



South Wokingham Distributor Road - Spine Road and Western Gateway Phase 1

Road Lighting Technical Note

WMHP-TG-SRWG1-RP-HI-1301

Revision: P01

Date: 31/01/2020

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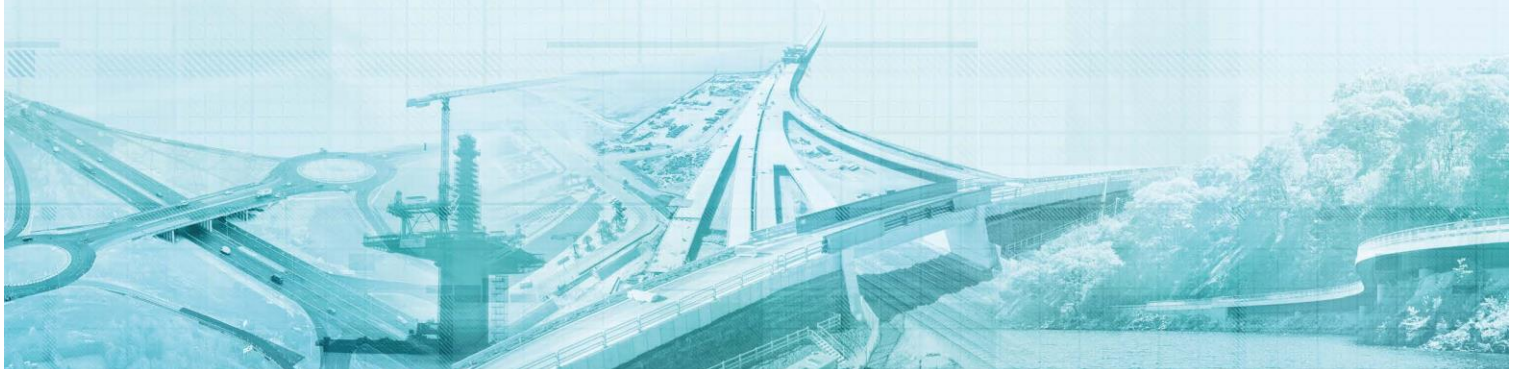
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1. Lighting Design

1.1. Design Considerations

- 1.1.1. Road Lighting is to be designed in accordance with the requirements of BS 5489-1:2013, BS EN 13201-2 and TD34/07 as well as local design guides, Street Lighting - Design Process, Requirements and Specification Guide - V2 (November 2013) and the Street Lighting - Design Process, Requirements and Specification Guide - Addendum V2 (February 2019) and their appendices.

The extent of conflict areas will be designed as defined in the Institution of Lighting Professionals publication 'The Application of Conflict Areas on the Highway'.

- 1.1.2. Special consideration will be made for ecology based on the findings of documents; 70032441 – Bat Survey Report and the Environmental Statement Volume 1: Ecology which propose the following mitigation measures:

- “Use narrow spectrum light sources where possible to lower the range of species affected by lighting, specifically avoiding shorter wave length blue light, using instead warm/neutral colour temperature 2,700 (ideally) kelvin lighting (BCT, 2018).”
- “A sensitive lighting scheme will be designed to avoid disturbance impacts on bats.”

It has therefore been proposed to use DW Windsor luminaires with warm light (3000k) for consistency with approved proposals as on the neighbouring Eastern Gateway scheme, and not Philips luminaires as stated in the WBC local design guides.

- 1.1.3. The scheme will be considered to be environmental Zone E3, suburban location, in accordance with Institution of Lighting Professionals publication 'Guidance Notes for the Reduction of Obtrusive Light GN01'.
- 1.1.4. Calculations assume a road surface CIE type C2 with an average luminance coefficient of $Q_0 = 0.07$, BS 5489-1:2013 7.1.2.
- 1.1.5. Lighting columns are to be located in the verge, set-back 1m from the kerb line.
- 1.1.6. Column heights will be 8m on the main distributor road and southern link, and 6m on adjoining residential roads in accordance with Street Lighting - Design Process, Requirements and Specification Guide - V2 (November 2013) – Appendix A, Table 1.
- 1.1.7. Lanterns are to be post top mounted unless stated otherwise on the drawings/schedule.

