

Tritax Symmetry (Hinckley) Limited

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

The Hinckley National Rail Freight Interchange Development Consent Order

Project reference TR050007

Written Statement of Oral Case ISH3 [Appendix G - M69 Lighting Proposals and associated effects]

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November 2023

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(q)

Project	Hinckley National Rail Freight Interchange		
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1 INTRODUCTION

- 1.1 The purpose of this technical note is to review the need for and standard of lighting to be provided at M69 Junction 2. This is in response to Action Point 90 recorded at Issue Specific Hearing (ISH) no. 3.
- 1.2 This report does not cover the assessment associated effects on biodiversity and visual effects.
- 1.3 Design Manual for Roads and Bridges (DMRB) standard TA 501¹ is the standard for appraising lighting on the trunk road network. "This report uses the principles of DMRB TA 501 to provide a high-level appraisal but does not include all the detailed reporting required by this standard as we do not consider this level of detail to be necessary given the conclusions contained within this appraisal.

2 M69 MAINLINE

Existing lighting

- 2.1 There is no existing lighting on the whole of the M69 mainline except for a short length at M69 J3 (M1 J21) and a length at M6 J2, i.e. only the northern and southern extremities of the M69 mainline are lit.

Safety baseline

- 2.2 Personal Injury Collision (PIC) data has been obtained for the M69 over a 5km length centred around M69 J2 for a five-year period from Feb 2018 to July 2023.
- 2.3 The data is summarised as follows:

Light conditions	PIC severity	No.
Daytime	Fatal	0
	Serious	0
	Slight	4
Darkness	Fatal	0
	Serious	0
	Slight	2*
Total Darkness PICs		2

* One no. PIC is recorded as being during darkness, but was recorded at 07:30 on 30 January 2019. At this time of year in this location the light conditions are recorded as being "Civil Twilight". However, for robustness, this PIC is taken as being in darkness.

- 2.4 **Figure 1** below shows the locations of the above PICs and the extents of the assessment.

