Transport for London

A105 Green Lanes J/W Station Road / Fords Grove

Cycle Enfield - Section 9

Stage 2 Road Safety Audit

Ref: 2759.02.09/032/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	25/11/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the A105 Green Lanes J/W Station Road / Fords Grove, Cycle Enfield - Section 9 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 14th November 2016. It took place at the Palestra offices of TfL on 15th November 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 15th November 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 4 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: Paul Rogers – 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 9 (Sheet 20) of this route only, A105 Green Lanes junction with Station Road and Fords Grove.

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 9) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.4 Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict.

This problem appears to remain in the detailed design proposals and therefore this is raised again as 3.1.2 in this Audit Report.

Problem 3.5.1 Station Road entry treatment - Cycle crossing close to the ramped exit from Green Lanes may mean the rear end of a car remains on the main carriageway with consequent risk of vehicle to vehicle collisions

The layout has been altered to incorporate the recommendation and this potential problem is mitigated. Therefore, this problem is not raised again within this Audit Report.

Problem 3.5.2 At the junction of Station Road / Fords Grove with Green Lanes- Right turn cyclists unaware of / ignoring the proposed 2SRT, could potentially be in conflict with other traffic movements at the junction leading to vehicle to cycle and cycle to cycle collisions

This problem appears to remain in the detailed design proposals and therefore this is raised again as 3.1.3 in this Audit Report.

No issues were raised in the ‘Outside of terms of reference’ (Section 4) of that report which relate to this section of the proposals

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**
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. 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.	
Client Organisation Comments	
Designer's response accepted – post implementation monitoring will be carried out.	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Visually impaired pedestrians may inadvertently enter the carriageway via cycle track ramps

The Audit Team are concerned that proposed cycle track ramps may lead to a visually impaired pedestrian inadvertently enter the carriageway, particularly if they follow the line of the kerb when exiting a bus. Visually impaired pedestrians unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the cycle track ramps are altered. This may include, but is not limited to, providing tramline tactile paving prior to, or on the ramps down to carriageway level.

Design Organisation Response	**~~Accepted / Part Accepted~~ / Rejected**
The cycle lane edging will comprise of 3x100x100mm cropped silver grey setts. The texture and differing contrast will indicate to visually compared pedestrians that they should not enter the cycle lane. Bus boarder areas are identified with contrasting surface materials that will indicate their shared use, as opposed to footway areas. Therefore, it is unlikely that visually impaired pedestrians will remain in the bus boarder area and inadvertently walk down the ramp.	
Client Organisation Comments	
Designer's response accepted.	

3.1.3 PROBLEM

Location: A – side road cycle crossovers at raised junction tables

Summary: Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict

At a number of locations the off-road cycle facilities cross side roads at raised table areas. Drivers turning from the main road have a short stacking space between the main road and these cycle crossovers due to the location of the give way lines to create priority for cyclists. Drivers may be confused by the arrangement and fail to give way to cyclists, or may stop suddenly and remain partially within the main carriageway, which may lead to late braking nose to tail collisions.

Drivers entering the main road may be confused by the double give way feature, and/or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

There is inconsistency in the provision of give ways for cyclists at such crossing locations and this may confuse users and lead to failure to give way type conflicts between cycles and vehicles.

RECOMMENDATION
If such cycle priority is to be provided at side roads then an appropriate stacking space should be provided between the main road and cycle crossing to allow a single vehicle to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide).

Design Organisation Response	**~~Accepted / Part Accepted~~ / Rejected**
An offset of 6m between the cycle lane and junction mouth has been provided to allow cycle priority with scope for a car to turn Into the side road and wait, without blocking A105 traffic. It is not possible to provide further space so that more than one vehicle can wait without encroaching onto the A105. The entry treatment should slow vehicles down enough to ensure that late breaking nose to tail collisions and cycle to vehicle conflict does not occur. The double give way feature should emphasise the need for drivers to be more careful and avoid conflict with others.	
Client Organisation Comments	
Designer's response accepted	

3.1.4 PROBLEM

Location: B – At the junction of Station Road / Fords Grove with Green Lanes

Summary: Right turn cyclists unaware of / ignoring the proposed 2SRT, could potentially be in conflict with other traffic movements at the junction leading to vehicle to cycle and cycle to cycle collisions.

