



West Winch Housing Access Road Lighting Assessment Report

Author: WSP

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1 Introduction

1.1 Scheme Background

1.1.1 WSP have been commissioned by Norfolk County Council (NCC) to conduct a lighting assessment of the proposed West Winch Housing Access Road to support enabling works for the potential development of the Southeast King's Lynn Growth Area to the East of the A10. The assessment covers two distinct areas owned and maintained by National Highways (NH) & NCC. These include the realignment of the A47, the proposed new section of road including 5 new roundabouts (RAB) and the tie in to the existing A10 road to the South.

1.1.2 The primary objective of this assessment is to evaluate the lighting requirements by both National Highways and NCC in accordance with their policies and/or relevant British Standards.

1.1.3 This report aims to assess the impact on the visibility and safety of road users, both pedestrians and motor vehicle users.

1.1.4 It is important to note that this assessment was conducted using data that was readily available at the time and through a desktop survey approach. Any future modifications to the proposal may necessitate a revaluation. Consequently, it is advised that the recommendations provided in this report be reviewed within the specific context and constraints of the project as it progresses.

1.2 Standards

1.2.1 Whilst there is some overlap in lighting standards, good working practices / policies, the assessment will be primarily split into the following two main aspects:

1. Assessment of the lighting / requirements of NH in accordance with -
 - TA501 – Road Lighting Appraisal.
 - TD501 Road Lighting Design.



- CD109 Highway Link Design.

2. Assessment of the lighting / requirements of NCC in accordance with –

- Norfolk County Council Development Specification for Street Lighting Works (Rev D).

1.2.2 In addition, these will be read in conjunction with the following that cover both Authorities / best working practices:

- ILP PLG02 - The Application of Conflict Areas on the Highway.
- ILP PLG23 - Lighting for Cycle Infrastructure.
- BS5489-1:2020 - Design of Road Lighting.
- ILP PLG23 - Lighting for Cycle Infrastructure.
- Guidance Note 08/23 - Bats and Artificial Lighting at Night.
- Guidance Note 01/20 - Guide on the limitation of the effects of intrusive light 2020.
- PD CEN/TR 13201-1:2014 – Road Lighting Guidelines on selection of lighting classes.
- TR12 Lighting of Pedestrian Crossings.

2 Site Proposal

2.1 Scheme Overview

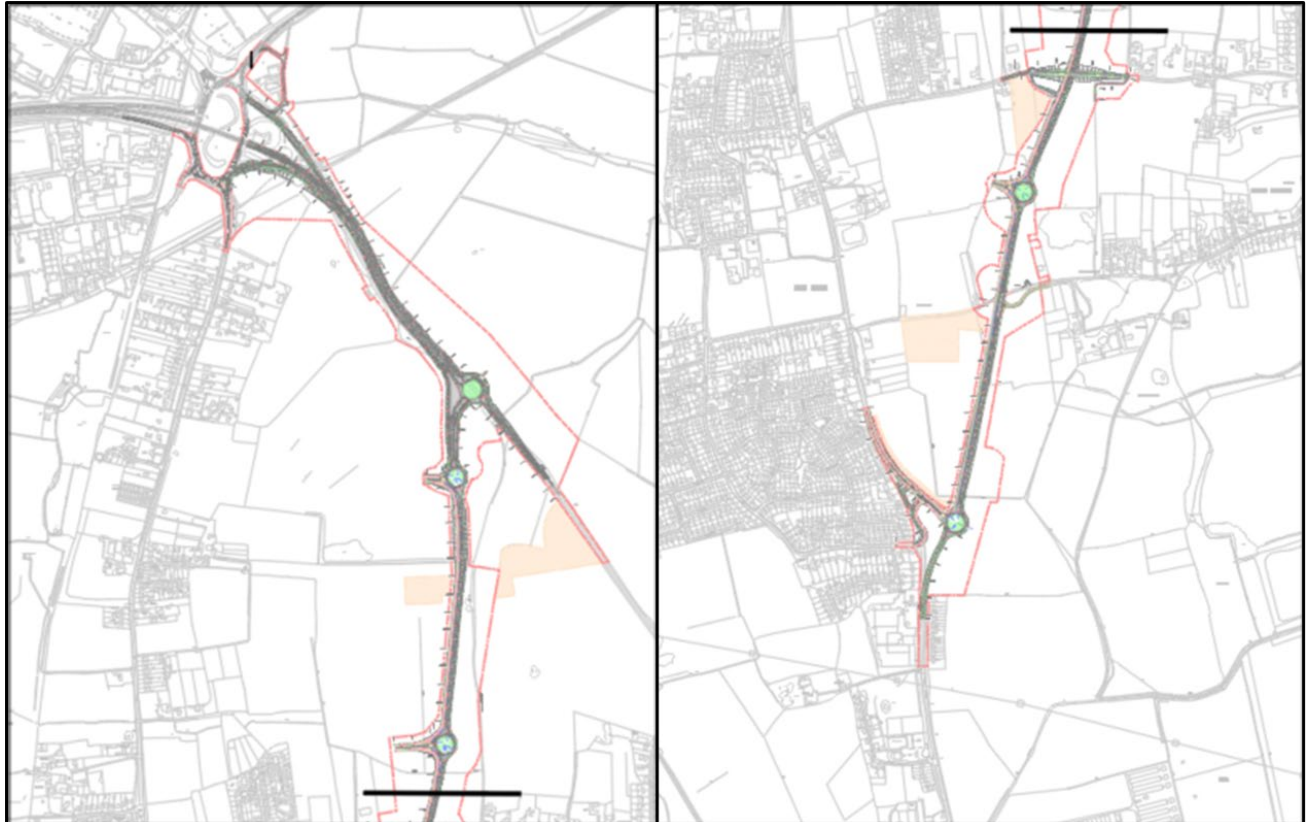
2.1.1 The proposed route connects the A10 to the A47 along a 1.5-mile road. That starts to the south of Gravelhill Lane in West Winch and joins the A47 East of the existing Hardwick junction.

