

Bracknell Forest Council

Developer Guide

**Street Lighting Specification for works carried out under
Section 38/278 Developments**

Version 12 Sep '24

This guide supersedes paragraph 2.8 of the Bracknell Forest Council 'Highways Guide for Development – Streetscene SPD Annex 1 – April 2011'.

This guide is to take precedence over any discrepancy there may be between this guide and the Bracknell Forest Council Standard Detail drawings.

1 Lighting Design

- 1.1 **All new lamp columns and any agreed existing re-sited columns to be adopted by Bracknell Forest Council must be electrically fed via the DNO (Distribution Network Operators), Scottish and Southern Energies (SSEN) or the IDNO (Independent Distribution Network Operators), Gas Transport Company (GTC) low voltage Mains Network.**
- 1.2 **Any private cable networks that are affected by developer works MUST be agreed and changes approved with the engineer on commencement of the design.**
- 1.3 Highways Street Lighting and electrical design must be carried out by competent street lighting engineering consultant and must be a member of the Institute of Lighting Professionals. A list of approved design consultancies can be found here: <https://lightingjournal.org.uk/directory/> or can be provided upon request.
- 1.4 Lighting levels to be agreed with lighting engineer and must be in accordance with the Code of practice for the design of road lighting BS 5489-1 2013 and BS EN 13201. Design Extents must be agreed with engineer on commencement of the design.
- 1.5 Electrical design for lighting where applicable to be in accordance with BS7671:2018 and revisions thereof.
- 1.6 Residential roads and cul-de-sacs shall be lit to lighting class P4 and reduced from 8pm to P5 for white light/LED lighting proposals. (see dimming table in 5.5)
- 1.7 Residential subsidiary link through roads are to be lit to lighting class P3 and reduced from 8pm to P4 for white light/LED lighting proposals. (see dimming table in 5.5).

Depending on how Major or Minor the subsidiary road is it may be more suitable to light to class P4 and reduced from 8pm to P5 for white light/LED lighting proposals. (see dimming table in 5.5). Dialogue with the LHA Engineer is encouraged if unsure.
- 1.8 Main estate spine roads are to be lit to lighting class P2 and reduced from 8pm to P3 for white light/LED lighting proposals. (see dimming table in 5.5)

Depending on how Major or Minor the Main estate spine road is it may be more suitable to light to class P3 and reduced from 8pm to P4 for white light/LED lighting proposals. (see dimming table in 5.5). Dialogue with the LHA Engineer is encouraged if unsure.
- 1.9 A maintenance factor of 0.83 shall be used for LED lighting calculations.
- 1.10 Scotopic/Photopic ratio for neutral white LEDs are NOT to be used.
- 1.11 As good design practice the designers must achieve the recommended lighting standard with no more than 70-80% light output.
- 1.12 Where columns are located within 6 metres of adjacent property windows internal 'Signify Lighting' rear shields are to be installed as standard. These are to be factory fitted or installed on site by lighting contractor. Type BL1 to be used as standard or Type BL2 in ecologically sensitive areas to be agreed with LHA.