It is proposed to introduce 'two-stage right turn' (2SRT) facilities for cyclists turning right from Green Lanes. It is not known if an 'early release' signal feature is incorporated as part of the 2SRT facility. There is a concern that cyclists turning right from Green Lanes might not be aware of / ignore the proposed 2SRT, leading to vehicle to cycle and cycle to cycle collisions at the junction.

RECOMMENDATION

It is recommended that 'early release' signals should be provided for the 2SRT facilities. The need for right turn facilities for cyclists making the manoeuvre from both Fords Grove and Station Road directions should be assessed and, if appropriate they should be consistent with the proposed facilities for the other right turn manoeuvres.

Ensure that cyclists approaching the junction are informed of the facility, by providing 2SRT direction signs. It should be ensured that cyclists can see an appropriate signal head when making the right turn manoeuvre in two stages.

Design Organisation Response	**~~Accepted~~ / Part Accepted ~~/ Rejected~~**
A cycle early release cannot be incorporated into the design due to its implications on the junction's capacity. Transport for London is currently implementing 2-Stage right turns, without early release. The Traffic Infrastructure team within TfL have confirmed that 2 Stage right turns without early release can be implemented at these locations. The volume of right turn cycles to and from Station Road/Fords Grove is anticipated to be low as Station Road and Ford's Grove do not form part of the cycle network. 2SRT advance signs could be provided as installed by TfL for CSH.	

Client Organisation Comments
Designer's response accepted. 2SRT signs should be erected, at least until people get used to new signal phasing.

3.1.5 PROBLEM

Location: C – A105 Green Lanes left turn slip to Station Road

Summary: Motorists may not see / appreciate cyclists on the cycle track attempting to assert priority.

The Audit Team are concerned that motorists turning left from the A105 Green Lanes towards Station Road may not anticipate or see approaching cyclists and may therefore not give way as the cycle route crosses this left turn slip road. The alignment of the track results in northbound cyclists approaching almost from behind a left turning vehicle. Therefore, a driver may have to look far over their left shoulder to try and view an approaching cyclist, this may not be possible for those with reduced neck movement, drivers of a van or similar which may have restricted visibility such as due to having a panelled or 'box' rear. Additionally, the approach path of cyclists / alignment of the vehicle giving may mean that approaching cyclists are not conspicuous, particularly as they may be approaching at a speed higher than the vehicle turning left. Therefore this layout may result in an increased potential for left turning vehicles to not give way and to collide with cyclists crossing the slip between sections of the track as a result.

RECOMMENDATION
It is recommended that alterations are made to ensure that approaching cyclists can be clearly sighted by those indicated to give-way. This may involve but is not limited to altering the alignment of the northbound cycle track and / or the left turn slip.

Design Organisation Response	~~**Accepted / Part Accepted**~~ **/ Rejected**
On the approach there should be adequate time for motorist to see cyclists. Motorists will be slowed by the ramped approach and cyclist will be slowed by the tight radii approaching the crossing point	

Client Organisation Comments
Designer's response accepted

3.1.6 PROBLEM

Location: D – A105 Green Lanes south of junction with Station Road

Summary: Loading bays adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays on the southern side of the junction to the nearside of the southbound traffic lanes. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle path. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	**~~Accepted / Part Accepted~~ / Rejected**
The alternative is to provide a cycle lane on the carriageway side. If the cycle lane was to be provided road side, the risk of dooring would be much more severe as it would lead to a cyclist swerving or being knocked onto the live carriageway. In the current situation, the buffer zone will provide a level of 'pause' prior to motorists exiting vehicles. On occasions where passengers are accessing vehicles visibility will allow interaction between cyclist and passengers. Visibility ahead is good and cyclists will be slowed at the ramps, giving enough time to check speed and warn of approach, if necessary.	
Client Organisation Comments	
Designer's response accepted.	