2.1.2 The West Winch Housing Access Road will provide an alternative route around the village of West Winch, thereby reducing traffic flow through the village. The road will connect to the A47 via a RAB and the dualling of the A47



between Hardwick junction and the new road. Figure 2-1 shows the site plan / red line boundary of the general alignment.

Figure 2-1 Site plan



2.2 A47 Hardwick RAB / Constitution Hill RAB

2.2.1 The proposed junction alters the existing alignment with the removal of the Constitution Hill RAB and the introduction of merge and diverge lanes linking into the Hardwick RAB. The associated conflict area (Harwick RAB) primarily remains intact with only the arms on the Eastern side being altered. As of March 2023 (Google Streetview) the existing lighting appears to primarily consist of Philips Trafficvision SONT luminaires with some units having been updated to Holophane Vmax LED luminaires following from what appears to be road traffic accidents.



2.3 New Tie-in RAB A47

2.3.1 Proposed new RAB approximately 800m East of the former Constitution Hill RAB that is a currently unlit section of road until the village of Middleton some 1.7m away.

2.4 Link Road around Village of West Winch

2.4.1 As per the Southeast King's Lynn Growth Area Masterplan, the link road appears to have a number of dark corridors along its length that form breaks in the proposed developments adjacent to the new carriageway.

2.4.2 As part of the design progression there now appears to be three new RAB along its length (Namely -Hopkins, Metacre & Zurich) not including the ones at either end. It is unclear how these proposed RAB interact/ intersect with any dark corridors. However, at the time of writing the exact nature and/or extents of any ecological / sensitive receptors is not known.

2.5 Gravel Hill Lane Tie-in RAB

2.5.1 Proposed RAB and re-alignment of the A10 to allow access to the link road. The existing A10 is currently lit throughout the proposed area of tie-in works and appears to have been converted to LED luminaires sometime between 2011 & 2016 with what is believed to be Urbis Teceo luminaires.

2.6 Signalised Crossing Chequers Lane

2.6.1 Proposed stopping up of Chequers Lane to motorised through traffic with a signalised crossing at the intersection of the link road. Thereby allowing pedestrians and cyclist a safe crossing point of the new link road.

3 Relevant Standards

3.1 TA501 Road Lighting Appraisal (National Highways)

3.1.1 The decision to provide and/or switch off / remove lighting on the National Highways network is based upon a TA501 assessment. This is outside the



scope of this assessment and is based upon several reports and assessments. These include but are not limited to the following:

- **Concept Lighting Design**
- **Determine works and operating costs** - Including Build, Maintenance, Energy & Decommissioning
- **Road Safety Engineers Report** - Determination of Personal Injury Collision (PIC) savings
- **Scheme appraisal report (SAR)** - Benefits Cost Ratio / Appraisal period
- **Non-quantifiable impacts** – Such as biodiversity, heritage, landscape, government policy etc

3.2 TD501 Road Lighting Design (National Highways)

3.2.1 This document refers to several other Standards covered below, however there is one stipulation that can have a large impact on the extent of lighting required and is as follows:

‘There shall not be an unlit gap of four times the safe stopping sight distance between lit sections.’

