive lighting load of 10 amperes and there shall be a means of protecting against mains borne surges or spikes.

Externally mounted photocell fittings shall provide protection of IP67 against ingress of dust and moisture.

The photocell shall be pre-set at the place of manufacture and shall not be capable of adjustment on site.

The photocell shall be so designed that, in the event of a fault occurring, it shall fail-safe in the 'on' position.

PECU's shall be of either:-

- One-Part NEMA Socket - in which the photo-electric sensor and the load switching components are housed in the same enclosure, suitable for insertion into a "NEMA" type socket to obtain mechanical and electrical connection. To be used at all mounting heights.
- One-Part Miniature – in which the photo-electric sensor and the load switching components are housed in the same enclosure, suitable for direct mounting to luminaire canopies or other equipment by means of a 20mm threaded conduit fixing complete with rubber seals, plastic washers, locknuts and cable tails, suitable hard-wiring into the lamp circuit. This type is only be used at mounting heights of 6m and below.

PECU's for Base-Lit Bollards shall be fitted in the gear tray and shall incorporate technology to ensure that the sensor only receives light from the top of the bollard and is unaffected by the fluorescent units used within the bollard unit.

## 2.13 Cables

Cables which are to be laid underground shall be of armoured construction with a minimum conductor size of 6.0sq.mm Dependent on circuit loading and max demand cable calcs to be submitted. Cables shall be constructed of copper/XLPE/PVC/SWA/PVC conforming to BS 5467, with the outer sheathing coloured black.

Cable core sheathing shall comply with the revision to Table 51 of BS 7671, Amendment N<sup>o</sup>.2.

Cables which are to be surface mounted, such as when servicing a luminaire mounted on a wall bracket, shall be of a Mineral Insulated Copper Clad (MICC) FP200 could also be used as a more cost-effective alternative it is also easier to terminate and cheaper construction complying with BS 6387. Where the cable run, between the DNO cut-out and the luminaire, is less than 6.0m long the minimum acceptable cable size will be 1.5sq.mm. where the cable runs exceeds 6.0m then a minimum conductor size of 2.5sq.mm. will be used.

In all cases, where wall brackets are to be used, the routes of any surface cables must be agreed with the Council prior to their installation.



## 2.14 Obstructions to Avoid

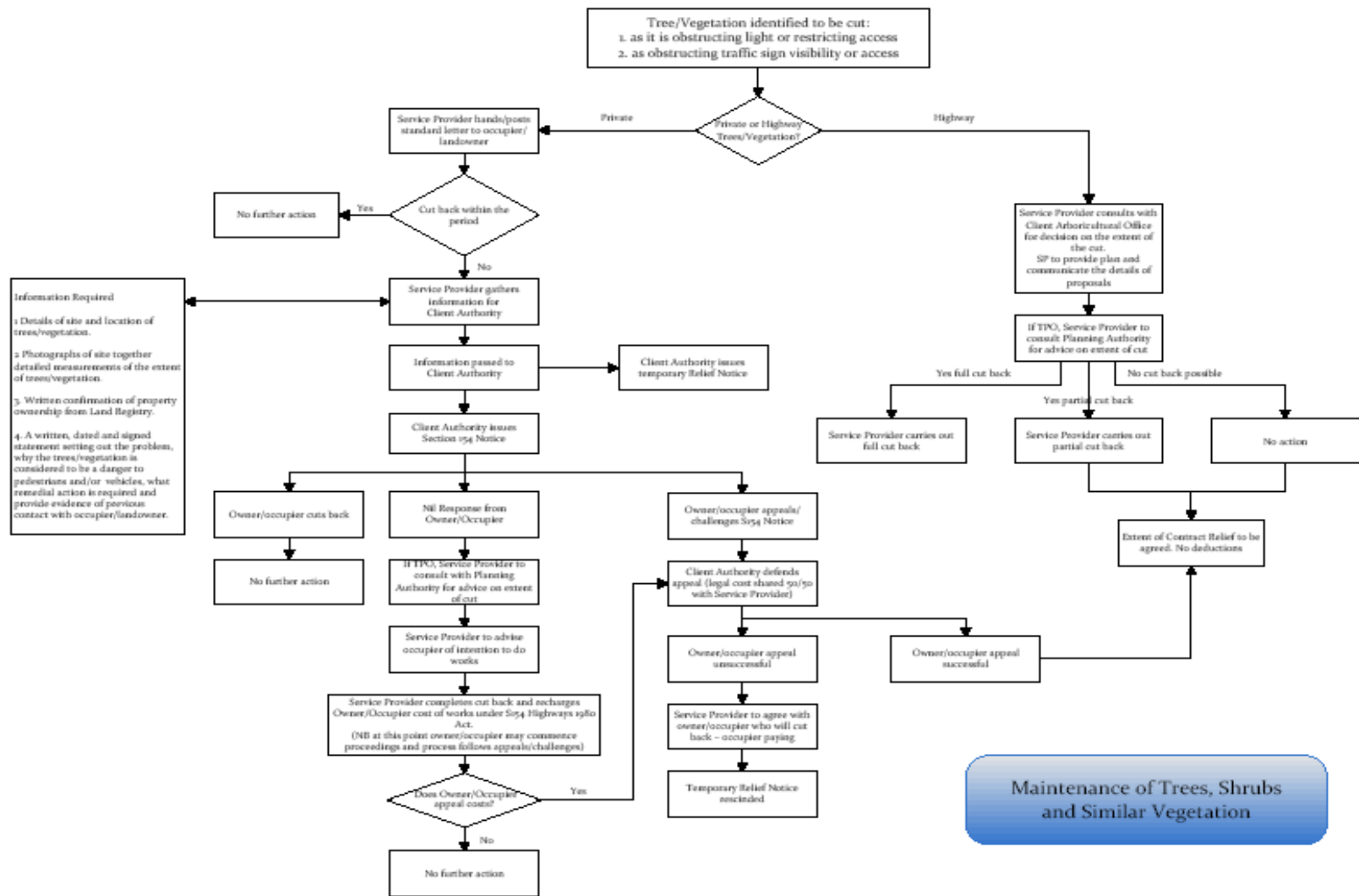
This list is not exhaustive and there will be other factors which will need to be taken account of. However, it should be clearly noted that all columns must be sited in the Highway unless a Wayleave or Deed of Grant has been signed by the landowner.