¹ DMRB TA 501 Road Lighting Appraisal, Revision 0, March 2020

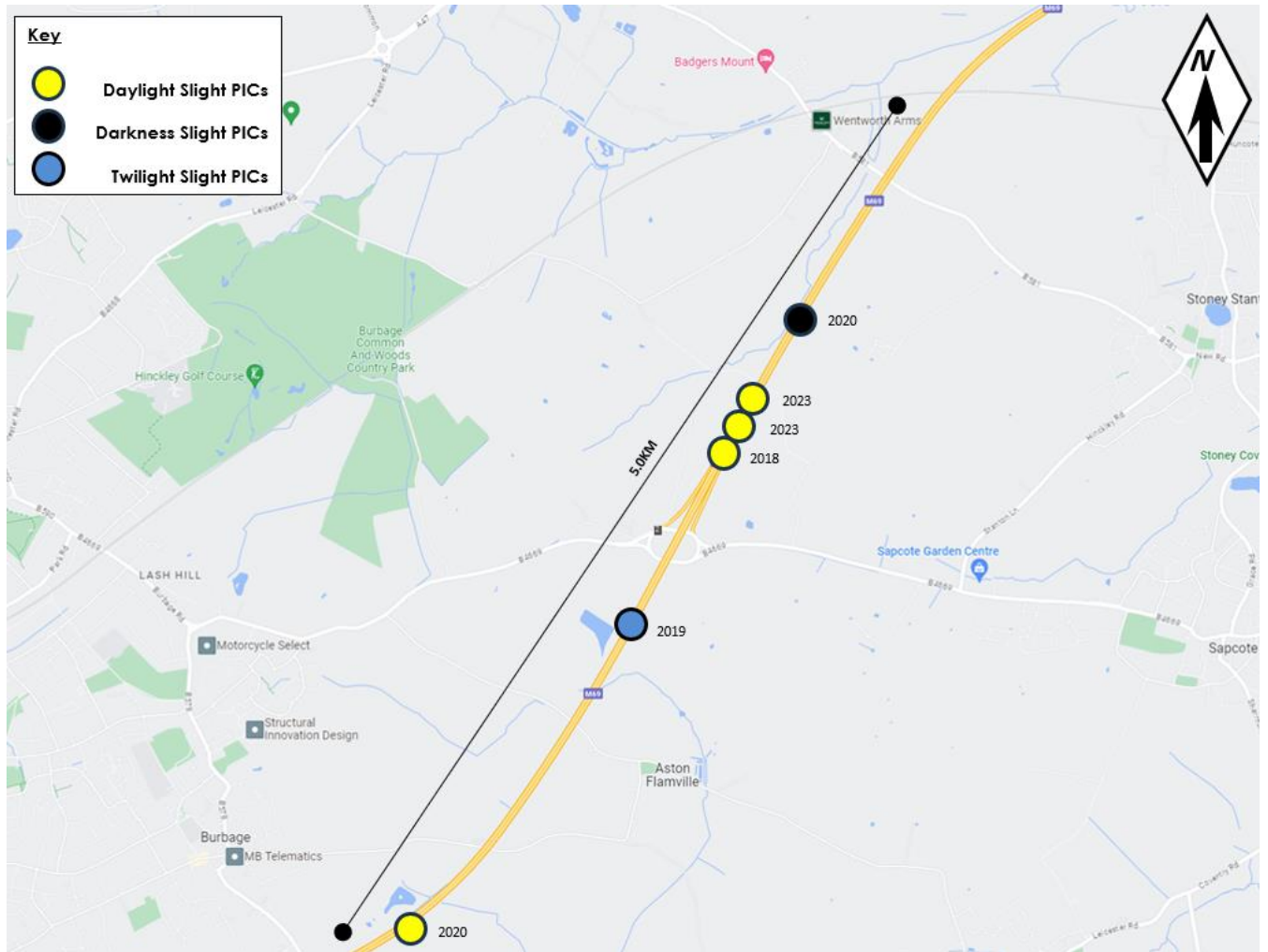


Figure 1: Darkness PICs for 5½ year period over a 5km length centred on M69 J2

2.5 From this data the following rates of Darkness PICs are obtained:

- 0.073 Darkness PICs per km per year.

Conventional motorway darkness PIC data

2.6 The National Highways Smart Motorway Stocktake² second year progress report contains data for average darkness PICs for different motorway types including conventional motorways as which the M69 is classed. The data is complete up to and including 2020, but given the Covid pandemic, 2019 data is used for comparison purposes.

2.7 The following data has been extracted from this report:

Subject	Report Reference	2019 Data
Length of conventional motorway network in England(miles)	Annex C	1564
Darkness PICs fatal injury for conventional motorway	Annex K	35

² <https://nationalhighways.co.uk/our-work/smart-motorways-evidence-stocktake/>

Subject	Report Reference	2019 Data
Darkness PICs serious injury for conventional motorway	Annex K	180.95
Darkness PICs slight injury for conventional motorway	Annex K	1,040.05
Total Darkness PICs		1256

2.8 From this data for following rates of Darkness PICs can be calculated for 2019:

- 0.80 Darkness PICs per mile; and
- 0.50 Darkness PICs per km.

2.9 It can be seen from the above that the existing M69 through junction 2 has a substantially lower Darkness PIC rate per km when compared to elsewhere on the conventional motorway network in England.

Theoretical Lighting of the M69 mainline

2.10 If the M69 mainline were to be lit through J2 then this would cover a distance of 2.1km. This is based on the extent of lighting on the mainline extending for 5 seconds of drive time beyond the farthest extents of the junction, north and south of J2 including the proposed south facing slip roads.

2.11 Using BS5489-1³ and based on the future year 2036 with development flow model the 2-way Annual Average Daily Traffic (AADT) flow is 80,000, and lighting class M3 is required. Note that this would be the same for any 2-way AADT above 40,000 so the assessment is robust.