- 1.13 Overhanging vegetation is to be considered and cut back in accordance with Bracknell Forest Council Street Lighting Tree Cutting Diagrams 1-5. Designers are to cover this aspect within their Input Statement/Site Specific Risk Assessment documents. Where Tree Preservation Orders exist, the developer is to seek permission and gain approval from the council before site work commences.
- 1.14 Lighting columns which are older than 10 years of age are to be replaced complete within design extents. The re-use of any existing columns and brackets if proposed shall be agreed with the engineer prior to installation of new lighting equipment. The developer/contractor if intending to re-use existing lighting columns will be required to provide satisfactory structural test certification to confirm suitability for re-use with new proposed equipment. Columns to be reused must be re-numbered by the developer.
- 1.15 Generally all lighting columns are to be installed at the back of footway. When it is not possible to install columns at the back of the footway the below setbacks must be achievable.
- 1.16 The developer/designer is to allow for adequate clearance from the carriageway with minimum setback of 800mm from kerb edge when installing lighting columns on 30mph roads; 1000mm from kerb edge when installing lighting columns on 40mph roads; and 1500mm from kerb edge when installing lighting columns on 50-70mph roads.
- 1.17 If a minimum column setback of 800mm from kerb edge is not achievable and lamp columns must be installed at the front of footway on residential roads a minimum setback distance of 600mm from the kerb edge must be achieved.
- 1.18 Lighting column base compartment doors are to face away from the direction of traffic travelling in the adjacent carriageway. Lamp column orientation on site must allow the electrician carrying out any maintenance works/electrical testing works within the inspection door area to see on-coming traffic approaching on the adjacent lane.
- 1.19 A 900 x 900 x 60 hard standing, must be provided to allow sufficient workspace access for maintenance operatives to safely service lighting columns which are located in shrubbed borders. Columns planted inside shrubbed borders must have suitable access path constructed also so as to access the constructed hard standing area. The access path should be created as to be accessed from the adoptable highway kerb edge.
- 1.20 Developer to provide adequate protection for columns that are installed in vulnerable locations. Bollards or tubular column guards are available and should be agreed with the engineer.
- 1.21 The developer is to use HEA/HERS approved and registered electrical contractors to carry out all electrical installation work. A list of approved electrical contractors is available on request or can be obtained from the <https://thehea.org.uk/>.
- 1.22 If period or decorative columns/luminaires are to be used, the developer shall provide the manufacturers specification for approval. Where decorative columns are used the Bracknell Forest Council engineer may impose additional conditions that may or may not be identified in this specification.
- 1.23 Where non-standard equipment is approved the developer shall supply Bracknell Forest Council, at no cost, spare equipment e.g. Lantern, bracket, column etc. The quantity to be supplied shall be 10% (rounded up) of that installed or 1 number if fewer than 10 are installed. A commuted sum for bespoke street lighting and electrical equipment may also be requested to be agreed with Bracknell Forest Council.
- 1.24 All illuminated bollards, illuminated signs and centre-island posts must be fed via a private cable network (Steel wired-armoured cable) from an adjacent lamp column or feeder pillar for traffic islands

- 1.25 The developer is responsible for ensuring that any surrounding high/low level trees and or vegetation, private or otherwise near proposed/installed lighting columns is sufficiently cut back/lopped etc to allow for suitable illumination of the highway in accordance with the approved lighting design. Refer to Bracknell Forest Council Street Lighting Tree Cutting Diagrams 1-5.
- 1.26 The developer is responsible for resolving and agreeing any cutting back/removal or modification of trees subject to TPO within design extents prior to the installation of lighting columns to ensure lighting provided is fit for purpose prior to hand over site to LHA.
- 1.27 The developer is to ensure that installation of all utility apparatus is installed as per recommendations shown in current NJUG Guidelines Streetworks UK.