3.2.2 The extent of the unlit gap is dependent on the ‘Design Speed’ and is covered by CD109 Highway Link Design.

3.3 Norfolk County Council Development Specification for Street Lighting Works (Rev D)

3.3.1 This document would appear to be out of date and at the time of writing it’s unclear if this is the latest version. However, it does not contain any information relating to the extent of lighting that differs from the norm / current standards. The document primarily covers equipment specification and required levels (although out of date / not current).



3.4 ILP PLG02 - The Application of Conflict Areas on the Highway

3.4.1 PLG02 provides guidance / best working practices in and around conflict areas. Mainly the '5 second rule' in which lighting needs to be extended from a conflict area. However, this can be extended if the anticipated queuing area is greater and/or if the conflict area is within a fully lit section. The extent of lighting would ultimately be dependent on usage, NCC requirements and/or the presence of any dark corridors / sensitive receptors.

3.5 ILP PLG23 – Lighting for Cycle Infrastructure

3.5.1 PLG23 reiterates that public lighting is a power afforded in Highways Act 1980 Section 65(1), it is not a duty. The decision to provide lighting on a highway (including cycle infrastructure) will be at the discretion of the Highway Authority (NCC).

3.5.2 The following table is an extract from PLG23 which aids designers to select appropriate indicative lighting standards, to achieve a level of consistency throughout an area.



Table 3-1 PLG23 - Table 2: Typical Cycle Route Hierarchy

Road type	Strategic	Major	Local	Rural
Description	Core routes linking main settlements and areas of high employment or education	Core leisure routes and routes linking the strategic network to secondary destinations	Feeder routes within urban areas	Rural feeder routes
Common characteristics	Largely segregated network of cycle routes with separation from pedestrians where width allows	Predominantly off-road routes, although some linking sections might be on road	Mix of on road routes often with cycle lanes / symbols and off-road shared use links	Predominantly quiet on road routes without cycle lanes, with some off-road paths
Surface	Sealed surface	Sealed surface	Generally surfaced routes	Generally surfaced but some routes may be unsurfaced
Lighting	Lit with urban areas	Lit with Urban areas	On road routes usually lit	Not generally lit



3.5.3 On these recommendations the indicative lighting standard should be based upon BS5489-1. The document further states that where a cycle track is purely recreational it will not normally be lit. there may also be cycle tracks where the dangers for cyclists after dark outweigh the importance of the route, and in such cases, it may be desirable to discourage nighttime use by not lighting them.

3.6 Guidance Notes 08/23 & 01/20

3.6.1 At the time of writing its unclear (if any) what constraints there maybe with regarding to ecological issues such as the presences of sensitive receptors / requirements for Dark Corridors etc.

- Guidance Notes 08/23 (GN01) – Bats and Artificial Lighting at Night Outlines the legal duties (whether bats are present at the time or not) and good working practices to ensure the nighttime environment / sensitive receptors are not adversely affected. Measures such as lighting buffer zones and the adverse effect about specific species are outlined. Figure 3-2 below shows an example of illuminance limit zones.
- Guidance Notes 01/20 (GN08) – Guidance Notes for the Reduction of Obtrusive Light

3.6.2 The document covers aspects relating to spill light, orientation, limitation of sky glow, light intrusion and environmental zones etc and sets out good working practices. Figure 3-3 below shows the types of intrusive light.



Figure 3-1 Guidance Note 08/23 (Example of Illuminance limit zonation)