- Trees

Trees, both large and small, are a constant problem when it comes to installing lighting columns. The following observations must be adhered to by scheme designers and maintenance operatives when considering column locations:-

- a) Where there is an alternative location, away from the tree, then utilise this location and re-configure the design accordingly;
- b) It may be possible to locate a column underneath the tree canopy but there must be at least 1.6m clearance above the lantern and the designer must be sure that this space will not be encroached upon at a later date;
- c) When location columns amongst trees, lanterns must be clearly visible when standing at the mid-point between columns; and
- d) When columns are located amongst trees, the light thrown across the road to the far footway must be unimpeded to a height of 2.5m above the footway.

Trees will, over time require to be maintained by the tree owner. The following flow chart indicates what steps will be required, and by whom, to maintain the tree so as to provide the correct levels of light output from street lighting



Maintenance of Trees, Shrubs  
and Similar Vegetation

- Bushes / hedges

Whilst most bushes are unlikely to block the light output from street lights, they often grow out and around the column bases and hence cause problems by blocking access to the base compartment of the columns. Trimming of the bush/hedge needs to be carried out on a regular basis and therefore every precaution needs to be taken to site columns away from existing locations where bushes and hedges might encroach on the lighting column.

- Overhead lines (electrical)

Shropshire is covered by two Distribution Network Operators (DNO's) Scottish Power and Western Power Distribution. These DNO's publish guidelines regarding the placing of columns near Low Voltage (LV) or High Voltage (HV) overhead lines but, in summary, these are shown in Table 2.8 below.

Distance from overhead Cable	Voltage	Further Criteria
0.5 times column height	LV	Insulated
1.5 times column height	LV	Uninsulated
2.0 times column height	HV	Wooden Poles
2.5 times column height	HV	Steel Towers

Table 2.8

Columns must not be positioned any closer than these limits. However, where height may allow for closer positioning the designer must consult with the appropriate DNO and obtain written consent as regards location.

Warning signs should be fitted to columns located underneath any HV cables as per Standard Detail Drawing SD-1400-12

- Overhead lines (other)

Wherever possible columns are to be positioned so that they do not conflict with any overhead lines, such as BT Cables etc. Where such conflict is unavoidable there must be sufficient clearance to enable an operative to gain access to the lantern via a mobile elevating working platform (MEWP).

- Vehicular accesses / gateways

Columns must never be positioned in a manner that blocks access, gateways or any other form of access to property. Normally (but not always) locating columns on property party lines will avoid this. However, in any case, columns must not obstruct site lines for vehicles entering onto the highway.

- Bedroom windows.

Light intrusion into properties should be avoided as much as possible. Consideration must be given to possible problems in all cases and, if necessary, the affected residents consulted. Where necessary shielding requirements should be identified at the site installation stage and fitted as a matter of course. Where columns are to be fitted with a shield then only those shields recommended by the lantern manufacturer shall be used. Shropshire Council will only accept the use of back shields on lanterns which are intended for adoption, they will not accept front shields for adoption.

- Footpaths

Where columns are being located on footpaths the choice of column position will depend on the width of the footpath and any verge area available. In most cases the columns will be sited at the back of the footpath but should not be placed any nearer than detailed in Table 2.5 above.

## 2.15 Electrical Design

Electrical design shall be carried out in accordance with BS EN 7671 and all other electrical and safety legislative and technical requirements and recommendations.

Electrical design calculations shall include details of:-

- Design current
- Rating protection
- Correction factors
- Cable current carrying capacity
- Cable size
- Voltage drop
- Risk constraints
- Thermal constraints
- Proposed ducting configuration drawings and layout

## 2.16 Supplementary Lighting

Where a development will significantly generate increased vehicular or pedestrian traffic, it may be necessary to improve existing lighting and/or provide additional lighting between the development and any existing lighting. As such, the Developer should note that this may be a requirement of the scheme, or a contribution will be required in full or in part towards the cost of upgrading the existing lighting installation.

## 2.17 Maintenance Period

Once the Development has been completed and accepted for adoption by the Council, the installation will enter a maintenance period of 12 months. During that time the Developer will continue to be responsible for both energy used and the maintenance of the System. At the end of the 12 month Maintenance Period, the installation will again be inspected by the Council and if found to be of the required standard, it will be transferred to the Council, who will then assume both energy and maintenance responsibilities.

### **3. INSTALLATION GUIDANCE**

#### **3.1 General**

The Developer is responsible for compliance with all Regulations and Legislation concerning works on his site, details of which can be found in Appendix 5 to this document.

The Developer is solely responsible for the installation and the site including all leadership and project management.