3.1.7 PROBLEM

Location: E – Left turn slip to Fords Grove from the A105 Green Lanes

Summary: Proposed hatch / approach to left turn slip may result in collisions with the proposed planting area.

The proposed layout may result in southbound motorists not noticing the left turn slip for Fords Grove until they are in close proximity to it, particularly whilst the bus stop is occupied. If motorists notice the left turn slip / that the nearside lane is ahead only as they pass a waiting bus at the stop, they may make last minute manoeuvres. Sudden turning manoeuvres may lead to loss of control or collisions with the proposed planting area at the head of the splitter island, particularly given that the hatching on approach is minimal and no vertical feature to highlight the splitter island is present.

RECOMMENDATION
It is recommended to alter the layout on approach to ensure that the left turn slip is conspicuous and provides suitable deflection / guidance either side of the proposed planting. This may require relocating the bus stop and / or providing alterations to the road markings and a vertical illuminated feature to highlight the island.

Design Organisation Response	**~~Accepted~~ / Part Accepted / ~~Rejected~~**
Consideration can be given to providing additional directional arrows on approach to junction.	
Client Organisation Comments	
Operation of junction will be monitored and additional markings/signs erected if necessary	

3.1.8 PROBLEM

Location: F – Fords Grove approach to the A105 Green Lanes

Summary: Layout may result in an increased potential for 'left hook' type collisions if cyclists attempt to continue ahead from the nearside.

The Audit Team are concerned that the proposed layout may result in cyclists staying kerbside and attempting to continue ahead westbound through the junction. As this lane is a designated left turn lane cyclists attempting to continue ahead may be at an increased risk of left hook type collisions as motorists attempt to turn left, potentially across the path of these cyclists.

RECOMMENDATION
It is recommended to provide suitable additional features to facilitate the likely demand for the ahead movement by cyclists. This may include, but is not limited to, an advanced stop line and / or early release for cyclists. If these features are not feasible then an alternative may be to provide cycle logos to provide guidance to assist cyclists to assert a primary position to continue in the appropriate lane before this approach widens to two lanes.

Design Organisation Response	**~~Accepted / Part Accepted~~ / Rejected**
An ASL was not possible at this location as bus manoeuvres include a U turn which isn't possible from tracking, without impacting on ASL. This is also not one of the proposed cycle routes and therefore unlikely that many	

cyclists will be approaching from this direction.
Client Organisation Comments
Operation of junction will be monitored and additional measures considered if necessary.

3.1.9 PROBLEM

Location: G – Left turn slip to Fords Grove from the A105 Green Lanes

Summary: Proposed zebra and cycle crossing may result in drivers failing to give-way to cyclists

The Audit Team are concerned that the proposed zebra and cycle crossing may not be understood by motorists particularly as the layout is new to drivers. The following issues may result in an increased potential for collisions:

- Zebra crossings are well established and the conspicuousness of the thick black and white striped road markings help to clearly indicate that a pedestrian has priority over vehicular traffic in this area. The lack of these markings within the proposed cycle section of the crossing may lead to ambiguity over who has priority and motorists may fail to give way to cyclists.
- Slow approach speeds by pedestrians enable an approaching motorist to notice they intend to cross, slow down and stop. Cyclists are likely to approach faster than pedestrians and may therefore fail to be noticed by approaching motorists.

These issues may lead to an increased potential for collisions between motorists and cyclists or shunt type collisions as motorists brake sharply as they unexpectedly encounter a cyclist attempting to assert priority.