2 Lighting Columns

- 2.1 Columns generally are to be 5m or 8m height hot dip galvanised steel. Before leaving the factory an internal and external coating is to be applied on the part of the column intended to enter the ground and for 150mm above the ground level with heavy grade black bituminous solution or other approved coating. Lighting columns are to be galvanised in accordance with BS EN ISO 1461:2009.
- 2.2 The use 6m & 10m height columns may offer a more economical and suitable long-term design solution in some cases; however this must be agreed with the engineer.
- 2.3 In general the following columns are considered to be 'standard' specification columns:
- 2.4 BE EN 40-5 2002 compliant 5m columns to be galvanised steel CU Phosco, Valmont Stainton or similar parallel sided column with 76mm shaft and spigot for post top luminaire.
- 2.5 BS EN 40-5 2002 compliant 5m Raise and Lower base hinged Galvanised steel Abacus or similar lighting column 76mm shaft and spigot for post top luminaire.
- 2.6 BE EN 40-5 2002 compliant 8m columns to be galvanised steel CU Phosco, Valmont Stainton or similar parallel sided column with 89mm shaft for use with separate bracket for side entry or adaptor for post top luminaire.
- 2.7 Columns proposed on minor Side roads/Cul-de-sacs are to be galvanised steel 5m columns with post top mounted luminaires mounted.
- 2.8 Columns proposed on main estate spine roads are to be galvanised steel 8m columns with post top mounted luminaires.
- 2.9 The design of any column that is to receive an attached road sign greater than 0.3m² is to be referred to the BFC engineer for consideration of an increase in steel gauge heavier duty columns.
- 2.10 Columns proposed on Footpaths/cycle-ways with limited/restricted MEWP access are to be 5m base hinged raise and lower columns with post top mounted luminaires.
- 2.11 The use passively safe columns and final specification of lighting columns is to be agreed with the engineer. When passively safe columns are proposed columns generally are to be ALC Aluminium Lighting Company conical columns for post top mounting or similar approved to BS EN 40-6 2002. Columns to have trimmer protection when used in grass verges.
- 2.12 All columns shall be fitted with M8 x 30mm brass earth studs, threaded the whole length, with two plain washers and two nuts within the base compartment and that are easily accessible.

Column doors shall be provided with an internal lug to enable earthing of the column door with an M8 brass earth stud.

2.13 Column doors and hinges are to have a thin coat of graphite grease applied to all moving parts.

2.14 The base compartment openings of columns are to be as follows:

- 500 x 100mm for 5 and 6 metre columns
- 600 x 115mm for 8, 10 and 12 metre columns

All columns to have a cable entry slot 75mm x 150mm with the top of the slot 350mm below ground level.

Generally, for 5m standard galvanised steel columns there is a 300mm distance between Ground Level and the bottom of the column base compartment aperture. The developer is to refer to column manufacturers standard details to ensure installation is in accordance.

In general columns shall have a root planting depth as listed in Clause 5 of Part 2 of BS 5649 and manufacturers detail as follows:

5 metre column	800mm planting depth
6 metre column	1000mm planting depth
8 metre column	1200mm planting depth
10 metre column	1500mm planting depth
12 metre column	1700mm planting depth

An appropriate Ground Factor G should be taken from the table below:

G (kN/m²)	Quality of Soil
630	Good: Compact, well graded sand and gravel, hard clay, well-graded fine and coarse sand, decomposed granite rock and soil. Good soils drain well.
390	Average: Compact fine sand, medium clay, compact well drained sandy loam, loose coarse sand and gravel. Average soils drain sufficiently well that water does not stand on the surface.
230	Poor: Soft clay, clay loam, poorly compacted sand, clays containing a large amount of silt and vegetable matter, and made up ground. Poor soils are normally wet and have poor drainage.

Backfilling

- i. All back-filling material is to be placed in 150mm thick layers and well compacted.
- ii. During compaction, care is to be taken to ensure that the corrosion protection system of the lighting column is not damaged.
- iii. Where in verge or landscape area, the concrete back-fill is to extend from the base of the lighting column to 150mm below final ground level and brought up to ground level with topsoil.
- iv. Where paving or bituminous surfacing is to be applied around the lighting column, the top level of the concrete is to be brought up to the underside of the surfacing.
- v. The top surface of the concrete back-fill is to have a 10mm camber from the column base to the edges of the concrete.
- vi. A duct with the same dimensions as the lighting columns cable entry slot is to be formed in the concrete using a suitable preformed lining tube.

Unless agreed otherwise all columns shall be designed for the following conditions:

- i. Mean hourly wind speed Vref of 20m/s.