The Developer is to supply, erect and install the whole of the equipment specified, together with any material which may not be expressly specified, but which is necessary for the satisfactory completion of the installation.

Any residual waste from the installation will be disposed of through a Contractor licensed by the Local Authority, all in accordance with Environmental Agency Regulations. Waste Transfer Notes must be obtained and retained for inspection in respect of all materials transferred for waste. All waste being carried must be transported by a waste carrier approved by the Environmental Regulator. No disposal of residual waste will be countenanced by burning, unless it is by incineration at the hands of a licensed waste Contractor.

#### **3.2 Working on the DNO Network**

No work shall be undertaken on any Distribution Network Operator plant or apparatus unless specific personnel are approved to so work by the DNO under Engineering Recommendation G39/1. Attention is particularly drawn to the need for the Developer to obtain formal written approval from the DNO before any authorised work on their plant is carried out. Developers need to be aware that authorisation will include indemnifying the DNO against claims and certifying the competence of their staff to perform prescribed tasks.

- Competent Persons

The Developer is responsible for notifying the DNO of the names and work areas and responsibilities of all personnel working on or near the DNO's plant. The Developer must have the DNO's prior written approval before work is carried out.

#### **3.3 Underground Services**

Where the Developer arranges for installation works to be carried out, the Developer is not relieved of any obligations, and must make all necessary arrangements with the Statutory Undertakers, to ensure that no existing mains or services are damaged or interrupted.

The requirements of Health & Safety Executive Guidance – HS(G)47 'Avoiding Danger From Underground Services' shall be adhered to. It is the Developer's/Council's responsibility to be in possession of the plans of underground plant or to ensure that the site is marked out by Undertakers to indicate the location of plant.

#### **3.4 Feeder Pillars**

Mini Feeder Pillars (Type 1 up to 2 circuits 25A max, Type 2 up to 4 circuits 100A max) will comply with the general layout as detailed in the Standard Detail Drawing(s). Larger feeder pillars with multiple circuits will be submitted with feeder pillar and full electrical circuit designs.

A concrete foundation, in accordance with manufacturer's instructions, shall be provided to which the free-standing pillar shall be firmly fixed.

Earth rods shall be 1200 mm length and made of copper and shall be connected to the earth electrode with 16 sq. mm, PVC insulated copper cable.

Engraved labels of the dimensions and legend indicated on the Standard Detail Drawing shall be provided and fixed to the pillar with self-tapping screws.

The minimum documentation provided for the pillars should contain :

- A circuit diagram detailing what circuits feed what assets (copy left in the pillar).
- A copy of the installation test certificate (this must be sent to Shropshire Council for approval for inspection and adoption purposes and a copy left in the pillar).
- Any other documentation/commissioning certificates for equipment installed on the network supplied by the pillar e.g. passive safe system, programmable lighting other miscellaneous electrical/electronic equipment.

### 3.5 Electricity Supply

Where DNO cables are readily available, each column shall be provided with an individual electricity service.

Where DNO cables are not readily available, street lighting cables shall be installed using the loop-in system and using a dedicated core to earth. Cable steel wire armouring shall be bonded to the dedicated core to earth.

Where the DNO network connection is a PME service, the installation shall be carried out as a TNC-S system (i.e. separate earth and neutral conductors).

- At each private owned service point a PME label must be fixed near the isolator; or
- A label stating 'WARNING, Local Authority Service Point looped from a PME Service shall be displayed near each isolator.

A single phase 230V 50 Hz supply will be provided and terminated in a fused DNO cut-out fixed to the backboard of the base compartment.

The Developer will be responsible for providing and fitting meter tails for connection into the DNO cut-out. The Developer must ensure that the red confirmation tag is connected to the meter tails to ensure that the DNO connect in the service.

Any costs charged by the DNO for abortive visits because the red tags are not present will be the responsibility of the Developer.

It is the Developer's responsibility to furnish the DNO with Orders for the connection and disconnection of services.

### 3.6 Cable Terminations

Every out-going circuit shall be protected by a lockable double pole isolator, fused to achieve prescribed discrimination. Each isolator shall be fitted with High Rupturing Capacity fuse(s) complying with BS 7671 Parts 1&5 and of the appropriate rating for the circuit load.

Lockable double pole isolators shall be fitted in the base compartment of each lighting column or traffic sign into which cables are to be terminated.

Armoured cables shall be terminated by means of a 3-part compression gland comprising armour locking ring, locknut, earth terminal and shroud.

The cable armour shall be bonded to the earth terminal block in each column and continuity achieved throughout the earth loop including the column.

Where dissimilar metals are in contact, the whole area of each contact surface shall be cleaned, dried and coated with jointing paste to avoid electrolytic action.

### 3.7 Cable Laying

All cables shall be installed in accordance with the Electricity Association's TG 39/1 "Model Code of Practice covering electrical safety in the planning installation commissioning and maintenance of public lighting and other street furniture".

Where a private network cable is to be provided, a trench shall be excavated so as to provide a minimum cover to the cable of 450 mm to invert, except in carriageways where cable shall be laid at 750 mm to invert. The cable shall be laid on a 75 mm bed of imported sand, free from impurities likely to cause damage to the cable and covered with a layer of the same material to a depth of 75 mm. All unsuitable material shall be removed and be disposed of to a licensed tip. The trench shall be re-instated with suitable material only.