RECOMMENDATION
Provide measures which will allow cyclists to assert priority over motorists. This could include an alternative crossing type, or provide appropriate temporary signing to inform drivers of the intended usage until this layout becomes more commonplace. At this location if this crossing type is retained it may be beneficial to reverse the layout so that motorists encounter the more conventional part of the zebra crossing before the cycle crossing.

Design Organisation Response	**~~Accepted~~ / Part Accepted / ~~Rejected~~**
Temporary signage will be provided.	
Client Organisation Comments	
Designer's response accepted.	

3.1.10 PROBLEM

Location: H – Access across the cycle track on the left turn slip for Fords Grove

Summary: Layout may result in both users assuming priority and collisions between cyclists and motorists

The Audit Team are concerned that the vehicular access over the segregated cycle track does not have a priority assigned. If both users assume priority then an increased potential for collisions between cyclists on the track and vehicles using the access may result.

RECOMMENDATION
It is recommended to clearly define the priority at this location.

Design Organisation Response	**~~Accepted~~ / Part Accepted / ~~Rejected~~**
The line marking for the cycle lane crossing this access has been modified to elephant's footprints to indicate to vehicles that cyclists have priority across the access. A 'SLOW' marking is also included on the cycle track to warn cyclists, which will help to reduce cyclist speeds in the case of a vehicle edging out. There is no issue with visibility for vehicles exiting this access as the wall is very low with railings above it which allow drivers to see clearly if any cyclists or pedestrians are approaching the crossing.	
Client Organisation Comments	
Designer's response accepted	

3.2 PEDESTRIAN CROSSING FACILITIES

3.2.1 PROBLEM

Location: I – Proposed controlled pedestrian crossing on southern side of the junction

Summary: Proposed reverse stagger pedestrian crossings may result in increased collisions with pedestrians.

The proposed reverse stagger pedestrian crossing encourages pedestrians to walk away from approaching traffic within the central reservation area. This may result in reduced awareness of approaching vehicles as pedestrians enter the second part of the crossing. Furthermore, this layout tends to rely on the provision of pedestrian guard railing to enforce the use of the stagger and deter users from crossing between stationary, accelerating or decelerating vehicles.

The proposed layout may therefore result in an increased potential for collisions between pedestrians and motorists.

RECOMMENDATION
Provide pedestrian crossing facilities which encourage safe crossing manoeuvres. This may include but is not limited to the provision of conventional staggered pedestrian crossings. If this cannot be achieved then pedestrian guard railing may be required to encourage safer use of the reversed staggered layout.

Design Organisation Response	**~~Accepted / Part Accepted~~ / Rejected**
Changing the stagger would decrease access to the slip road and reduce capacity at junction.	
Client Organisation Comments	
Designer's response accepted	

3.2.2 PROBLEM

Location: J – Station Road crossings

Summary: Proximity of tactile paving facilities may confuse blind or partially sighted users and lead to these users colliding with cyclists or motorised vehicles.

On the triangular splitter island, the tactile paving layout across the cycle lane is very close to that for the signalled crossing of Green Lanes. This may mean that blind or partially sighted users are confused by the merged layout and inadvertently walk into live carriageway or the cycle lane without realising.

Similarly, on the south-western footway, the tactile paving at the cycle lane is in close proximity to the dropped crossing facility for the Station Road left slip lane. Again, this may mean that blind or partially sighted users are confused by the merged layout and inadvertently walk into live carriageway or the cycle lane without realising.

RECOMMENDATION
It is recommended that the tactile paving layouts in close proximity to each other are relocated to clarify the layouts for vulnerable users.

Design Organisation Response	**~~Accepted / Part Accepted~~ / Rejected**
This is noted. However, the tactile arrangement/crossing points represent the desire line. Moving the cycle track crossing from this location may lead to visibly impaired pedestrians getting confused and missing the location of the controlled crossing points.	
Client Organisation Comments	
Operation of junction will be monitored and additional measures considered if necessary.	