2.12 Using modern LED lanterns a preliminary design has been undertaken that would require columns at 46m spacings and it is assumed that these would be verge-mounted to avoid complications with constructing and maintaining assets within the central reserve.

2.13 Over the 2.1km scheme there would be 92 columns and lanterns, 46 in each direction.

Safety benefits

2.14 It is typically taken from historical assessment that lighting on links reduces PICs by 10% and lighting on junctions reduces PICs by 30%. As this section of the M69 includes a junction a saving of 30% is to be taken which will create a best-case benefit-cost ratio (BCR) which will give a robust analysis.

2.15 From DfT data RAS4001⁴ the average cost for a PIC on the motorway network in 2022 was £162,143.

2.16 Using the Darkness PIC rate for the M69 at J2 of 0.073 PICs per km per year, this would give a benefit of £3,537 per km per year.

2.17 On the 2.1km scheme through J2 this would provide a safety benefit of £7,429 per year.

Costs

2.18 The costs are split into the following categories:

- Construction cost;
- Energy cost;

³ BS 5489-1 Design of road lighting Part 1: Lighting of roads and public amenity areas - Code of practice

⁴ <https://www.gov.uk/government/statistical-data-sets/reported-road-accidents-vehicles-and-casualties-tables-for-great-britain#other-road-safety-data-ras40>

- Maintenance cost; and
- Decommissioning cost.

2.19 New lighting installations have a design life of 25 years and hence the cost appraisal is to be undertaken over this period.

2.20 For robustness the decommissioning cost has not been calculated and only the construction costs for the columns and lanterns have been included.

Construction cost

2.21 A total construction cost for the columns and lanterns is estimated to be £221,572. Over a 25-year period this equates to £8,863 per year.

Energy cost

2.22 An energy cost of £0.27/kWh has been used and an annual lit time of 4180 hours. Given the current uncertainties in the energy price further testing will be undertaken on the BCR to see the impact of falling or rising energy costs.

2.23 The power of the selected lantern in the preliminary design is 165W.

2.24 Based on the above the annual energy cost is estimated to be £17,132.

Maintenance cost

2.25 The amount of maintenance varies year to year with some aspects such as inspections taking place around every six years.

2.26 An approximate maintenance cost of £2,100 per year has been estimated.

Total cost

2.27 The total cost used for the assessment is taken to be £28,095 per year.

Benefit-cost ratio (BCR) appraisal

2.28 The benefits divided by the costs give a BCR of 0.26. Sensitivity testing of the result has been undertaken as follows:

- Ignoring construction costs and maintenance costs the BCR (i.e. based on energy cost alone) is 0.43;
- Halving the energy cost would result in a BCR of 0.38; and
- Doubling the energy cost would result in a BCR of 0.12.

2.29 TA 401 states that "for all motorways, APTRs and dual carriageways not incorporating variable mandatory speed limits there shall be a positive BCR ≥ 1 ". It is clear that this threshold has not been met.

2.30 To achieve a BCR ≥ 1 there would need to be a rate of 0.276 Darkness PICs per km per year which is nearly four times as many as recorded over the last five year period.

Conclusions

2.31 The M69 around junction 2 has a very low rate of Darkness PICs, substantially lower than the average for conventional motorways in England.

2.32 Even with an over-estimation of the benefits and an under-estimation of the costs to achieve a BCR ≥ 1 :

- The costs would need to be substantially lower; or
- There would need to be a four-fold increase in Darkness PICs.

2.33 On this basis lighting of the M69 through junction 2 is not justified.

3 M69 SLIP ROADS

3.1 On the basis that the mainline is not to be lit the extent of lighting on the slip roads has been determined using DMRB TD 501⁵ and PLG 02⁶.