Cables must be laid at an ambient temperature above 0°C

All private cables exceeding a linear length of 3m must be contained in smooth bore medium density polyethylene duct, colour coded orange of minimum wall thickness 5 mm, and marked 'STREET LIGHTING' at intervals of 900-1000 mm. 50 mm diameter duct shall be used, except for road crossings and where particularly specified that 100 mm diameter shall be used.

For private cables a 150 mm wide by 0.1 mm thick orange PVC tape marked "Street Lighting Cable" 150 mm wide by 0.1 mm thick shall be laid along the cable length above the line of the cable 150 mm below finished ground level. Cable tiles or 100 mm diameter duct must be used where cable is laid in carriageway.

The entire length of the duct shall be properly abutted and jointed in accordance with manufacturer's instructions to give a smooth bore. The conduit shall be impact resistant impervious to water and flexible enough to follow undulations in the trench bottom and be able to withstand minor earth movements.

Where more than two ducts converge, a suitable inspection chamber shall be fitted.

All ducts shall be provided with a nylon draw rope which shall remain in-situ upon completion of ducting prior to the installation of the cable. Where appropriate the draw rope shall be brought to the surface, secured and marked by a permanent marker. When cables are drawn into a duct an additional draw rope shall be drawn in parallel with the cable and a 3 metre loop buried at each duct end.

Duct positions shall be indicated on the kerb line by permanent duct markers. Unless otherwise directed, all ducts shall project a minimum of 100 mm beyond the edge of the carriageway construction with its draw rope firmly secured to a crosspiece to prevent accidental withdrawal. All ducts shall be plugged to prevent ingress of soil or other matter.

No cable joints will be permitted below ground level.

The Developer will provide 5 working days' notice, to the Street Lighting Section, of any excavation works for street lighting cables and the laying of any ducts and/or cables. The Developer will confirm with the Street Lighting Section when ducts and/or cables have been laid and that the trench will remain open for a period of 24 hours, from such notification, before any backfill will commence. If the Council wishes to, it will carry out such inspections as required within that 24 hour window.

The trench shall be backfilled and reinstated in compliance with the HAUC specification contained within the New Roads and Street Works Act 1991 and Chapter 8 of the Traffic Signs Manual. All open trenches must be fenced and guarded in accordance with Chapter 8 of the Traffic Signs Manual and the Department for Transport's Safety at Street Works and Road Works a Code of Practice

Failure to notify the council that a trench is open for inspection will result in the trench being re-opened at the Developer's expense. Any damage or rectification works required will also be carried out at the Developer's expense.

### **3.8 MICC/FP200 Cables**

All cables shall be securely fixed with PVC covers and saddles except where an alternative fixing method is specified. Fixings shall be spaced in accordance with BS 7671 and the manufacturer's instructions.

Bending radius of any cable shall not be less than six times the diameter of the cable and all bends shall be made with the correct tool. Offsets to accessories and equipment shall have a minimum of 80 mm between the gland and the first bend of the offset.

Seals shall be screw-on type brass pot seals with earth tails. Standard brass ring type compression glands shall be used at all terminations and PVC shrouds shall be fitted to all glands unless stated otherwise.



A separate insulated earth wire shall be provided in all conduit systems.

All bare earth conductors shall be sleeved with green and yellow PVC sleeving.

### **3.9 Lighting Columns and Brackets**

Only workmen experienced in the erection of street lighting columns and brackets should be employed on this work, and they must at all times be under the direct supervision of a foreman who is so experienced.

Installation is to be carried out as development proceeds and in accordance with the needs of the occupiers of the new premises. Prospective occupiers must be made aware that lighting is to be installed and column positions should not be altered to achieve sales. In order that the positions for columns can be correctly established it is advisable that this should be done after the kerbs and/or edging are laid and preferably before any paving works are carried out. Lighting columns shall be sited in the rear of the footway.

Lighting columns and brackets shall be supplied and installed in compliance with BS EN40. Column doors shall be flush fitting, vandal resistant, weatherproof, and have stainless steel locking screws tri-headed, anti-vandal or other design subject to approval.

Street lighting columns shall be free from irregularities and burrs.

The columns shall be of a design currently acceptable to the Design Council.

Columns manufactured from tubular aluminium shall only have a circumference joint of the sleeve type at the point where the base section meets the reduced shaft diameter they shall be guaranteed for a design life of 50 years and columns manufactured from stainless steel shall be guaranteed for a design life of 70 years, in either case they shall be supported by full manufacturers' specification and warranty.

### **3.10 Raise and Lower Columns**

Raise and Lower, or Mid-Hinged columns, are designed for installation in locations where the lanterns and control gear cannot be reached by means of a vehicle mounted lift or MEWP. There are, however considerations that must be taken into account to ensure their effective use.

Because of the design care must be taken to ensure there is sufficient clearance to enable the column to be lowered, and raised again, without obstruction. When in its lowered position the column shaft should not obstruct pedestrians i.e. is should not lie across a footpath or cycleway. There should be sufficient room for an operative to work safely away from any building, steep slope, trafficked routes or open bodies of water.

Such columns should not be used as a tool of convenience and should only be employed where there is no chance of vehicular access and all other reasonable means of safe access have been eliminated.

The Developer is required to provide the council, at no cost, the manufacturer's equipment required for the lowering of the fold-down column.

### **3.11 Erection of Equipment**

The holes for the planted root columns shall be excavated to a depth as recommended by the column manufacturer. Tubular 5m or 6m columns may be erected with lantern affixed. All other columns may be erected with bracket attached only. All columns shall be placed centrally in the hole in a vertical position on a pad of concrete and the hole filled with Class ST1 concrete in 150 mm layers up to a depth of 150 mm below ground level. The excavation shall be backfilled and evenly rammed. An orange polyethylene 5 mm wall thickness smooth bore duct of 50 mm internal diameter shall be installed through the concrete surround into the column via the cable entry hole to provide a clear route for the supply cable.