- ii. Site altitude of 250 metres.
- iii. Terrain category III for columns less than 8m height.
- iv. Terrain category II for columns 8m and above in height.
- v. Topography factor f , shall be 1
- vi. A partial safety factor load factor shall be class B, wind load of 1.2 and dead load of 1.2
- vii. The maximum horizontal deflection of a lantern connection shall be class 3 as per table 4 BS EN 40-3-1 2013

3 Column Numbering

- 3.1 All column numbers shall be installed at 1800mm height from ground level and be stencil painted on or printed on a reflectorized 3M or similar self-adhesive label with black coloured character on a white background. The column numbering will be specified by the BFC engineer.
- 3.2 Numbers on columns located on residential subsidiary roads/cul-de-sacs/footpath shall have a character height of 50mm.
- 3.3 Numbers on columns located on main traffic routes (A, B and C roads) other than those located on dual carriageways shall have a character height of 75mm.
- 3.4 Numbers on columns located on dual carriageways shall have a character size of 100mm. Where lighting is installed in central reservations then the numbering must be installed on both sides of the street lighting column so that the column number is clearly visible from both directions of travel on the carriageway.

4 Luminaires and Brackets

- 4.1 On side roads, cul-de-sacs footpaths/cycle-ways luminaires are to be Philips Micro Luma LED neutral white LED 4000k. (See table for permitted optical settings)
- 4.2 On secondary subsidiary through roads and main estate spine roads luminaires are to be Philips Mini Luma LED neutral white LED 4000k. (See table for permitted optical settings)
- 4.3 Luminaires are to be generally post top mounted with zero degrees inclination to the horizontal. Luminaires to have luminaire intensity class of no less than G3.
- 4.4 Luminaires to be finished in Futura Gris 900 Sable (Dark Grey).
- 4.5 A reflectorised 'Luminaire Type' label is to be fitted to the underside of the lantern body. See 5.3/5.4 below.
- 4.6 Luminaire type QR code service tag identity labels are to be installed clearly visible on column backboard and on inside/back of column door. These are provided within the Signify Lighting packaging/box.



- 4.7 Luminaires to have Philips Xitanium DALI dimmable electronic driver.
- 4.8 Luminaires to be fitted with either Royce Thompson Oasis 1000 70 lux photocell or Telensa Telecell as agreed with the LHA. All luminaires must be fitted with a 7pin NEMA socket as standard to allow for Telensa Telecell compatibility.
- 4.9 In some cases a bracket projection and a maximum of 5° tilt may provide a more economical and better long-term design solution. In these cases the following bracket projections lengths will apply however must be agreed with the LHA.
 - 5 & 6m columns – Post Top - 0.7m outreach bracket projection
 - 8m columns – Up to a maximum of 1m outreach bracket projection
 - 10m & 12m columns – Up to a maximum of 1.5m outreach bracket projection
- 4.10 When discharge lamps are fitted to the luminaires, the date the lamp is fitted shall be stamped or written in indelible ink on the lamp cap.

5 LHA Approved Luminaires & Dimming Profiles

- 5.1 The below table shows a definitive list of the current lighting units which are approved to use on the Bracknell Forest Councils Highway Network.
- 5.2 Luminaire lighting photometry files are available on request from LHA.
- 5.3 A waterproof reflectorised 3M or other label to be fitted – fix a suitably long-life label to the underside of each luminaire showing the label code as defined in the luminaire choice table below. The label should be 50mm x 80mm indicating luminaire type designation **A**, **B** **C** etc.

