

Cycle Enfield - Section 5

A105 Green Lanes junction with Bourne Hill / Hedge Lane

Stage 2 Road Safety Audit

Ref: 2759.03.05/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by: Shane Martin, Audit Team Leader

Checked by: Kevin Seymour, Audit Team Member

Approved by: Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	11/01/2017



1.0 INTRODUCTION

1.1 Commission

- 1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 5, A105 Green Lanes junction with Bourne Hill / Hedge Lane proposals.
- 1.1.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 and comprised an examination of the documents provided as listed in Appendix A, plus a visit to the site of the proposed scheme.
- 1.1.3 The visit to the site of the proposed scheme was made on 16th December 2016. During the site visit the weather was sunny and the existing road surface was dry.

1.2 Terms of Reference

- 1.2.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170 dated May 2014. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and how it impacts on all road users and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit. An absence of comment relating to specific road users / modes in Section 3 of this report does not imply that they have not been considered; instead the Audit Team feels they are not adversely affected by the proposed changes.
- 1.2.2 This Safety Audit is not intended to identify pre-existing hazards which remain unchanged due to the proposals; hence they will not be raised in Section 3 of this report as they fall outside the remit of Road Safety Audit in general as specified in the procedure SQA-0170 dated May 2014. Safety issues identified during the Audit and site visit that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in Section 5 of this report.
- 1.2.3 Nothing in this Audit should be regarded as a direct instruction to include or remove a measure from within the scheme. Responsibility for designing the scheme lies with the Designer and as such the Audit Team accepts no design responsibility for any changes made to the scheme as a result of this Audit.
- 1.2.4 In accordance with TfL Procedure SQA-0170 dated May 2014, this Audit has a maximum shelf life of 2 years. If the scheme does not progress to the next stage in its development within this period, then the scheme should be re-audited.
- 1.2.5 Unless general to the scheme, all comments and recommendations are referenced to the detailed design drawings and the locations have been indicated on the plan located in Appendix B.

- 1.2.6 It is the responsibility of the Design Organisation to complete the Designer's response section of this Audit report. Where applicable and necessary it is the responsibility of the Client Organisation to complete the Client comment section of this Audit report. Signatures from both the Design Organisation and Client Organisation must be added within Section 5 of this Audit report. A copy of which must be returned to the Audit Team.

1.3 Main Parties to the Audit

1.3.1 Client Organisation

Client contact details: Demos Kettenis – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – TfL Road Safety Audit

Audit Team Observer: None present

1.3.4 Other Specialist Advisors

Specialist Advisor Details: None present

1.4 Purpose of the Scheme

The purpose of the scheme is to provide 5.5km of two-way segregated cycle route with public realm improvements at town centres*.

*Taken directly from the Audit Brief.

1.5 Special Considerations

- 1.5.1 This Audit Report covers Section 5 (Sheet 11) of this route only, the A105 Green Lanes junction with Bourne Hill / Hedge Lane.

- 1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 5) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.2 General to the scheme – town centre / shopping street areas – Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.2.

Problem 3.7.1 Green Lanes (North and South) at the junction with Bourne Hill – Separator islands may not be obvious to all road users, leading to collisions with the island.

This problem appears to have been resolved and is therefore not raised again within this report.

Problem 3.7.2 Junction with Bourne Hill and Green Lanes – Right turning cyclists not utilising the two stage right turn (2SRT) could be in conflict with other traffic movements.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.5.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.1 The revised kerb lines at side roads may alter vehicle swept paths and it is not clear if these have been assessed or may result in conflicts between turning vehicles.

This issue is considered to remain in part and will therefore be raised again as part of 3.2.1 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 ROAD SAFETY AUDIT

This section should be read in conjunction with Paragraphs 1.2.1, 1.2.2 and 1.2.3 of this report.

