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21/08/2022

Our Ref: SSE296001-SL-001-G

Dear Patricia Nicklen,

Lighting Design – Horton Heath Segment 3

Thank you for your scheme enquiry for the Horton Heath Segment 3.

We have undertaken a lighting design for the area using Urbis Schröder Axia 3 lanterns on 8 and 6 metre post top columns. Lighting has been designed in accordance with BS5489-01:2020, and a lighting classes of C3, P2, P3 and P4 have been applied.

Following the completed design work if there are changes to the road layouts which require design revisions these may incur further charges.

Yours sincerely,

A black rectangular box used to redact the signature of James Duffin.

James Duffin BA (Hons) IEng MILP
Lighting Designer

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Design Commentary Horton Heath Segment 3

Drawings

Drawing at 1:500 scale.

General Layout

Section 38 lighting design covering the section of road between the 2 roundabouts of Segments 1 and 2 (Burnetts Lane, Segment 1 and Allington Lane, Segment 2), and new link road with new residential and commercial developments adjacent.

Street Lighting Class

The lighting design has been carried out in accordance with the requirements of BS5489-01:2020, Table A.1, Table A.3, Table A.5.

The lighting design has been carried out in accordance with the requirements of BS5489-01:2013. Lighting classes selected after consultation with HCC in February 2019. Environmental Zone E2/E3.

	Distributor Road	Distributor Road Footpaths	Estate Access Road	Minor Side Roads
Reference Table	A3 & A.1	A.6	A.5 & A.1	A.5
Environmental Zone	E2/E3	E2/E3	E2/E3	E2/E3
Traffic flow	Busy	Busy	Busy	Quiet
Traffic composition	Mixed	Cyclists and Pedestrians	Mixed	Pedestrians & cyclists
Road Speed	30 mph	N/A	30 mph	N/A
Other Considerations	Distributor road linking Allington Lane in the west to Burnetts Lane roundabout in the east	Shared cycle/footway, very close to residential developments	Proposed community centre, health centre, convenience store, commercial properties	None
Lighting Class	M4 to comparable P2, conflict areas to C3 (PLG02)	P4 (25% Uo on the eastern side due to Uo due to cyclists)	C3 (PLG02) at junction to match distributor road	P4 (25% Uo due to cyclists)

Where footpaths are separated from the carriageway by a narrow verge the backlight from the road lighting illuminates the footway and achieves greater than P4 lighting levels and achieves one class higher P3. It is not possible to reduce this to a compliant P4 without compromising the carriageway lighting.

Standard lighting levels			
	Eav (lux)	Eav Max (lux)	Emin (lux)
P4	5.00	7.50	1.00
P3	7.50	11.25	1.50
P2	10.00	15.00	2.00

Lighting Class	Average Illuminance, <i>Eave</i> (Lux)	Overall Uniformity, <i>Uo</i> (%)
C4	10.00	40
C3	15.00	40

The P2 section has been calculated with Threshold Increment (TI) in line with EN13201-2:2015 Annex C. TI has not been calculated for the C3 section due to irregular arrangements, and G1-G3 optics chosen to control.

Only the junction adjacent to proposed column 12 is considered a conflict area, due to the additional traffic expected as this is a route both into the adjacent residential parcel but also to a school, local centre and further residential areas. Additionally, the junction has been provided with a filter lane too, demonstrating its expected higher traffic levels.

SSE296001-AC-001-G grids 3, 9 it has not been possible to achieve 25% *Uo* on this footpath, due to minimising light intrusion onto adjacent dwellings, avoiding driveways and aiming to place columns on boundaries. At least 20% uniformity is achieved on both.

SSE296001-AC-002-G grid 4 is at the junction to a small later residential & commercial parcel (Chalcroft Farm consisting of 295 homes and small commercial centre expected 2029). As this isn't a large parcel and the road wouldn't be a through route and that the eastern side will remain open country side the lighting class has not been increased to C3 and proposed to be an equivalent conflict class of C4 as per Table A.1. Given the environmental sensitivity at the site increasing the C3 with open country side to the east was deemed inappropriate and higher uniformity the best way to light the junction.

SSE296001-AC-002-G grids 9, 10, 12 it has not been possible to achieve 25% *Uo* on this footpath, due to minimising light intrusion onto the restrictions on lighting the watercourse under and around the southern bridge. At least 20% uniformity is achieved on all three.