Flange-plate columns, where required shall be carefully lowered onto the foundation base prepared for it and shall be set vertical using metal shims where necessary. The nuts shall be made tight to secure the column to the foundation and the nuts and exposed bolts shall be coated with 'Denso paste' and protected with 'Denso tape'. The space between the flange-plate and foundation base shall be grouted. The foundation bases shall be purpose designed and constructed.

The bracket arms shall be fixed in accordance with the manufacturer's instructions to prevent rotation in service. The door locking device shall be lubricated. The column door shall be positioned as per Table 3.1 below:

<b>COLUMN POSITION</b>	<b>DOOR POSITION</b>
Back of footpath	Facing away from oncoming traffic
Near kerb edge	Facing away from oncoming traffic
Centre of central reserve	Facing oncoming traffic in a consistent direction
Near edge of central reserve	Facing away from oncoming traffic or facing distant side of reserve.

Table 3.1

### 3.12 Fixing of Luminaire and Control Gear

The luminaire shall be securely fixed in accordance with the manufacturers recommendations.

### 3.13 Wiring

- **Columns**

Columns shall be wired in 300/500V grade PVC sheathed and PVC insulated cable. Dependant on wiring configurations, these cables will have three PVC Insulated copper cores consisting of live neutral and earth conforming to BS 6004. For columns of 6 m and below, cores will have a cross-sectional area (csa) of 1.5sq.mm, for columns of with a height greater than 6.0m the cable will have cores with a minimum csa of 2.5sq.mm.

Cable to photo-electric cell shall be with a 3-core cable, having brown, black and blue cores, the black core being used as the switch wire. Black switch wire and blue neutral to the PECU shall be marked with the appropriate cable markers respectively.

- **Luminaires**

All wiring shall be of 300/500 volts approved non-hygroscopic heat resistant material, of appropriate cross-section not less than twice the nominal current rating. In no circumstances shall it be less than 24/0.02mm and be connected to a suitable terminal block of porcelain or other approved material for connection of main supply.

An earth terminal suitably marked shall be provided and the reflector and all electrical components shall be effectively earthed to the body of the luminaire unless the whole luminaire is double insulated.

- **Earthing**

The installation must be earthed and labelled in accordance with BS 7430 and BS 7671 and labelled accordingly.

Armoured cables shall not rely upon the steel wire armour alone for the return path to earth. The steel armour shall be bonded to the earth termination in the base of each column by means of a 6.0mm<sup>2</sup> insulated copper earth wire.

Separate dedicated earth terminal block shall be fixed to the baseboard of each column and the earth terminals of all equipment shall be bonded separately to this terminal block. Crimped connections are to be used wherever possible.

This dedicated earth terminal shall be supplied irrespective of any other earth terminal, e.g. within the cut-out or on the column.

The terminal block shall be connected to the DNO earth terminal and the main earth conductor shall be the equivalent cross-sectional area of the incoming phase conductor.

Minimum cross-sectional area of protective conductors in relation to the area of associated phase conductors shall be as the following table:

Minimum csa of the CPC (mm <sup>2</sup> )	
csa of Phase Conductor	Minimum csa of corresponding Main Earth Conductor
6sq.mm	6sq.mm
10sq.mm	10sq.mm
16sq.mm	16sq.mm
25sq.mm	16sq.mm
Larger sizes	Consult Street Lighting Section

Table 3.2

All bare earth conductors shall be sleeved with green and yellow PVC sheathing. All screwed earth connections shall be made between two brass washers.

Where service cables are of the Protective Multiple Earth type, the Contractor shall ensure that the DNO fit the correct Protective Multiple Earthing label.

Earth warning labels shall be fitted at every main or supplementary earth bonding point. Labels shall be of the Traffolyte type and be in accordance with Regulation 514-13-01 of BS 7671.

### 3.14 Fastenings

All screws, washers and bolts shall be manufactured from stainless steel or brass.

### 3.15 Numbering of Columns

Each column shall be numbered with the number scheme being supplied by the Street Lighting Manager and put into place by the Developer.

Each number shall consist of a white patch 90mm x 180mm high and with black lettering 75mm high located at 2,0m from ground level and sited so that it can be clearly seen by a passing vehicle.

### **3.16 Removal of Existing Equipment**

Where any existing equipment is to be removed, the equipment shall be carefully dismantled and the site permanently re-instated.

Equipment shall not be re-used unless specifically authorised, in writing, by the appropriate Commissioning Engineer.

If the equipment is to be re-used immediately then it shall be either re-erected as indicated on the drawings. If the equipment is not to be re-used immediately then it is to be retained in a secure environment until required or, if not to be re-used, it shall be removed from site and safely disposed of to a licensed tip.

Where, in order to progress the works, it is proposed to remove existing lighting from any area still open to vehicle or pedestrian traffic, temporary lighting shall be provided by the Developer at his expense.

No existing lighting shall be switched off, dismantled or removed without the prior approval of the council and any necessary arrangements made with the DNO.

No existing traffic signs, illuminated or non-illuminated, which are fixed to columns to be removed, shall be so removed without the permission of the council. The Developer shall re-fix those signs and their lighting units and re-commission. At no time shall prescribed signs be absent from the site.