3.1 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION

It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>The use of light segregation Orcas has been a proposed element of the scheme since initial development. The Orcas will be set inside the mandatory cycle lane marking (diag 1049B) and are white/black marked to stand out. In addition, the start and finish of an Orca line will be marked by a wand to further highlight the Orca line as it is approached. Orcas placed alongside vehicular access will be of a lower profile to allow vehicular over run. Orcas will be sited away from pedestrian crossing points to minimise the risk of trips.</p> <p>Post construction monitoring is recommended at a number of agreed locations to determine if there are any issues and to allow for modifications if necessary..</p>	
Client Organisation Comments	
<p>Designer's response accepted – post implementation monitoring will be carried out.</p>	

3.1.2 PROBLEM

Location: General to the scheme - Town Centre / shopping street areas

Summary: Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions

Within the main shopping streets the proposed cycle lanes will reduce the effective footway widths and segregate pedestrians from crossing points, bus stops and parking / loading bays. Pedestrians not contained or comfortable on the footway area may increasing use the cycle lanes at a greater risk of collision with cyclists. Additionally, pedestrians crossing or waiting / walking immediately adjacent to the proposed cycle lanes may also be at an increased potential for collisions with cyclists.

RECOMMENDATION

It is recommended to provide a defined separation between footway / cycle lane, and cycle lane to carriageway. This may include but is not limited to providing a stepped facility at a different level for each facility. It may also be beneficial to incorporate contrasting colour and/or texture between cycle lane and footway; measures to address cycle speeds may be beneficial to ensure safe pedestrian to cycle interaction.

Design Organisation Response	Accepted / Part Accepted / Rejected
The cycle lane edging will comprise of 3 x 100x100mm cropped silver grey setts. The texture and differing contrast will indicate to visually impaired pedestrians that they should not enter the cycle lane.	
The cycle track will be surfaced in a suitable colour, to provide tonal difference with the surrounding footway.	
Client Organisation Comments	
Designer's response accepted.	

3.1.3 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineator may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION

It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway whilst not presenting a trip hazard.

Design Organisation Response	Accepted / Part Accepted / Rejected
See 3.1.2	

Client Organisation Comments

Designer's response accepted.

3.1.4 PROBLEM

Location: A – Green Lanes southbound entry to Hedge Lane

Summary: Semi-segregated cycle lane terminates just before the left turn slip road which may increase left turning collisions between vehicles and cyclists

The proposed layout results in the semi segregated cycle lane returning to the carriageway just before the left turn slip for motorists to turn left from Green Lanes on to Hedge Lane. The proposed road markings indicate this is a bus gate but no other corresponding signs or road markings clarify this and it is therefore anticipated that some general traffic will also use this area. It may be difficult for both sets of road users to understand who has priority and this may lead to left hook type collisions as motorists potentially turn across the path of cyclists attempting to continue ahead.

The signalised junction ahead also results in an increased potential for cyclists to be travelling faster than vehicles whom may be queuing in traffic. Left turning drivers may struggle to see or anticipate a cyclist undertaking on the nearside, which may exacerbate the potential for left hook type collisions.

RECOMMENDATION

If the left turn slip is intended to be used by buses only then this should be made more conspicuous with additional signs and road markings. It may be beneficial to clarify priorities between cyclists on the track and left turning vehicles. As the current gap that cyclists have to cross is long it may be beneficial to alter the layout to reduce the distance over which they are exposed to turning movements which may also have the added benefit of reducing vehicle speeds and potentially making this less appealing for general traffic. This would require careful consideration of the movements which buses undertake and the implications on swept paths of vehicles.

Design Organisation Response

Accepted / Part Accepted / Rejected

The cycle lane is already at carriageway level on the approach to the junction and consequently motorists should be aware of cyclists travelling within the carriageway area, albeit within a semi segregated cycle lane.

It would not be possible to alter the layout of the left slip without compromising the ability of vehicles to bypass any buses parked in the bus stand.

Client Organisation Comments

Signage, markings and coloured surfacing should be considered to make clear that the slip road is for buses only.