Where luminaires are installed with internal shields (BL1/BL2) the labels are to contain an Asterisk suffix after the luminaire type designation i.e. **A***, **B***, **C*** etc



Roadway Lighting

Luminaire Type/Model	Photometry File	Elexon Code	Driver Wattage	Luminaire Wattage
Type A Luma Gen2 Micro BGP702 6000lm, 20LED, NW 4000K	A - Luma Gen2 Micro_BGP702_DN11_6000_20LED 5.2S_CLO_L90_740.ies	42 0035 0000 100	40	35
Type B Luma Gen2 Mini BGP703 12.000lm, 40LED, NW 4000K	B - Luma Gen2 Mini_BGP703_DN11_12000_40LED 5.2S_CLO_L90_740.ies	42 0067 0000 100	100	67
Type C Luma Gen2 Medium BGP704 21.000lm, 80LED, NW 4000K	C - Luma Gen2 Medium_BGP704_DN11_21000_80 LED 5.2S_CLO_L90_740.ies	42 0116 0000 100	150	116
Type D Luma Gen2 Micro BGP702 6000lm, 20LED, NW 4000K	D - Luma Gen2 Micro_BGP702_DM10_6000_20LE D 5.2S_CLO_L90_740.ies	42 0035 0000 100	40	35
Type E Luma Gen2 Mini BGP703 12.000lm, 40LED, NW 4000K	E - Luma Gen2 Mini_BGP703_DM10_12000_40LED 5.2S_CLO_L90_740.ies	42 0067 0000 100	100	67
Type F Luma Gen2 Medium BGP704 21.000lm, 80LED, NW 4000K	F - Luma Gen2 Medium_BGP704_DM10_21000_80 LED 5.2S_CLO_L90_740.ies	42 0116 0000 100	150	116
Type G Luma Gen2 Micro BGP702 6000lm, 20LED, NW 4000K	G - Luma Gen2 Micro_BGP702_DX10_6000_20LED 5.2S_CLO_L90_740.ies	42 0035 0000 100	40	35
Type H Luma Gen2 Mini BGP703 12.000lm, 40LED, NW 4000K	H - Luma Gen2 Mini_BGP703_DX10_12000_40LED 5.2S_CLO_L90_740.ies	42 0067 0000 100	100	67
Type I Luma Gen2 Medium BGP704 21.000lm, 80LED, NW 4000K	I - Luma Gen2 Medium_BGP704_DX10_21000_80 LED 5.2S_CLO_L90_740.ies	42 0116 0000 100	150	116
Type P Luma Gen2 Micro BGP702 2000lm, 20LED, NW 4000K	P - Luma Gen2 Micro_BGP702_DM10_2000_20LE D 5.2S_CLO_L90_740.ies	42 0012 0000 100	40	12
Type Q Luma Gen2 Micro BGP702 4000lm, 20LED, NW 4000K	Q - Luma Gen2 Micro_BGP702_DM10_4000_20LE D 5.2S_CLO_L90_740.ies	42 0023 0000 100	40	23
Type R Luma Gen2 Micro BGP702 2000lm, 20LED, NW 4000K	R - Luma Gen2 Micro_BGP702_DN11_2000_20LED 5.2S_CLO_L90_740.ies	42 0012 0000 100	40	12

Type S Luma Gen2 Micro BGP702 4000lm, 20LED, NW 4000K	S - Luma Gen2 Micro_BGP702_DN11_4000_20LED_5.2S_CLO_L90_740.ies	42 0023 0000 100	40	23
Type T Luma Gen2 Micro BGP702 2000lm, 20LED, NW 4000K	T - Luma Gen2 Micro_BGP702_DX10_2000_20LED_5.2S_CLO_L90_740.ies	42 0012 0000 100	40	12
Type U Luma Gen2 Micro BGP702 4000lm, 20LED, NW 4000K	U - Luma Gen2 Micro_BGP702_DX10_4000_20LED_5.2S_CLO_L90_740.ies	42 0023 0000 100	40	24

Road Crossing Lighting

Type X Luma Gen2 Mini BGP703 DPL1, 6000lm, CW 5700K	Luma Gen2 Mini_BGP703_DPL1_6000_40LED_5.2S_CLO_L90_757.ies	42 0035 0000 100	40	35
Type Y Luma Gen2 Mini BGP703 DPL1, 9000lm, CW 5700K	Luma Gen2 Mini_BGP703_DPL1_9000_40LED_5.2S_CLO_L90_757.ies	42 0049 0000 100	100	49
Type Z Luma Gen2 Mini BGP703 DPL1, 12.000lm, CW 5700K	Luma Gen2 Mini_BGP703_DPL1_12000_40LED_5.2S_CLO_L90_757.ies	42 0067 0000 100	100	67

The above approved list of luminaires is subject to change designers to confirm and verify with LHA prior to carrying out lighting design calculations.