3.2 The extent of lighting on the approach to or exit from a conflict is calculated using 5 seconds of drive time and for the slip roads has been determined as follows:

- For the diverge slip roads a speed of 70mph has been used based on a design speed of 120kph, this is because although the slip road has a lower design speed than the mainline, drivers are likely to leave the mainline at the mainline speed; and
- For the merge slip roads a speed of 40mph has been used based on a design speed of 70kph and this is appropriate for the speed of vehicles leaving the roundabout and beginning to accelerate on the slip road.

3.3 The above results in the following lengths of slip roads being lit:

- 156.5m of the diverge slip roads on the approach to the conflict area; and
- 97m of the merge slip roads on the exit from the conflict area.

3.4 Using BS5489-1, an Environmental Class of E2 (i.e. low ambient luminance) and the 2036 with development forecast year traffic data the lighting classes for each element of M6 Junction 2 has been determined as follows:

Element	Class	Highway authority
M69 NB diverge slip road where lit	M4	National Highways
B4669 west of J2	M3	Leicestershire County Council
M69 NB merge slip road where lit	M5	National Highways
M69 SB diverge slip road where lit	M5	National Highways
B4669 east of J2	M4	Leicestershire County Council
M69 SB merge slip road where lit	M4	National Highways
Roundabout (conflict class based on highest approach class and determined as per BS 5489)	C2	Leicestershire County Council

4 CONSULTATION

4.1 The proposed extent of lighting has been discussed with the National Highways East Midlands Asset Lead. The initial comments received are that the extents of lighting are as expected but the lighting class on the north facing slips should be increased to M4.

⁵ DMRB TD 501 Road Lighting Design, Revision 0, March 2020

⁶ Institution of Lighting Engineers Professional Lighting Guide 02 The Application of Conflict Areas on the Highway, 2013

5 M69 JUNCTION 2 STRATEGY

5.1 The following lighting strategy for each section of the road network at M69 Junction 2 is therefore proposed:

Element	Class	Highway authority
M69 mainline and merges/diverges	Unlit	National Highways
M69 NB diverge slip road where lit	M4	National Highways
B4669 west of J2	M3	Leicestershire County Council
M69 NB merge slip road where lit	M4	National Highways
M69 SB diverge slip road where lit	M4	National Highways
B4669 east of J2	M4	Leicestershire County Council
M69 SB merge slip road where lit	M4	National Highways
Roundabout (conflict class based on highest approach class and determined as per BS 5489)	C2	Leicestershire County Council