1.2. Selection of Lighting Classes

1.2.1. Lighting Class For Traffic Routes

The lighting class for traffic routes has been selected as luminance class M4 in accordance with BS 5489-1:2013 Table A.3 where low to moderate traffic flow is defined as having ADT of between 7,000 – 40,000 or where the flow is between 15% and 45%. The table is presented in Figure 1 below.

Table A.3 Lighting classes for traffic routes ($v \leq 40$ mph)

Traffic flow	Lighting class		
	Dual carriageway		Single carriageway
	Junction density: high	Junction density: low	
High to very high ^{A)}	ME3b or M3	ME4a or M4	ME3b or M3
Low to moderate ^{B)}	ME4a or M4	ME5 or M5	ME4a or M4
Very low ^{C)}	ME5 or M5	ME6 or M6	ME5 or M5

Figure 1: BS 5489-1:2013 Table A.3

The traffic route is then assessed against the criteria set out in BS 5489-1:2013 A.3.1.3 to determine any requirement for deviation from the selected lighting class.

Table 1: BS 5489-1:2013 Risk Assessment

Criteria	Definition	Evaluation
Traffic Composition	Where the traffic consists of a high percentage of slow-moving vehicles, cyclists and pedestrians, it might be beneficial to increase the lighting level.	Cyclists and Pedestrians are to be provided with a separate facility away from the traffic route.
Parked vehicles, bus stops and pedestrian crossings	Where there are bus stops, frequent parked vehicles or pedestrian crossings, the driving task becomes more complex and a higher lighting level might be justified.	There is no anticipation for vehicles to be parked frequently along the scheme. Although crossing points and bus stops will be located along the traffic route, the majority of crossing points will be located within the vicinity of junctions where a higher lighting class will be defined. Location of bus stops, and frequency/number of service is yet to be fully defined.
Ambient luminance or environmental zone	Table A.3 assumes a moderate ambient luminance. If the ambient luminance is high or very high, a higher lighting class might be justified; conversely if the ambient luminance is low or very low then a lower lighting level might be justified.	Ambient light is anticipated to be moderate due to being a suburban location with proposed developments to the north and south of the scheme.

Criteria	Definition	Evaluation
Visual guidance/ traffic control	Table A.3 assumes good visual guidance. If visual guidance is poor, then a higher lighting level might be justified.	Good visual guidance is anticipated, based on the proposed route being a new development, designed in accordance with The Manual for Streets.

Based on the above risk assessment it have been determined that there is no requirement in this location to increase the lighting class from M4.

Typically luminance classes are used to determine the even spacing of columns along straight sections of road, where it is common practice to reduce this spacing by 10% around bends. As all bends in the propsed scheme are <500m radius an illuminance-based criteria should be used, as stated in BS 5489-1 7.1.3.1. Lighting class C4 has therefore been selected from BS 5489-1 Table A.1 to provide a comparable level to M4.

The lighting requirements for illuminance based C lighting classes are defined in BS EN 13201-2:2015 Table 2.

1.2.2. Lighting Class for Conflict Areas

Lighting classes for conflict areas are given in BS 5489-1 Table A.4 which details the relationship between the traffic route class and the conflict class. Therefore conflict areas are to be lit to lighting class C3 where the traffic route class is M4.

At locations where the scheme ties in to existing traffic routes, an assessment will be made on the existing lighting levels, and the highest lighting class on approach will be used to determine the class at the conflict area.

1.2.3. Lighting Class for Shared Footway/Cycleway

The shared footway/cycleways will be lit to lighting class P5, in accordance with BS 5489-1 Table A.6 based on having a normal traffic flow with a moderate ambient luminance (environmental zone E3)

1.3. Determination of Maintenance Factors

1.3.1. Proposed DW Windsor Luminaires

A maintenance factor of 0.85 will be used for the DW Windsor Luminaires mounted on 8m columns this is derived from a manufacturer maintenance factor of 0.9 multiplied by the cleaning factor of 0.95 based on a 36 month cleaning frequency for a column taller than 6m in accordance with BS 5489-1:2013 Table B.1. For DW Windsor Luminaires mounted on 6m columns, a maintenance factor of 0.81 will be used, based on a cleaning factor of 0.90.

1.3.2. Existing Luminaires

Where the scheme interfaces with existing columns to be retained, a conservative maintenance factor of 0.74 will be applied in the absence of any further information.