Additional photometry files are available for internal rear shielded lanterns from approved luminaire list which utilise Type BL1/BL2.

- 5.4 Lighting designers to assign one of the following dimming profiles when carrying out lighting calculations. (See table below)

Time Programme	06:00-20:00	20:00	22:00	05:00	06:00
C1 100	100%	70%	50%	70%	100%
C2 90	90%	63%	45%	63%	90%
C3 80	80%	56%	40%	56%	80%
C4 70	70%	49%	35%	49%	70%
C5 60	60%	42%	30%	42%	60%

6 Telensa Central Management System

- 6.1 All new proposed luminaires are to be switch controlled via the Telensa central management system.
- 6.2 The developer/designer is to allow for additional communication relays or base stations as required to ensure strong connectivity to the Telensa central management system.
- 6.3 The developer is to check and confirm with the LHA engineer where relays or base stations are to be installed to ensure optimum coverage.
- 6.4 For each Telensa Telecell installed the developer must provide waterproof node number labels as follows:
 - 1no is to be installed in a clearly visible position inside column base compartment on isolator.

- 1no is to be factory fitted to underneath of Telensa telecell.
- 1no is to be installed inside luminaire canopy away from control gear.
- A full size scaled paper plan is to be provided to the LHA engineer with node number labels stuck next to corresponding lighting column symbol positions. Hand written plans are not acceptable.



7 Feeder Pillars

- 7.1 Feeder Pillars are to be constructed from 3mm mild steel plate hot dipped galvanised to BSEN ISO 1461.
- 7.2 Feeder Pillars to have root treated with bituminous paint internally and externally.
- 7.3 Have an earth bond from the pillar door to the pillar. 6mm brass earth stud on pillar and door with 500mm earth strap.
- 7.4 Feeder pillars are to have a thin coat of graphite grease applied to all moving parts. (Hinges and Locks etc)
- 7.5 The backboard is to be fully treated 12mm or 18mm marine grade plywood non-hygroscopic depending on feeder pillar size.
- 7.6 Feeder Pillars must be sited to suit the design of the system and will normally be erected at the back of the footway, cycleway or highway verge. A minimum of 2.5m from the face of kerb is required wherever practicable.
- 7.7 A hard standing of concrete paving slabs is required in front of feeder pillar doors in verges.
- 7.8 Anti-Vandal tri-head locks to be fitted as standard
- 7.9 Where possible all feeder pillar outgoing lighting cables must be laid in 50 or 100mm diameter MDPE orange duct and must be clearly labelled street lighting white lettering at 9mm text height at no more than 1m intervals.
- 7.10 100mm diameter black MDPE duct to be provided in feeder pillar for incoming DNO supply.
- 7.11 Feeder pillar numbering is to be agreed with the LHA engineer

- 7.12 A laminated circuit schematic showing all outgoing circuits controlled via the feeder pillar must be affixed to the door sleeve.
- 7.13 There are to be 3 no labels to be fixed to the front of the feeder pillar as follows:
- "Street Lighting" – 50mm high black text on white background
 - Electrical hazard sign with "Danger 240V" sub plate. The sign is to be not less than 150mm x 200mm. Hazard warning labels to BS5378.
 - Feeder Pillar No to be agreed with LHA engineer – 75mm high black text on white background.