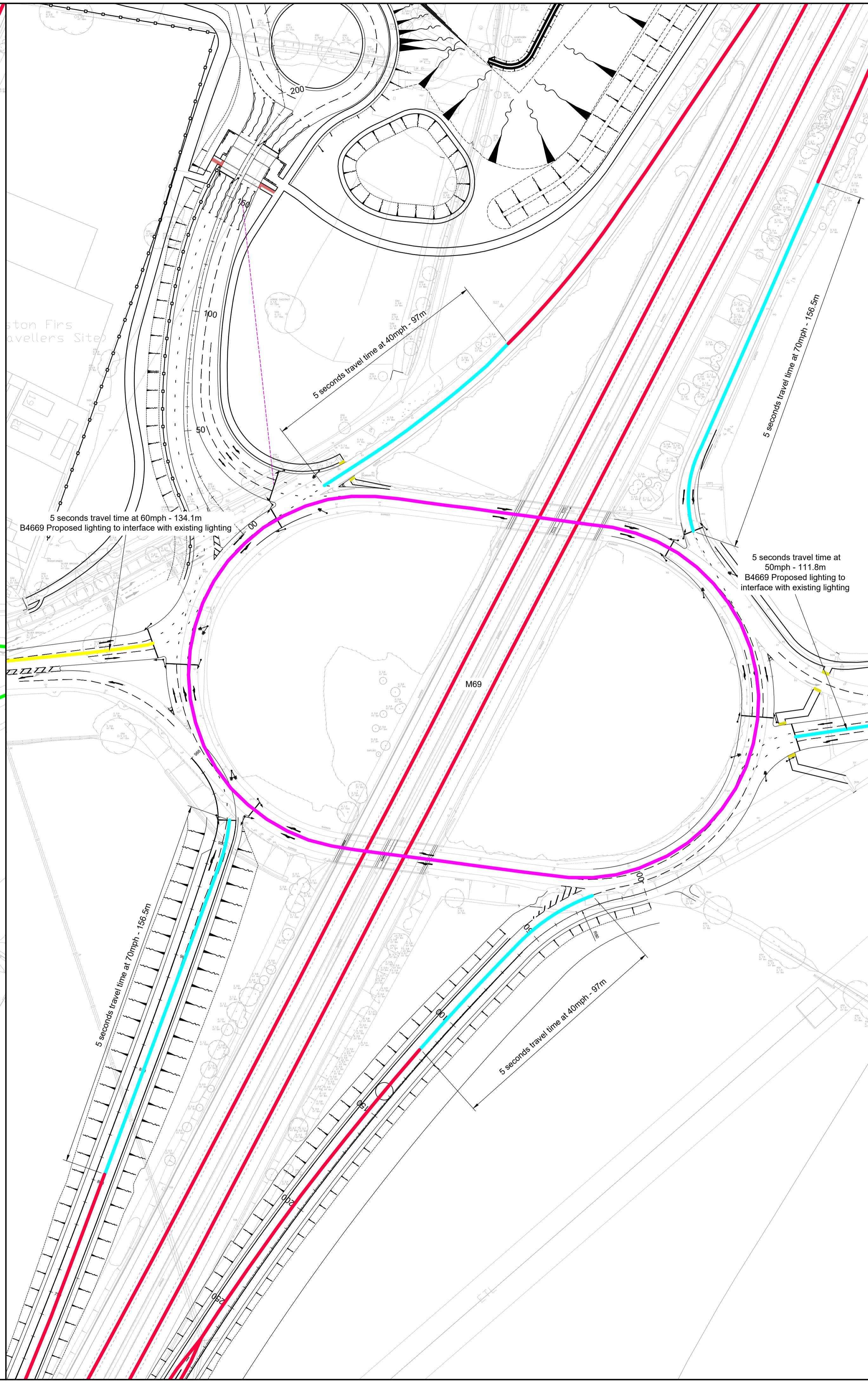
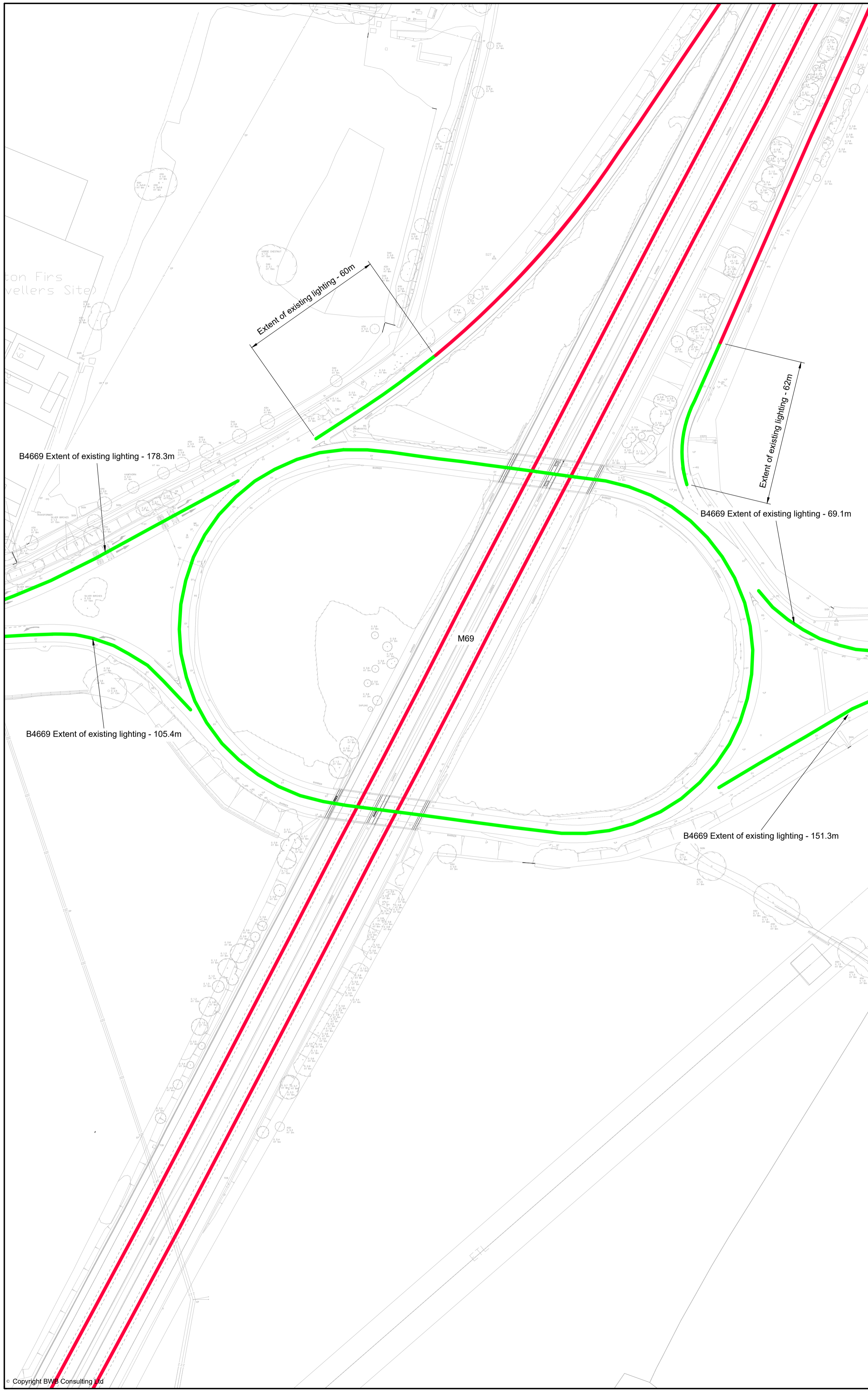
5.2 The strategy is shown graphically on drawing HRF-BWB-GEN-XX-SK-CH-SK130 found at **Appendix A**.