### **3.17 Electrical Testing**

- **Test Instruments**

Test instruments shall possess a unique serial number. They shall be correctly calibrated to National Physical Laboratory Standards and be in accordance with the manufacturers published specifications, with testing procedures to comply with BS EN ISO 10012/1. Proof of calibration to be made available on request

- **Electrical Inspection and Testing**

The Developer shall undertake all tests prescribed in BS 7671 for all new circuits or alterations to circuits. Inspection and testing must all be carried out as prescribed by BS 7671.

Works shall also be undertaken in accordance with the Code of Practice for In-Service Inspection and Testing of Electrical Equipment as issued by the Institution of Electrical Engineers.

Adherence to the Electricity at Work Act 1989 is mandatory when undertaking electrical test and inspection works

**APPENDIX 1 – Health & Safety File**

Information required to be addressed in the Health and Safety File will include the following detail relating to street lighting equipment:

(a)	Description of the works	Brief description of the work carried out
(b)	Residual hazards	Any residual hazards which remain and how they have been dealt with (for example surveys or other information concerning asbestos; contaminated land; water bearing strata; buried services etc.)
©	Hazardous materials used	Hazardous materials used (for example lead paint; pesticides; special coatings which should not be burnt off etc.)
(d)	Information regarding the removal or dismantling of installed plant and equipment	Information regarding the removal or dismantling of installed plant and equipment (for example any special arrangements for lifting, order or other special instructions for dismantling etc.
(e)	Equipment for cleaning or maintaining the structure	Health and safety information about equipment provided for cleaning or maintaining the structure
(f)	Location of significant services	The nature, location and markings of significant services, including underground cables; gas supply equipment; fire-fighting services etc.
(g)	Information and as-built drawings	Information and as-built drawings of the structure, its plant and equipment

The Health and Safety File is a stand-alone document and any drawings or relevant documentation such as those referred to below should be included.

The Developer will include the following documentation on completion of works:-

- A plan of the works and details of the types of relevant Apparatus;
- The lighting classes which have been applied to each item of Apparatus and/or each road, footpath or cycle track within the development or works;
- Details of any special requirements by the Authority in addition to the Standard Development Specification with which the proposed development or works must comply;

- A copy of the design of the Apparatus, including:
  - a) Details of all Apparatus types including manufactures Catalogue N<sup>os</sup>.
  - b) Location of the Apparatus;
  - c) Manufacturers guarantee;
  - d) Completion of Developers Visual Checklist detailed in Appendix 5; and
  - e) Written confirmation by the Developer that the design complies with the adoption required standards.
- Details of any cable distribution networks forming part of the Apparatus and proposed to be taken over by the Authority;
- The electrical test certificate for the Apparatus;
- Details of the connected/disconnected loads together with the relevant MPAN details;
- Written confirmation from the Developer that the Apparatus complies with the Adoption Required Standards; and
- Sufficient relevant information to allow the Service Provider to satisfy any Legislation.

As Built Drawings might include details such as:-

- Earthworks – Extent of batter slopes cross sections and levels should be included where relevant. Topsoil thickness where relevant. Ground conditions where relevant, Contaminated Land;
- Surfacing – Details including materials specifications, sizes, thicknesses patches inlays etc.;
- Drainage – Details of new drains (size, material, level, direction of flow etc.) chambers depth diameter standard detail;
- Utilities – Location of known services which were installed as part of the works, also services and protection with details and dimensions of known service locations, when available taken from trial pits etc. including photos;
- Fencing, and hedging Trees – Details including specification and standard detail;
- Street Lighting – Locations including details of new lights, cables, ducts, electrical connections etc.; and
- Traffic Signs – Locations including details of new signs, electrical connections etc.

**It must be noted that if there is any defect or omission whatsoever with the Health & Safety File, any application to adopt the street lighting system will be rejected until such time as the installation and the Health & Safety File are acceptable.**

**APPENDIX 2 – Luminaire Specification**

<b>Life Statement</b>	<b>Materials and Finish</b>	<b>Wiring</b>	<b>Mounting</b>	<b>Tilt Settings</b>	<b>Optics</b>	<b>Degree of Protection</b>
L90, B10, 100,000 hr life min.	High pressure die cast aluminium	Pre-wired with PVC/PVC 3 core 1.5mm	Fixing to lighting columns having a male spigot of 60mm or 76mm diameter (post top)	0 to +20 post top	Overlay Principle	Ingress protection of IP66 with the photocell (socket or minicell) installed.
Evidenced in accordance with LM80 and TM-21.	Optical assembly shall have a flat glass cover	Tails to suit proposed mounting height.	Male bracket of 34, 42 or 60mm (side entry)	15 to +15 side entry	Minimum of ten light distributions shall be available	Minimum impact resistance of IK09

<b>Conformity and Approvals</b>	<b>LED Driver</b>	<b>Controls</b>	<b>Warranty</b>
Luminaire shall meet the requirements of BSEN 60598-2-3 and the general requirements of BSEN 60598-1.	The driver shall have a DALI interface pre-wired to the Violet and Grey cables of the 7 Pin NEMA socket.	Fitted with a 7 pin Nema Socket	Minimum 10year warranty
	Adjustable Light Output Constant Light Output Programmable dimming regime with a minimum of 5 stages with in- built calendar facilitating calculation of midnight based on photocell activation times	Lantern should include either NFC or Bluetooth capability	