8 Secondary Isolation and Cabling

- 8.1 A Charles Endirect or similar type approved BS EN 60947-3 compliant lockable secondary isolation unit complete with 32A rated AC22B double pole switch disconnector incorporating BS88 Part 2 fuse and carrier shall be used.
- 8.2 Fuse discrimination must be achieved for all outgoing spur circuits.
- 8.3 Where applicable incoming and outgoing private supply SWA cables to signs and bollards etc are to be terminated into secondary isolator. Standard brass compression glands to BS6121 suitable for SWA cable complete with brass lock nut and PVC shroud are to be used.
- 8.4 Where applicable outgoing spur circuits are to be clearly labelled using critchley machine or similar labels. Details of supply origin and outgoing feeds are to be marked on isolator. Hand written labels are not acceptable.
- 8.5 Flexible internal wiring between terminal block in the lantern and the components in the base of the column shall be PVC insulated and sheathed cable of 300/500 volt grade and have a copper conductor size of no less than 2.5mm².
- 8.6 A double pinch 4 way solid brass earth block is to be installed on column backboard.
- 8.7 All column earth bolts and blocks are to have label securely fixed to say "Safety Electrical Connection – Do Not Remove".
- 8.8 For double arm columns incorporate two fuses, one per luminaire, and a common neutral block.
- 8.9 Where approved cable to a two part photo electric cell unit is to be 1.5mm² 2 core flat cable with white sheath.
- 8.10 Fuse ratings for final circuits

Circuit	Fuse Rating
Cutouts for signs and bollards	4A
Mains Cutouts for road lighting columns	10A
External sub-circuits	6A*
Cutouts in columns with internal sub-circuit	6A
Cutout in columns with external sub-circuit	10A*
Secondary isolator controlling lantern on column 8-12m columns	6A*
Secondary isolator controlling lantern on column 5-6m columns	4A*

* Fuse ratings give are minimum values and for guidance only. Fuse ratings selected shall suitable for the load and shall be in accordance with BS7671.

9 Bollards

- 9.1 Bollards are to be internally illuminated or non-illuminated Glasdon Signmaster White LED base lit with side patches to be confirmed by the LHA.
- 9.2 Internally illuminated bollards are to be fed from nearest adjacent lighting column from fused spare way.
- 9.3 All bollards are to be fed via a 6mm² 3 core SWA cable to be installed in 50-100mm orange MDPE street lighting ducting.
- 9.4 Bollard numbering is to be agreed with the LHA engineer. The numbering should have 50mm character height black text on white background printed on a reflectorized 3M or similar self-adhesive label.
- 9.5 Bollards to have a 230V ac supply connected within Signmaster LED Sublite. Light box installation to include light box chamber to house cut-out and flexible ducting connection.
- 9.6 Internally illuminated bollards to be installed onto sub base using 4no standard Glasdon bolt down fixings. Fixing centres are to be 228 x 228mm.
- 9.7 Non-illuminated they are to be set in concrete using Glasdon Bolt down fixing with concrete-in anchors or adjustable depth concrete-in anchors.
- 9.8 The reflective sign/patches to Avery Dennison Yellow and translucent white in colour. All retroreflective materials are to be in accordance with BS EN 12899-1:2007 Fixed Vertical Signs.
- 9.9 Sign faces are to be 300mm in diameter.

10 Externally Illuminated Sign Units

- 10.1 For illuminated signs up to 600 x 600mm 6W Simmons signs LED LUA light units are to be installed as standard.
- 10.2 For illuminated signs up to 1500 x 1500mm 14W Simmons signs LED LUB light units are to be installed as standard.
- 10.3 Externally illuminated sign units to have a 70/35 lux mini cell as standard.
- 10.4 Externally illuminated sign unit to have a minimum IP54 rating.