3.2.3 PROBLEM

Location: K – A105 Green Lanes junction with Station Road / Fords Grove

Summary: Proposed crossings may not suitably accommodate pedestrian desire lines.

The proposed layout may be too inconvenient for pedestrians, for example if a pedestrian exiting a southbound bus followed the designated crossing points to get to the north western side of the A105 Green Lanes they would have to make six crossing manoeuvres (including crossing sections of cycle lane). Similarly, to get to the Southern side of Fords Grove using designated crossing points it would be ten separate crossing manoeuvres. This may be very cumbersome and potentially confusing for visually impaired users, particularly given that some of the tactile paving sections are very close to one another. It is considered that non visually impaired pedestrians are likely to disregard the designated crossing points and instead cross on desire lines. Pedestrians crossing at undetermined locations and without the assistance of crossing facilities may be more vulnerable and less likely to be anticipated by cyclists and motorists which may lead to an increased potential for collisions between the two users.

RECOMMENDATION
It is recommended that alterations are incorporated to make the cycling and pedestrian routes more appealing and to cover the likely desire lines. This may include but is not limited to providing pedestrian crossing facilities. Desire lines that may be present in the proposed layout but which do not appear to be accommodated, include, but may not be limited to, crossing the A105 to / from the bus stop to the north of the junction and crossing Fords Grove to the east of the junction.

Design Organisation Response	**~~Accepted~~ / Part Accepted / ~~Rejected~~**
With a formal crossing on the southern arm and a new formal crossing on the western arm the northern arm has retained existing informal crossing facilities. Reviewing the eastern arm it is proposed that an informal crossing point could be provided between Queens Avenue and Farm Road.	
Client Organisation Comments	
Operation of junction will be monitored and additional measures considered to assist pedestrians if necessary.	

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: General cycle routes in both directions on the A105 Green Lanes junction with Station Road / Fords Grove (Sheet 20/47)

Reason considered to be outside the Terms of Reference: Level of service / likely usage comment rather than a defined road safety concern.

The proposed layout may be considered too inconvenient for cyclists attempting to keep momentum through the junction. For example southbound cyclists approaching the junction could be 'held up' or delayed as other users cross their path at various points, such as:

1. Pedestrians crossing near the bus stop, north side of the junction,
2. Vehicles using the crossover for 'Capitol House' car park,
3. If road users wait across the cycle / zebra crossing,
4. Pedestrians crossing the cycle path within the splitter island to the west of the cycle / zebra crossing,
5. The cycle stop line as cyclists re-enter the carriageway.

This may result in cyclists taking to the carriageway on approach to the junction where they are given very little assistance.

It is appreciated that a significant level of intervention is provided to encourage segregated cycling and that provision on carriageway may be perceived as guidance to deviate from the designated and predominantly segregated cycle routes. Therefore, it is recommended that the use of the cycle facilities and cyclists remaining on carriageway at this junction are carefully monitored with a view to developing proposals if necessary.

Design Organisation Response	**~~Accepted~~ / Part Accepted / ~~Rejected~~**
Noted. The designs are not intended to prohibit confident cyclist from continuing to use the carriageway. The proposals are intended to promote for and provide additional facilities for less experienced cycling users. Monitoring can be undertaken, as suggested.	
Client Organisation Comments	
Designer's response accepted.	

4.2 ISSUE

Location: Various – throughout the junction

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

Planting / SuDs 'Rain Gardens' are proposed within this junction immediately adjacent to the carriageway / cycle lanes.

The full details of the proposed features have not been provided but it is assumed that these will be of a type / maintained so that they do not restrict visibility or overgrow into the live carriageway areas.

Design Organisation Response	**Accepted / ~~Part Accepted / Rejected~~**
Yes, that is correct.	
Client Organisation Comments	
Designer's response accepted	

4.3 ISSUE

Location: Various – throughout the junction

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

No details of swept path analysis have been provided. Access in to the left turn slip for Station Road and from the right turn pocket for Fords Grove appear as though they may be difficult for larger vehicles to complete without over-running kerbs.