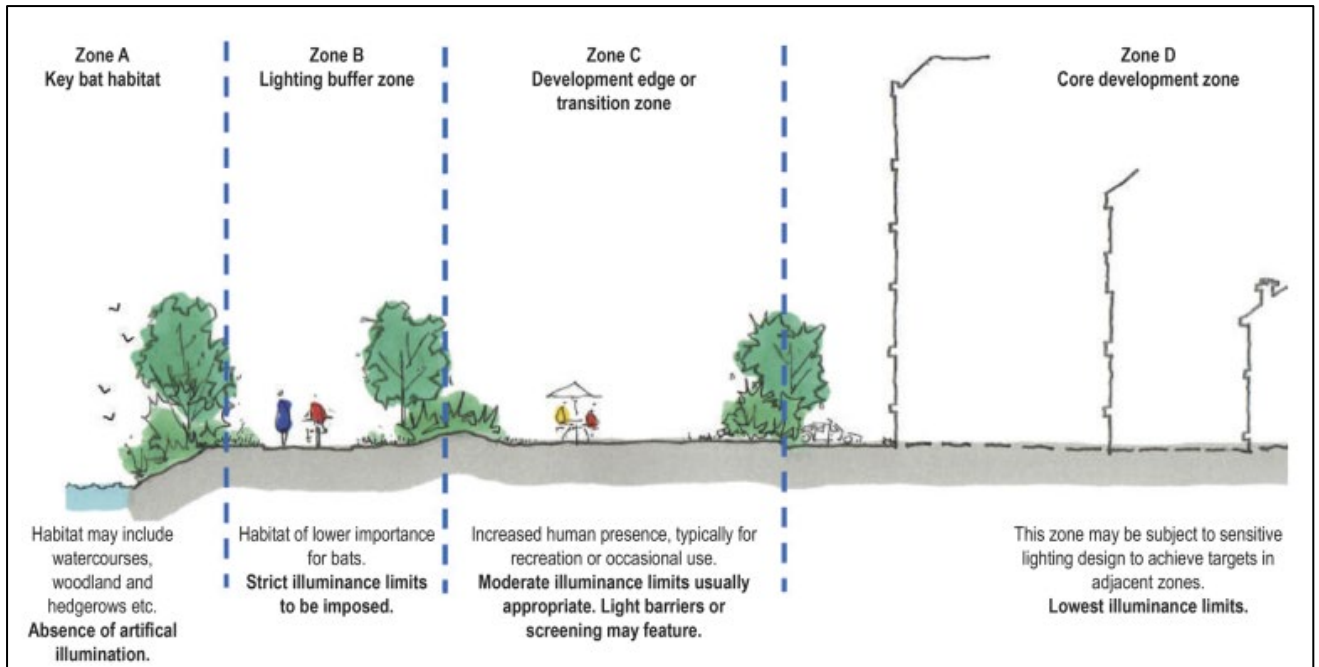
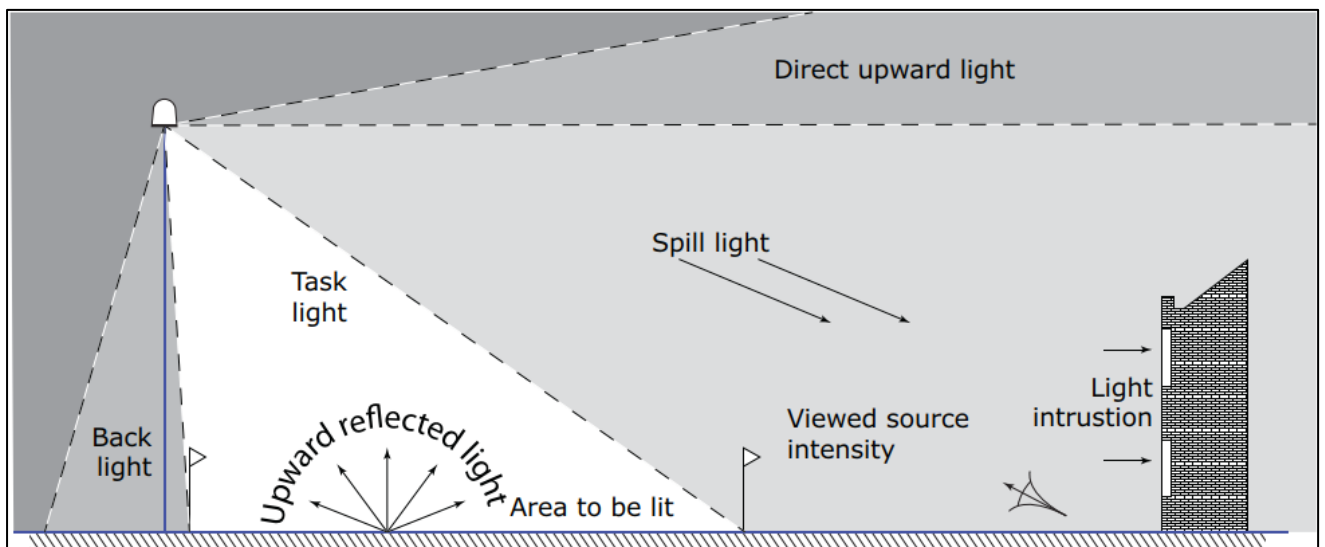


Figure 3-2 Guidance Note 01/20 (Types of intrusive light)



3.7 PD CEN/TR 13201-1:2014 – Road lighting guidelines on selection of lighting classes

3.7.1 The report gives guidelines on the selection of the most appropriate class for a given situation. To do this, it includes a system of parameters / weighted values to various factors / risks that fine tune the required lighting class. Close



cooperation with road lighting, traffic planning, highway engineering and traffic safety experts is required, as the lighting class can be increased as well as decreased using this process.