**APPENDIX 3 – Lamp/Lumen Output Specification**

LED Luminaires					
Lamp Type	Light Source CRI 75	Lumen Output (Lumens) Min.	LED Binning : Macadam Ellipse Tolerance (Max)	photometric data measured at and presented for ambient temperature (Celsius)	At zero and five degrees tilt, I <sub>max</sub> above 90
LED	+/- 200K	105 Luminaire Lumens per Watt min.	4	25	Zero



**APPENDIX 4 – Electronic Control Gear Specification**

Mains Input Voltage		180V – 260V 50/60 Hz
Power Factor		>0.98
Power Consumption		1W (lamp off)
Lamp Wattage		10 - 173 (factory set)
Maximum Case Temperature		75 degrees Centigrade
EMC	Emissions	EN55015
	Immunity	EN61547
	Harmonics	EN61000.3-2
Manufacturing Standard		EN ISO 9002
Load Current Crest Factor		<1.1
Output Power Variation For +1 – 15% Supply Variation		<5%
Lamp Frequency		80 Hz
Lamp Ripple Current		Less Than 5% Of Lamp Current

**APPENDIX 5 – Reference, Regulations and Legislation**

The References, Regulations and Legislation detailed in this Appendix are referred to within this document, they are not intended to be exhaustive and it is the Developers, Installers responsibility to ensure that they comply with all Regulations, Legislation and Codes of Practice as required.

**BRITISH STANDARDS:**

Standard	Part	Year	Title	Designation
BS 88	1	2007	Low Voltage Fuses	General Requirements
BS 4800	-	2011	Schedule of Paint Colours	
BS 5467	-	1989	Specification for Cables with Thermosetting Insulation for Electrical Supply	
BS 5489	1	2013	Code of Practice for the Design of Road lighting	Lighting of Roads and Public Amenity Areas
BS 5972	-	1980	Specification for Photoelectric Control Units for Road Lighting	
BS 6004	-	2012	Electric Cables	PVC Insulated and PVC Sheathed Cables for Voltages up to 300/500v
BS 6387	-	1983	Specification for Performance Requirements for Cables required to Maintain Circuit Integrity under fire conditions	
BS 7654	-	2010	Specification for Single-Phase Street Lighting Cut-Out Assemblies	
BS 7430	-	1998	Code of Practice for Earthing	Earthing of Electrical Systems
BS 7671	-	2008	Requirements for Electrical Installations	IEE Wiring Regulations – Sixteenth Edition
BS EN 40	1	1992	Lighting Columns	Definitions and Terms
	2	2004		General Requirements
	3-1	2000		Design and Verification – Specification for characteristic loads
	3-2	2000		Design and Verification – Verification by Testing
	3-3	2003		Design and Verification – Verification by Calculation

	5	2002		Requirements for Steel Lighting Columns
	6	2002		Requirements for Aluminium Lighting Columns
BS EN 13201	1	2014	Road Lighting	Selection of Lighting Classes
	2	2015		Performance Requirement
	3	2015		Calculation of Performance
	4	2015		Methods of Measuring Lighting Performance
BS EN 60061	-2	1993	Lampholders	Lamp Caps and Holders together with gauges for the Control of Interchangeability and Safety
BS EN 60269	1	2007	Low Voltage Fuses	General Requirements
BS EN ISO 10012	-	2003	Measurement Management Systems	Requirements for Measurement Processes and Measuring Equipment

### **National Joint Utilities Group (NJUG)**

Volume 1	NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus (Issue 6)
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### **Health and Safety Executive**

HS(G)47	Avoiding Danger From Underground Services'
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### **Department for Transport**

Safety At Street Works And Road Works A Code Of Practice
Manual of Contract Documents for Highway Works (MCHW)

### **The Institution of Electrical Engineers**

Code of Practice for In-Service Inspection and Testing of Electrical Equipment
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### **Electricity Association**

G39/1	Model Code of Practice covering electrical safety in the planning installation commissioning and maintenance of public lighting and other street furniture
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### **REGULATIONS AND LEGISLATION**

New Roads and Street Works Act 1991;

Electricity at Work Regulations 1989;

The Management of Health and Safety at Work Regulations 1999;

Traffic Management Act 2004; and

Waste from Electronic and Electrical Equipment & Recycling Regulations 2006

The Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2011

**APPENDIX 6 – Developers Visual Inspection Checklist**

The following checklist shall, together with an electrical test certificate, be completed for all new sites and forwarded to the Street Lighting Section of the Authority. This is the same checklist which will be employed by the Councils Inspector before adoption is approved.

	Item	Description of Inspection	Comments
1	General	Have the appropriate Risk Assessments been made regarding the installation and removal of street lighting apparatus?	
		Check NRSWA Notices have been issued and closed and that there are no outstanding defaults	
		Have all redundant items of equipment been removed from site	
		Check that operatives carrying out installation works are suitably trained, qualified and experienced for the works they are required to undertake.	
		Check that any site clearance works have been carried out correctly and that the site has been left clean and tidy	
		Check that any reinstatement works which have been carried out are to the required standard	

	Item	Description of Inspection	Tolerances	Column No.										
				1	2	3	4	5	6	7	8	9	10	
2	Design	Is the column height as designed												
		Is the lamp, gear and luminaire as per the design												
		Check the design category is correct for the road/footpath												
		Check the design for compliance with British Standard												
		Check that the minimum and maximum spacings (where applicable) have been complied with.												
		Check that any objects having an adverse influence on the design have been catered for												
		Check lamp lumen output and maintenance factors have been employed in lighting calculations												