11 Developer Electrical/Lighting Design Submission Requirements

- 11.1 Lighting designer Input Statement document outlining what the proposed lighting levels in relation to the proposed S38/S278 developer works.
- 11.2 Lighting designers risk assessment and any relevant method statements as required.
- 11.3 Series 1300 proposed lighting design drawing (PDF and AutoCad 2010). The luminaire elxon charge codes and light switching arrangement are to clearly noted on the drawing. The proposed columns and luminaire specification is to be shown on the drawing.
- 11.4 Series 1400 proposed electrical design drawing (PDF and AutoCad 2010). Cable and ducting arrangements to be clearly shown on drawing. A separate cable schematic drawing is to be provided when proposing private cable networks and feeder pillars.

- 11.5 Provide lighting design calculations (pdf and raw lighting design file in Lighting Reality, Calculux etc).
- 11.6 Proposed lighting column schedule showing type of connection, lighting column height, luminaire specification, wattage, column position etc. A sample schedule is available upon request from LHA.
- 11.7 Proposed sign and bollard schedule(s).
- 11.8 If proposing any private supply networks an electrical cable schematic and associated electrical cable calculation must also be provided.
- 11.9 The developer is to provide a full scaled paper plan with as installed node numbering labels stuck next to corresponding lighting column symbol positions. Hand written plans are not acceptable.
- 11.10 Series 1300 Street Lighting and 1400 Electrical AS BUILT drawings are to be provided by the developer to the LHA. The as built drawings provided shall clearly show the position of all the street lighting equipment, cabinets, cables, draw pits, ducts and the like as actually installed, together with all telephone cables and communication cables including cable sizes, and route, that cross or run within 5m of a street lighting cable or duct.
- i. The locations of all buried and ducted cables shall be clearly shown by dimensions from fixed reference points at 20 metre intervals.
 - ii. Where the line of a cable changes direction, the location of the change shall be recorded both transversely from the kerb or fence line, and from fixed reference points along the carriageway.
 - iii. The location of cable ducts shall be shown by dimensions from fixed reference points on both sides of the carriageway, depth of cover on both sides of the carriageway and the length of any under kerbs.
 - iv. The contractor shall make records of ducts installed during the Contract and ducts that are re-used or exposed as part of the works.
- 11.11 The developer must provide electrical test certificates to the LHA prior to adoption of the street lighting and electrical equipment.
- i. Visual Inspection – To verify that the electrical equipment has been correctly installed in accordance with the design with correctly rated protection devices and bonding and that no visible damage exists.
 - ii. Continuity – Every protective conductor, including bonding, shall be tested to verify that it is electrically sound.
 - iii. Insulation Resistance – The insulation resistance should be measured between all the conductors and the conductors to earth with test voltage of 500 volts. The insulation resistance should not be less than 0.5 MΩ
 - iv. Polarity – A polarity test should be made and a check to verify that the protective devices are connected correctly and fuses in the phase conductor only.
 - v. Earth fault loop impedance – Measurements should be taken at the point of supply and, where underground cables have been installed, at the most distant point of each circuit. The values should be in accordance with those shown in BS 7671 to ensure circuit protective device will function within 5 seconds.
 - vi. Earth Electrode Resistance – Tested in accordance with BS 7430:2011 and BS 7671.
 - vii. Voltage Drop – Measured at the furthest point from the supply under full load conditions.

viii. Operation of Residual Circuit Device (where applicable) – Verify by a test simulating appropriate fault condition independent of any test facility incorporated in the device. The device shall be tested at 50% and 100% of its rated trip current.

11.12 Structural test certificates and lighting column data sheets (Manufacturer column design and check sheets for each column type used) where required are to be provided to the LHA prior to adoption of the lighting columns.

11.13 Lighting and Electrical equipment Warranties.

11.14 Lighting designers are to include on the proposed lighting design drawing or separately a current landscape topo with accompanied notes to indicate how trees are proposed to be cut back to ensure that lighting levels and ongoing electrical maintenance is not compromised as a result of any overhanging vegetation or low-level shrubs. Refer to Bracknell Forest Council Street Lighting Tree Cutting Diagrams 1-5.