3.1.5 PROBLEM

Location: B – Green Lanes junction with Bourne Hill / Hedge Lane

Summary: Two stage right turn may lead to confusion and potential collisions

The proposed layout includes two stage right turns (2SRT) from Bourne Hill and Hedge Lane. The Audit Team are concerned that the road markings alone may not clearly convey the intended manoeuvre and that once at the intended waiting position before making the second stage of the right turn cyclists may not be able to clearly see a relevant traffic signal. This is particularly relevant for users trying to travel southbound (from Bourne Hill) as the lack of secondary traffic signal may make it difficult for them to know when it is safe to proceed. If cyclists attempt to proceed at the wrong time they may face an increased potential for collisions with passing vehicles.

RECOMMENDATION

It is recommended to provide signs to clearly indicate the intended manoeuvres for cyclists and also to ensure that a relevant traffic signal is clearly visible to encourage cyclists to set off at the most appropriate time.

Design Organisation Response	Accepted / Part Accepted / Rejected
The two stage right turn has been removed from this design as TfL signallers were not able to signalise it to the satisfaction of their Stage 2 safety auditor.	
Client Organisation Comments	
Operation of the junction to be reviewed post-implementation to assess whether 2SRT can be safely re-introduced.	

3.2 JUNCTIONS

3.2.1 PROBLEM

Location: C - A105 Physical Islands / turning points within the junction

Summary: The altered kerb lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb line alterations which may increase the potential for turning vehicles to encroach into another user's path or collide with a kerbed island. This could lead to an increased potential for head on, side impact type collisions or collisions with physical islands / revised kerb lines.

RECOMMENDATION

It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle or over-running / scrubbing of kerbs.

Design Organisation Response	Accepted / Part Accepted / Rejected
Swept paths have been checked.	
Client Organisation Comments	
Designer's response accepted	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 ROAD SAFETY AUDIT THAT ARE OUTSIDE THE TERMS OF REFERENCE

Safety issues identified during the audit and site inspection that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in this section. It is to be understood that, in raising these issues, the Audit Team in no way warrants that a full review of the highway environment has been undertaken beyond that necessary to undertake the Audit as commissioned.

4.1 ISSUE

Location: Various – shared use cycle / footway

Reason considered to be outside the Terms of Reference: Issue for clarification rather than a defined road safety concern.

It is not clear what the extents of the shared use surfaces are, as none of the shared use extents appear to be defined.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended shared use areas and cycle routes are. This may include but is not limited to appropriate tactile paving, dropped kerbs and road markings / signs to indicate the intended routes and extents of shared use areas.

Design Organisation Response	Accepted / Part Accepted / Rejected
Shared areas will be identified by appropriate signage and the change from specific cycle track surfacing (buff asphalt) to generic footway surfacing (paving slabs).	
Client Organisation Comments	
Designer's response accepted	

4.2 ISSUE

Location: 1 – Green Lanes junction with Hedge Lane / Bourne Hill

Reason considered to be outside the Terms of Reference: Existing problem rather than a defined road safety concern.

The proposals include an Advanced Stop Line and a two stage right turn (2SRT) for for cyclists exiting Bourne Hill but only a two stage right turn for cyclists exiting Hedge Lane.

The lack of an ASL for cyclists exiting Hedge Lane may make them more vulnerable to left hook type collisions, or for a driver of a HGV not to see them (in close proximity to the front of a HGV) as they pull away from the lights. This is not raised in section 3 as it is an existing issue but as cycling uptake may increase as a result of the overall scheme it may be beneficial to assess and if feasible include an ASL for cyclists on Hedge Lane.

Design Organisation Response	Accepted / Part Accepted / Rejected
The modelling shows that during the AM peak the DoS on all 4 arms is above 96% (PRC -9.5%). During the PM peak 3 out of 4 arms have a DoS equal or greater than 92% (PRC -9.1). It is possible to implement an ASL on the southern approach of the junction, however this would mean that the intergreens would increase and the already saturated performance of junction would be affected.	
Client Organisation Comments	
The impact of the addition of an ASL on Hedge Lane should be reviewed with the TfL and implemented if the impact on junction performance is minor.	