	Item	Description of Inspection	Tolerances	Column No.										
				1	2	3	4	5	6	7	8	9	10	
2 cont.	Design	Is the column located in Local Authority owned land or has a Wayleave has been obtained												
		If the lighting is in a conservation area, are the columns, brackets and luminaires suitable for that conservation area												
		Have the lighting columns been designed to accommodate banners, hanging baskets and / or festive illuminations												
		Has the Statutory Undertakers provided details of their plant on-site and has this been made available during construction etc.												
3	Columns and Brackets	Has the column been planted to the correct depth	Manufacturers specification ± 25mm											
		Check for compliance with design	± 500mm longitudinally ± 50mm laterally											

	Item	Description of Inspection	Tolerances	Column No.										
				1	2	3	4	5	6	7	8	9	10	
3 cont.	Columns and Brackets	Check that the correct root protection is evident												
		If access is limited, has a raise / lower column been installed												
		Is the pole upright and plumb?	Spirit level bulb touching line											
		Is the bracket installed as designed?												
		Is the bracket outreach as designed?												
		Is the colour / finish correct and undamaged?	Minor scratches are not through to galvanised layer.											
		Is unit numbered correctly and in the correct manner?	Height $\pm$ 25mm											
		If this is a replacement column, have any existing attachments been transferred to the new column												



	Item	Description of Inspection	Tolerances	Column No.										
				1	2	3	4	5	6	7	8	9	10	
4	Column Doors and Base Compartments	Is the column door in the correct orientation												
		Is the column door flush mounted												
		Does the door fit securely and does the lock operate correctly												
		Check that the correct cabling has been used, that wiring is neat and insulation is maintained up to termination blocks.												
		Check that earth bonding is correctly sized and is securely terminated												
		Check that all components are securely fixed to backboard												
		Check if double pole isolating devices have been fitted												
		Check that correctly rated electrical protection has been installed												

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	Item	Description of Inspection	Tolerances	Column No.																	
				1	2	3	4	5	6	7	8	9	10								
4 cont.	Column Doors and Base Compartments	Check that private supply cables are correctly sized, glanded and identified																			
5	Lanterns	Is luminaire aligned correctly																			
		Is luminaire lens(es) clean and free from blemishes																			
		Is the optic setting as per design																			
		Is the correct switching device fitted and set																			
		Check that the lamp strikes																			
		Does the installation respond to the fitted control device commands																			
6	Signs Supported By or Powered From a Lighting Column	Check that statutory signs have been installed where they need to be																			
		Check that any holes made in the lighting column fabric has been adequately sealed to prevent water ingress.																			
		Check that any wiring to an illuminated sign is independently fused from																			

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		street lighting circuits												
	Item	Description of Inspection	Tolerances	Column No.										
1				2	3	4	5	6	7	8	9	10		
6 cont.	Signs Supported By or Powered From a Lighting Column	Check correct cables, sleeving and wiring has been used, is neat and tidy.												

	Item	Description of Inspection	Tolerances	Column No.											
				1	2	3	4	5	6	7	8	9	10		
6 cont.	Signs Supported By or Powered From a Lighting Column	Check insulation extends to terminals and that terminals are tight													
7	Illuminated Signs and Bollards	Check the signs face type, post locations, orientation and door position are correct.													
		Check the shell type, base is installed to correct depth and that it opens in correct direction.													
8	Feeder Pillars	Check that location agrees with design													
		Check that private supply cables are correctly sized, glanded and identified													
		Check that the correct cabling has been used, that wiring is neat and insulation is maintained up to termination blocks.													
		Check that earth bonding is correctly sized and is securely terminated													

	Item	Description of Inspection	Tolerances	Column No.										
				1	2	3	4	5	6	7	8	9	10	
8 cont.	Feeder Pillars	Check that all components are securely fixed to backboard												
		Check if double pole isolating devices have been fitted												
		Check that correctly rated electrical protection has been installed												
9	Electrical Testing	Check that instruments used to undertake the electrical tests are calibrated.												
		Check that a test certificate is provided, valid and complete												

## **APPENDIX 7 – Designers Submission Checklist**

Extract from Designers Submission Checklist Form (The form is required to be submitted as part of the Lighting Design Submission with the aim of ensuring that the Lighting element in a Design submission meets the required standards for Shropshire Council.

If the following requirements are not Submitted then Shropshire Council will be required to stop the process until the appropriate information has been supplied.

Lighting Submission Requirements :

- 1 Lighting Brief - To explain the description of the scheme and proposed lighting works, a summary of the results and any assumptions or recommendations made plus an approved overview plan of the works extents
- 2 Document Register / Transmittal Form Supplied? - The form should list all the documents and their revisions
- 3 State any departures from standards
- 4 Paper copies of the design proposal documents (If Required/Requested)
- 6 Electronic copy of the project proposals in PDF
- 7 Electronic copy of the scheme proposals in AutoCAD (including any X-ref attachments). - AutoCAD drawing in eTransmit formats so that all attachments are present and auto attach
- 8 An electronic copy of the lighting design calculations in Lighting Reality software
- 9 Specific Lighting Design Risk Assessments
- 10 Existing Lighting Schedule(s) Including Lantern, Column/Bracket, Supply details (if applicable) & Attachment schedule (if applicable)
- 11 Proposed Lighting Schedule(s) Including Lantern, Column/Bracket, Supply details (if applicable) & Attachment schedule (if applicable)
- 12 Private cable Network design information (if applicable)

APPENDIX 8 – Environmental Zones