- 3.7.2 The report covers some environmental factors but not all, therefore other associated risks (ecological issues / sensitive receptors for example) need to be considered and support the final solution.

3.8 TR12 Lighting of Pedestrian Crossings

- 3.8.1 This report gives guidance on evaluating the lighting required in locations where pedestrians are encouraged to cross the road. It covers the various types of pedestrian crossing (zebra & signal-controlled crossings), therefore depending on the crossing, different lighting approaches are advised (e.g. negative / positive contrast / vertical illuminance etc).
- 3.8.2 The document touches on informal crossings (e.g. whole width traffic calming raised tables & refuge islands) but primarily covers those types, that sit within areas where lighting is already allowed for / installed. The document therefore doesn't allow for / cover pedestrian crossings in rural locations where lighting wouldn't normally take precedent due to other factors / considerations.

4 Lighting Assessment

4.1 Traffic flow

- 4.1.1 For purpose of this assessment the traffic flow information is based upon '2042 Scenario R' AADT information, that contains West Winch Housing Road and the full 4,000 dwelling development and therefore represents the busiest scenario.
- 4.1.2 The following table below show the relevant values that form the basis on which the lighting levels will be based.



Table 4-1 Traffic Flow

Location	AADT
West of A47 (Tie-in) RAB	46,250
A47 (Tie-in) RAB to Hopkins RAB	14,183
Hopkins RAB to Metacre RAB	25,317
Metacre RAB to Zurich RAB	22,848
Zurich RAB to A10 (Tie-in) RAB	20,389

4.2 Lighting Levels

4.2.1 Based upon the above AADT, known highway configuration / speed restrictions, the appropriate lighting levels can be determined from BS5489-1:2020. Figure 3-3 below shows the relevant extract from the British Standard.

Figure 3-1 BS5489-1:2020 Table A.2 – Lighting classes for traffic route (v>40mph)

Traffic flow	Lighting class		
	Dual carriageway		Single carriageway
	Junction density: high	Junction density: low	
High to very high ^{A)}	M2	M3	M2
Low to moderate ^{B)}	M3	M4	M3
Very low ^{C)}	M4	M5	M4

NOTE 1 High junction density would be junction centres spaced < 3 km apart.

NOTE 2 Where a single carriageway has a high density of junctions, a risk assessment can determine whether some of the junctions constitute conflict areas (see [A.3.2](#)).

NOTE 3 Grey highlighting indicates situations that would not usually occur in the UK.

^{A)} High to very high traffic flow might be defined as either having an average daily traffic (ADT) > 40 000, or where the flow exceeds 65% of the lane maximum capacity for dual or multi-lane carriageways or 45% for single carriageways.

^{B)} Low to moderate traffic flow might be defined as either having an ADT of between 7 000 and 40 000, or where the flow is between 35% and 65% for dual or multi-lane carriageways or between 15% and 45% for single carriageways.

^{C)} Very low traffic flow might be defined as either having an ADT of < 7 000, or where the flow is < 35% for dual or multi-lane carriageways or < 15% for single carriageways.



4.2.2 In accordance with BS5489-1:2020 Table A.2 the required road (M Class) lighting levels are outlined in the Table below. The final levels will however be subject to review as part of the detailed design stage and following consultation with NCC.

Table 4-2 M Class Lighting Parameters

Road	Lighting Class	Minimum Lav (Cd/m ²)	Overall Uniformity (U _o)	Longitudinal Uniformity (UI)	Threshold Increment (TI)	Rei
A47	M2	1.5	0.40	0.70	10	0.35
New Carriageway	M3	1.0	0.40	0.60	15	0.30

On the above basis the corresponding / associated conflict areas (C Class) are outlined in the table below.