4.3 ISSUE

Location: 2 – Green Lanes junction left turn slip to Hedge Lane

Reason considered to be outside the Terms of Reference: Issue for consideration rather than a defined road safety concern.

The proposals include an uncontrolled crossing facility which crosses the rear end of a bus stand cage. It is possible that a visually impaired user utilising a tapping stick may identify the crossing point (tactile paving) and begin to cross and not identify the presence of the rear overhang of a bus.

It may therefore, be beneficial to relocate the bus stand further forwards so that it does not cover the crossing carpet.

Design Organisation Response	Accepted / Part Accepted / Rejected
The bus stand will be relocated further forward.	
Client Organisation Comments	
Designer's response accepted	

5.0 SIGNATURES AND SIGN-OFF

5.1 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit report. The Road Safety Audit has been carried out in accordance with TfL Procedure SQA-0170 dated May 2014, with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the measures. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name: Shane Martin MCIHT, MSoRSA Signed: 

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin@tfl.gov.uk (020 3054 2590)

AUDIT TEAM MEMBER:

Name: Kevin Seymour Signed: 
B Sc, PG Dip TS, MCIHT, MSoRSA

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour@tfl.gov.uk (020 3054 1037)

5.2 DESIGN TEAM STATEMENT

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 2 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: Colin Aarons

Position: Project Manager

Organisation: Jacobs

Signed: *Colin Aarons*

Dated: 24.02.17

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: David Taylor

Position: Head of Traffic & Transportation

Organisation: LB Enfield

Signed:



Dated: 07.04.2017

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed:

Dated:

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-011 Rev -	Cycle Enfield A105 - General Arrangement Sheet 11 of 47
B240A024-DG-A105-0200-011 Rev -	Cycle Enfield A105 - Site Clearance Sheet 11 of 47
B240A024-DG-A105-0500-011 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 11 of 47
B240A024-DG-A105-0700-011 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 11 of 47
B240A024-DG-A105-1100-011 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 11 of 47
B240A024-DG-A105-1200-011 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 11 of 47
B240A024-DG-A105-1300-011 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 11 of 47

DOCUMENTS

- Safety Audit Brief
- Site Location Plan
- Traffic signal details
- TfL signal safety checklist
- Departures from standard
- Previous Road Safety Audits
- Previous Designer Responses
- Collision data
- Collision plot
- Traffic flow / modelling data
- Pedestrian flow / modelling data
- Speed survey data
- Other documents