M69 JUNCTION 2 LIGHTING
HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE



APPENDIX A

Drawing HRF-BWB-GEN-XX-SK-CH-SK130



- Notes**
1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 4. Any discrepancies noted on site are to be reported to the engineer immediately.



- Legend**
- Existing Lighting
 - Unit Road
 - Proposed Lighting - Design Class M4
 - Proposed Lighting - Design Class M3
 - Proposed Lighting - Design Class C2
- Merge slip road extends to 5 seconds equivalent travel time at 40mph based on slip road design speed of 70kph.
- Diverge slip road extends to 5 seconds equivalent travel time at 70mph based on mainline design speed of 120kph.

P02	10.11.23	North facing slip classes updated	RP	SC
P01	3.11.23	Preliminary Issue	RP	SC
Rev	Date	Details of issue / revision	Dw	Rev

Issues & Revisions

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Client

TRITAX SYMMETRY
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Project Title

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

Drawing Title

M69 J2 STREET LIGHTING STRATEGY

Drawn:	R.Picknell	Reviewed:	S.Carter
BWB Ref:	NTT2814	Date:	3.11.23
Scale@A1:	1:1000	Status:	PRELIMINARY
Project - Originator - Zone - Level - Type - Role - Number	HRF-BWB-GEN-XX-SK-CH-SK130	Status	S1
Rev	P02		