Table 4-3 C Lighting Class Parameters

Road	Lighting Class	Minimum Eav (lux)	Eav/Emin (U _o)
A47 (Tie-in) RAB	C2	20.0	0.40
Hopkins RAB	C3	15.0	0.40
Metacre RAB	C3	15.0	0.40
Zurich RAB	C3	15.0	0.40
A10 (Tie-in) RAB	C3	15.0	0.40



4.3 Extent of Lighting

4.3.1 Where no lighting is otherwise provided on a road leading to or leaving a conflict area, then the selected lighting class should be installed for a stretch long enough to provide 5 seconds of driving distance at the traffic speed. The below table shows the relevant values in metres that requires lighting to standard if each RAB (conflict area) were to be lit in isolation to surrounding unlit roads.

Table 4-4 PLG02 Table 2 – Relationship of Speed Limit to Approach Extent

Speed Limit (MPH)	Speed Limit (KPH)	5 Second at Speed Limit (m)
30	48	67
40	64	89
50	80	111
60	96	133
70	96	133
70	112	156

4.3.2 The extent of lighting on a 40mph road is therefore 89m. However, if the normal circumstances of queuing distance falls outside the 5 second rule area. The distance may be extended if risk assessments deem it necessary.

4.4 Cycle Path

4.4.1 Whilst it may be desirable to light the cycle path, it might not be appropriate in all cases. To reiterate public lighting is a power afforded in Highways Act 1980 Section 65(1), it is not a duty. Therefore, the decision to provide lighting on a highway (including cycle infrastructure) is at the discretion of the Highway Authority.

4.4.2 The extent of lighting based upon motorised vehicles is more onerous therefore it is recommended that the cycle path is covered by the same lighting as the main carriageway (in line with PLG23 where applicable).



4.4.3 The below table highlights the comparable lighting class levels.

Table 4-5 ILP PLG23 Lighting for Cycle Infrastructure Table 10: Lighting classes of comparable level

M Class	C Class	P Class
Not applicable	C0	Not applicable
M1	C1	Not applicable
M2	C2	Not applicable
M3	C3	P1
M4	C4	P2
M5	C5	P3
M6	Not applicable	P4
Not applicable	Not applicable	P5
Not applicable	Not applicable	P6

4.4.4 To be within two comparable levels of either of the previously stated M classes, the associated P class would be P2 or a P3. However, if the cycle path is directly adjacent to the main carriageway with clear visibility, then it can be covered by Edge Illuminance Ratio (Rei).

4.5 Signalised Crossing

4.5.1 The lighting levels of conflict areas are ordinarily one class higher than the brightest approach (M class) road. However, PLG02 allows signal-controlled areas to be lit to the comparable C class to the traffic route classification e.g., M3 = C3 and not M3 / C2. Therefore, the lighting need only be arranged in such a way that the crossing point falls in the middle of the span, it allows for good negative contrast and covers the extent of the 5 second rule on each approach.

4.6 Ecology / Mitigation

4.6.1 Any lighting proposal will need to consider ecology issues / potential sensitive receptors.



4.6.2 To limit any adverse effects of road lighting; part-night operation, dimming, colour temperature, glare control and/or retention of dark corridors need to be considered. Advise and consultation will be needed from the relevant bodies / ecologists to ensure any legal duties / limitations are met.

4.7 Consultation with NCC / National Highways

4.7.1 Any proposal will need approval / input from the maintaining authority and in the case of National Highways this is likely to start with a full TA501 assessment.

4.7.2 As part of the document review process consultation with NCC is already underway. NCC have stipulated those areas that do and do not require lighting. The report and associated drawings have therefore been amended to reflect this (please see Appendix A & B).

4.7.3 Any associated risk and/or ownership thereafter remains with the NCC and is backed up in writing by a departure / design decision register outlining the NCC preference not to light to the Standards / guidelines outlined in this report.

5 Conclusion and Recommendations

5.1.1 As per NCC request / previous comments, only Hopkins RAB, A10 RAB including tie-in to the existing system of lighting and the signalised crossing at chequers lane (inclusive of the 5 second rule) are too be lit.

5.1.2 At this stage the exact levels and/or specified equipment is not known and therefore any parameters set out within this report are subject to change as part of a detailed design phase / full consultation with all relevant parties.

5.1.3 Further action to minimise the extent of lighting etc, may require further departure however, the required levels of lighting could be further reduced by undertaking a BS EN 13201 risk assessment, based traffic composition and not just ADT information. This would however require further information / input from other disciplines such as a Road Safety Engineer.



- 5.1.4 Limited hours of operation and part-night dimming including could further reduce the impact.
- 5.1.5 Appendix A & B show indicative column locations for planning purposes only based upon NCC departure request. Road lighting design including power supplies is to be developed in coordination with the relevant highway authority / ecological constraints at detailed design stage.