SSE296001-AC-002-G grids 15, 16, 17, 18 show light levels in the environmentally sensitive areas under and around the Southern Bridge and Foxholes Wood Bridge.

SSE296001-AC-003-G grids 7, 11 it has not been possible to achieve 25% *Uo* on this footpath, due to minimising light intrusion onto the restrictions on lighting the watercourse under and around the Quobleight Brook Bridge. At least 20% uniformity is achieved on both.

SSE296001-AC-002-G grids 9,10 show light levels in the environmentally sensitive areas under and around the Quobleigh Brook Bridge.

1 lux and 5 lux isolux contours have been shown on the lighting drawing in the immediate vicinity of the crossings to demonstrate compliance with the restrictions put in place by "Technical Note OHH Street Lighting and Ecology July22.pdf. These contours are limited to directly adjacent the bridges to avoid them cluttering the drawing in other areas where they are not required.

Maintenance factor

Environmental maintenance factor assuming a 48-month clean is 0.94.

Luminaire maintenance is 0.9 (this considers lumen depreciation and LED failures, L90B10).

Giving overall maintenance factors of 0.85 (as per HCC TG13).

Column Locations

Columns are to be installed either rear of footpath or rear of verge. Where verges are at least 1 metre wide columns are to be installed rear of verge. Any deviation from rear of path or verge are noted on the drawing.

Where columns are at the top of slopes level ground must be expanded to give 1 metre of level ground around each column to allow for sufficient ground to support the columns foundation.

It has not been possible to setback columns 0.5m from cycleways in line with TG13 and TR23 due to proximities of properties and extents of highway boundary. To mitigate this, columns placed on cycleways are to be fitted with 150mm deep white self-adhesive retro reflective band to BS EN12899 Class RA1, applied between 1.4m & 1.6m above ground to increase night time visibility for cyclists.

Where proposed columns are within the proximity zone of existing overhead high voltage lines, they should not be installed prior to them being diverted underground, the route of the diversion was not available at the time of the design.

Column Type

Columns to be 8 and 6 metre galvanized tubular steel straight shaft (no outreach bracket), Abcite coated, colour 12B21, Mineral Green.

Raise and lower columns are to be installed on footpaths and are to be of the mid hinge type.

All raise and lower columns and any 8m columns adjacent to cycleways are to be fitted with 150mm deep white self-adhesive retro reflective band to BS EN12899 Class RA1, applied between 1.4m & 1.6m above ground to increase night time visibility for cyclists.

Lantern Type

Urbis Axia 3 with DALI dimming ballast fitted with Mayflower six pin NEMA socket, post-top mounted, tilt 0 degree.

Lanterns to be finished in 12B21 (mineral green).

Every lighting scheme is required to install one Mayflower Complete Lighting Control DALI Sub-master unit to control Nodes and link to Central Management System.

Light Intrusion

Back louvres have been fitted to minimise light intrusion, however this has not been possible in all locations, as it would compromise lighting levels on the road. Light intrusion above 2 lux has been calculated in the following locations:

Calculation	Grid	Reason
SSE296001-AC-001-G	5	Due to proximity of the proposed dwellings to the footpath (<2m) & being unable to fit back louvre without compromising lighting levels on road and footpath.
SSE296001-AC-001-G	7	Due to proximity of the proposed dwellings to the road without compromising lighting levels on road and footpath. Louvres fitted to minimise light intrusion.
SSE296001-AC-001-G	13	Due to proximity of the proposed dwellings to the road without compromising lighting levels on road and footpath. Louvres fitted to minimise light intrusion.
SSE296001-AC-001-G	15	Due to proximity of the proposed dwellings to the road without compromising lighting levels on road and footpath. Louvres fitted to minimise light intrusion.

Overhead High Voltage Lines

The site is crossed by overhead high voltage lines (O/H HV) at 4 locations. The columns within the proximity zone and must not be installed prior to the O/H HV lines being diverted.

Nearest Columns	Voltage
16, 18, 19, 20, 22 Distributor Road 1 Minor Side Road	11kV
28, 29, 30 Distributor Road	11kV
60, 61, 62, 63, 64 Distributor Road	33kV
90 Distributor Road	11kV