It is recommended that the swept path analysis is checked and alterations are incorporated if required.

Design Organisation Response	**Accepted / ~~Part Accepted / Rejected~~**
Tracking movements have been carried out.	
Client Organisation Comments	
Designer's response accepted	

4.4 ISSUE

Location: Various – throughout the junction

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

The typical cross section of the on footway cycle track indicates that 3 rows of granite setts will be provided alongside the edges of the track. It is considered that these are likely to provide a reasonable tonal contrast and a texture / tactile difference to highlight the cycle track / edge of footway.

It is assumed that these will be laid almost flush (maximum upstand of less than 6mm) so that they do not present a trip hazard for pedestrians.

Design Organisation Response	**Accepted / ~~Part Accepted / Rejected~~**
Confirmed	
Client Organisation Comments	
Designer's response accepted	

4.5 ISSUE

Location: 1 – Western crossing on the southern side of the junction.

Reason considered to be outside the Terms of Reference: Drawing anomaly

Full details of the traffic signals have not yet been provided but the Audit Team note that the western part of the staggered pedestrian crossing on the southern side of the junction is not indicated with any green time. The phasing also shows that southbound vehicles are given a green signal to turn right on to Station Road during the same phase as pedestrians are given a green signal to cross Station Road.

It is assumed that these issues will be rectified as part of the continued design. This may require additional 'catch' stop lines as well as rectifying the traffic signal staging.

Design Organisation Response	**Accepted / ~~Part Accepted / Rejected~~**
Phasing diagram has been updated.	
Client Organisation Comments	
Designer's response accepted.	

5.0 SIGNATURES AND SIGN-OFF

5.1 AUDIT TEAM STATEMENT

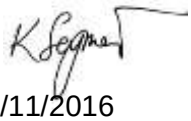
We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit report. The Road Safety Audit has been carried out in accordance with TfL Procedure SQA-0170 dated May 2014, with the sole purpose of identifying any feature that could be removed or modified in order 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: 25/11/2016
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	
	B Sc, PG Dip TS, MCIHT, MSoRSA	Signed: 
Position:	Principal Road Safety Auditor	Date: 25/11/2016
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 Organisations endorsement of my proposals.