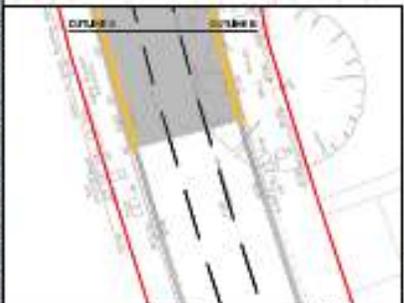
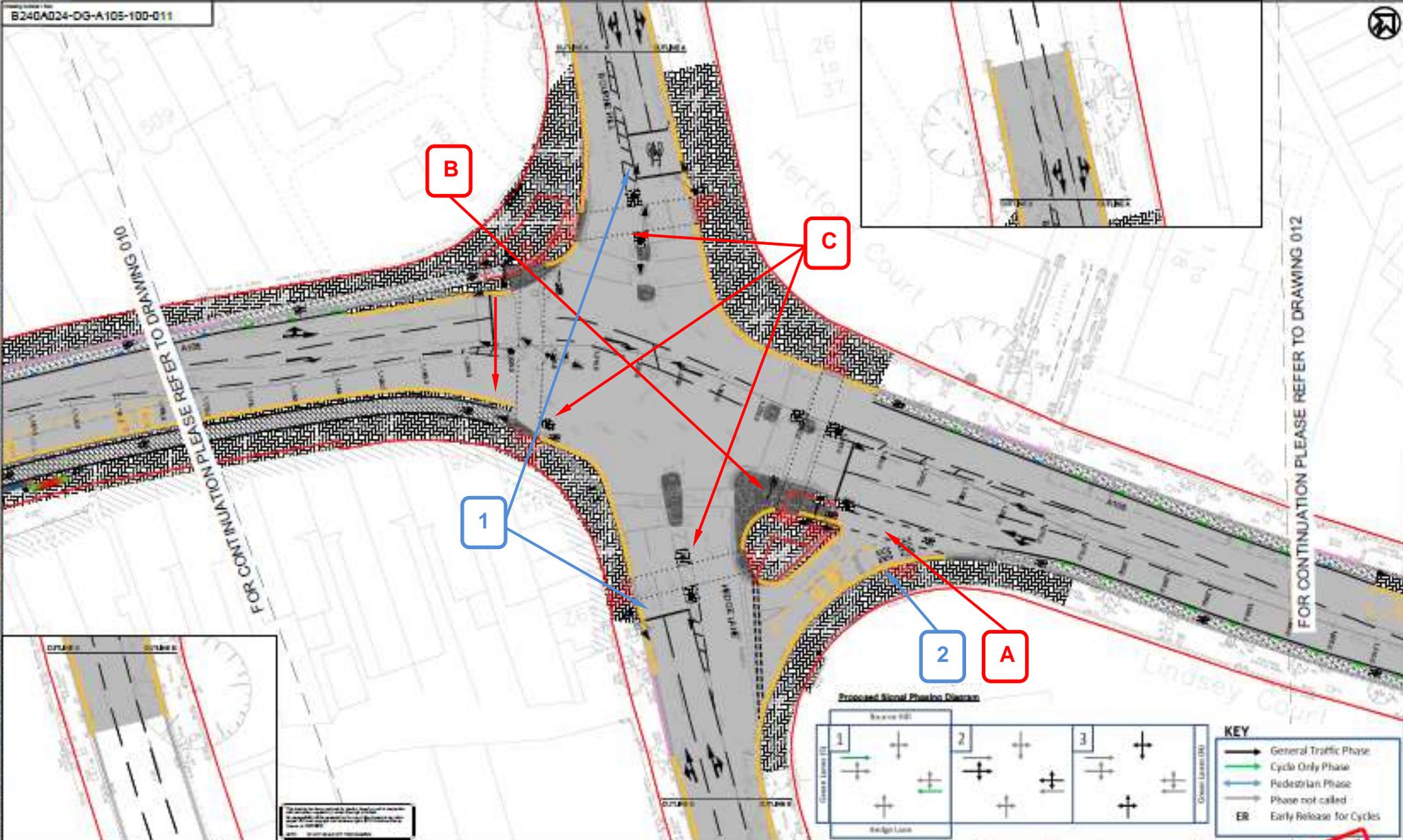
DETAILS (where appropriate)

2524/032/A105/BOR/2016

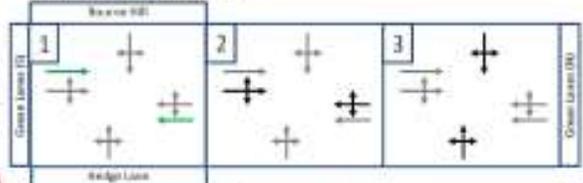
A105 Enfield - Proposed Road Marking Schedule
 A105 Enfield - Sign Schedule - Section 5

APPENDIX B

Problem Locations



Proposed Signal Phasing Diagram



KEY	
	General Traffic Phase
	Cycle Only Phase
	Pedestrian Phase
	Phase not called
	Early Release for Cycles

Code	Description
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
16	...
17	...
18	...
19	...
20	...

Code	Description
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
16	...
17	...
18	...
19	...
20	...

Code	Description
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
16	...
17	...
18	...
19	...
20	...

1. The drawings are to be used as a guide only. The contractor shall be responsible for the interpretation of the drawings and for the provision of all necessary details. The contractor shall be responsible for the provision of all necessary details. The contractor shall be responsible for the provision of all necessary details.

GENERAL ARRANGEMENT SHEET 11

DRAFT FOR COMMENTS ONLY

FOR INFORMATION

Project: B240A024-DG-A105-100-011