Name: Colin Aarons

Position: Project Manager

Organisation: **J**acobs

Signed: Colin Aarons **Dated:** 09.02.17

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:** 14.03.2017

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

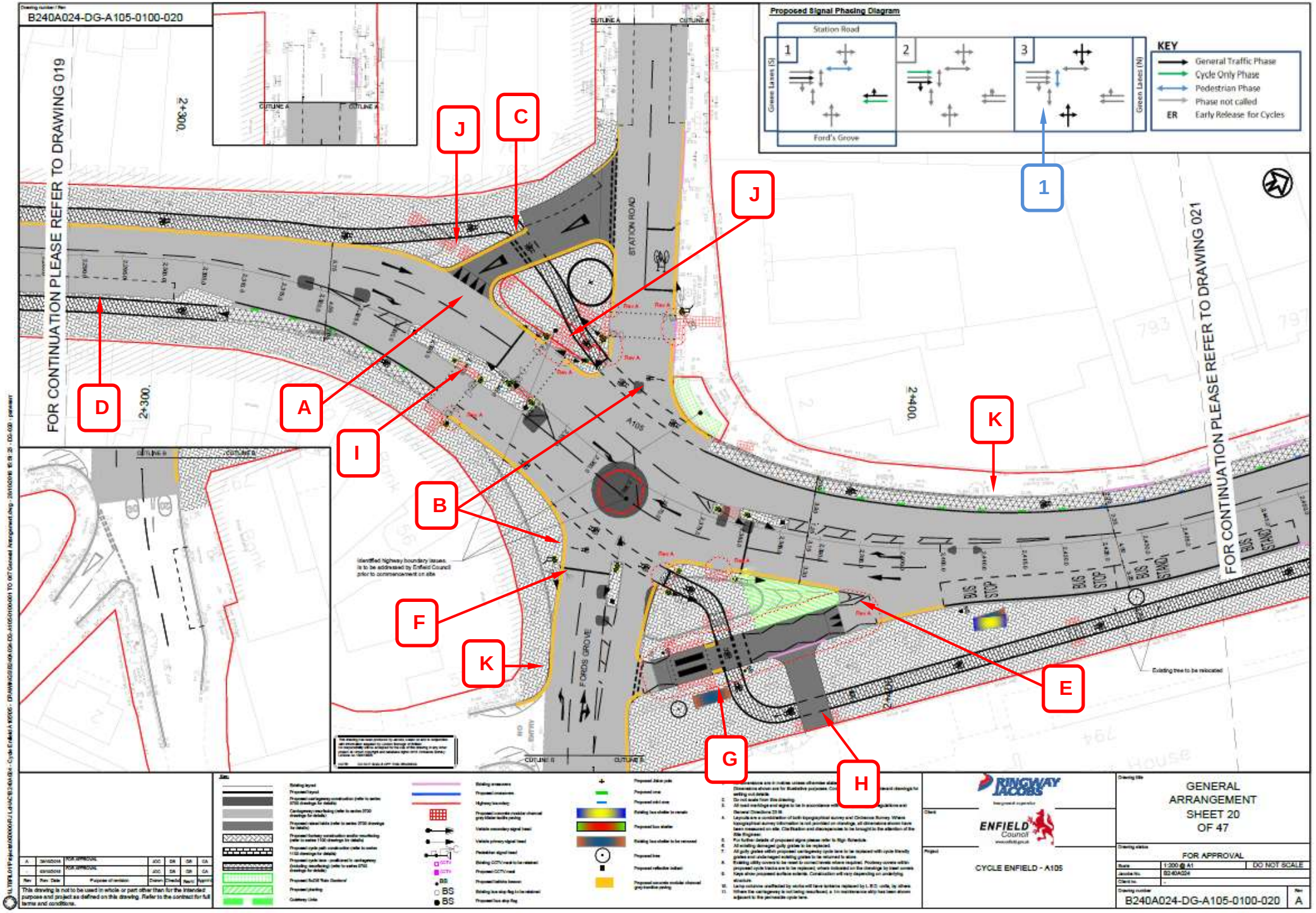
Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-020 Rev A	Cycle Enfield A105 - General Arrangement Sheet 20 of 47
B240A024-DG-A105-0200-020 Rev –	Cycle Enfield A105 - Site Clearance Sheet 20 of 47
B240A024-DG-A105-0500-020 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 20 of 47
B240A024-DG-A105-0700-020 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 20 of 47
B240A024-DG-A105-1100-020 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 20 of 47
B240A024-DG-A105-1200-020 Rev A	Cycle Enfield A105 - Traffic signs and road markings Sheet 20 of 47
B240A024-DG-A105-1300-020 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 20 of 47
B240A024-DG-A105-1400-020 Rev A	Cycle Enfield A105 – MCHW Series 1400 Schedule of Electrical Works Section 9 of 14

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 9

APPENDIX B

Problem Locations


B240A024-DG-A105-0100-020
Proposed Signal Phasing Diagram
Station Road
Ford's Grove
Green Lanes (S)
Green Lanes (N)
KEY
General Traffic Phase
Cycle Only Phase
Pedestrian Phase
Phase not called
ER Early Release for Cycles
FOR CONTINUATION PLEASE REFER TO DRAWING 019
FOR CONTINUATION PLEASE REFER TO DRAWING 021
STATION ROAD
FORDS GROVE
A105
2+300
2+400
A
B
C
D
E
F
G
H
I
J
K
1
Identified highway boundary issues is to be addressed by Enfield Council prior to commencement on site
Existing tree to be relocated
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 20 OF 47
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-020
A