The background of the page is a vibrant red. It is decorated with several abstract geometric shapes: a large teal semi-circle in the top-left corner, a blue semi-circle in the top-right, a dark blue semi-circle in the bottom-right, and a teal semi-circle in the bottom-left. Scattered throughout are white circles of various sizes, some of which are partially enclosed by blue or dark blue shapes, creating a modern, stylized aesthetic.

Appendix M2
Road Safety Audit
Stage 1

© Copyright 2019 Jacobs Engineering Ireland Limited. The concepts and information contained in this document are the property of Jacobs. Use or copying of this document in whole or in part without the written permission of Jacobs constitutes an infringement of copyright.

Limitation: This document has been prepared on behalf of, and for the exclusive use of Jacobs' client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this document by any third party.

Contents

1.	Introduction.....	1
2.	Site Specific Problems Identified.....	2
2.1	General.....	2
3.	General Arrangement Drawings	5
3.1	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0001).....	5
3.2	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0003).....	6
3.3	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0003).....	7
3.4	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0004).....	7
3.5	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0005).....	8
3.6	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0006).....	8
3.7	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0007).....	8
3.8	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0008).....	9
3.9	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0009).....	10
3.10	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0010).....	10
3.11	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0012).....	11
3.12	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0013).....	11
3.13	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0015).....	12
3.14	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0016).....	12
3.15	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0018).....	14
3.16	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0019).....	14
3.17	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0020).....	15
3.18	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0023).....	15
3.19	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0024).....	16
3.20	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0025).....	17
3.21	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0027).....	18
3.22	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0028).....	18
3.23	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0029).....	19
3.24	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0030).....	19
3.25	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0031).....	20
3.26	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0032).....	21
3.27	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0033).....	21
3.28	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0034).....	22
3.29	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0035).....	22
3.30	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0036).....	23
3.31	General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0037).....	24
4.	System Design Drawings.....	26
4.1	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0001.....	26

4.2	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0002.....	26
4.3	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0004.....	26
4.4	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0005.....	27
4.5	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0010.....	27
4.6	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0013.....	27
4.7	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0015.....	27
4.8	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0019.....	28
4.9	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0022.....	28
4.10	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0024.....	29
4.11	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0026.....	29
4.12	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0027.....	29
4.13	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0030.....	29
4.14	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0033.....	30
4.15	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0034.....	30
4.16	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0035.....	30
4.17	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0037.....	30
4.18	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0038.....	31
4.19	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0040.....	31
4.20	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0041.....	31
5.	Fencing and Boundary Treatment.....	32
5.1	BCIDB-JAC-SPW_BW-0002_XX_00-DR-CR-0003.....	32
5.2	BCIDB-JAC-SPW_BW-0002_XX_00-DR-CR-0017.....	32
6.	General Comments.....	33
7.	Supplementary Audit.....	34
7.1	General Problems.....	34
7.2	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0001.....	34
7.3	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0004.....	35
7.4	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0005.....	35
7.5	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0006.....	36
7.6	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0008.....	36
7.7	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0009.....	36
7.8	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0012.....	36
7.9	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0015.....	37
7.10	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0018.....	37
7.11	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0019.....	37
7.12	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0020.....	38
7.13	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0021.....	38
7.14	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0023.....	38

7.15	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0024.....	38
7.16	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0026.....	39
7.17	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0036.....	39
7.18	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0016.....	39
7.19	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0018.....	39
7.20	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0021.....	40
7.21	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0022.....	40
7.22	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0024.....	40
7.23	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0025.....	41
7.24	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0029.....	41
7.25	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0036.....	41
7.26	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0038.....	41
7.27	BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-0001 to 0037.....	42
7.28	BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-00035.....	42
7.29	BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-00006.....	42
8.	Audit Team Statement.....	44

Appendix A. Location Maps

Appendix B. Initial Drawings & Documents Supplied

Appendix C. Road Safety Feedback Form

Appendix D. Supplementary Audit Drawings & Documents Supplied

Appendix E. Supplementary Road Safety Feedback Form

1. Introduction

This report results from a Stage 1 Road Safety Audit of the CBC02 Swords to City Centre Core Bus Corridor.

The Audit has been prepared in accordance with TII Publication GE-STY-01024 (HD 19/15) Road Safety Audit. The Audit Team has examined and reported on only the road safety implications of the scheme and has not examined or verified the compliance of the design to any other criteria.

The Audit Team was as follows:

G. Turley Team Leader	MEng, HDip PM, H Dip H'ways & Geo, CEng MIEI, Associate Director, Merrion House, Merrion Road, Dublin
P Kelly Team Member	MEng, BEng MIEI Senior Engineer, Merrion House, Merrion Road, Dublin

The audit was carried out between Monday 12th October and Thursday 12th November 2020.

Weather conditions during the site visit were dry and overcast.

Following the implementation of the accepted recommendations and some other design changes, the Audit Team were requested to reaudit the scheme with a focus solely on these changes. The audit findings are found in section 7 Supplementary Audit. This part of the audit was carried out between 11th April and 19th May 2022

The Design Team and Employer (Client) is reminded that the Road Safety Audit Designers Response (separate document accompanied with this audit) shall be completed and returned to the Road Safety Audit Team Leader for sign off.

2. Site Specific Problems Identified

2.1 General

2.1.1 Problem

The Drawings indicate the provision of a cycle track throughout the scheme. The drawings do not indicate where the cycle track changes to an on-road cycle lane on the approach to pedestrian crossings, accesses or junctions.

Recommendation

The Design Team should ensure that the drawings differentiate between cycle lanes and cycle tracks and show clearly where the cycle track ramps up and ramps down.

2.1.2 Problem

The Drawings provided are not clear or consistent on the approach to driveways/ commercial premises as to whether the footpath/ cycle track will continue through the junction (through a dished or bevel kerb) or whether the cyclist/ pedestrian is to cross the mouth of an access, and the motorist has priority.

Recommendation

The Design Team should ensure that where appropriate, the footpath and cycle lane continues across an access to provide an increased sense of priority for cyclists and pedestrians.

2.1.3 Problem

The Audit Team noted on site the ponding of water in the carriageway at various locations. The widening of the carriageway to facilitate additional lanes may increase the risk of ponding of water and increase the risk of loss of control type collisions due to ice during cold conditions

Recommendation

The Design Team should ensure the drainage design is sufficient to positively drain the carriageway.

2.1.4 Problem

The Audit Team note that at some junctions, the signal phasing indicates that the cyclist 'green' movement proceeds at the same time as the bus lane 'green'. The Audit Team note that the cycle stop line is placed ahead bus stop line but is concerned that where the bus lane is used by taxi or private coaches to undertake a left turn movement and are unaware of the need to yield to cyclists crossing, increasing the risk of cyclist and vehicular conflicts.



Figure 2.1 Ponding of water in the carriageway (Ch A4650)

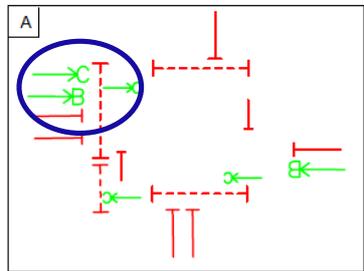


Figure 2.3 Swords Road/
Northwood Avenue

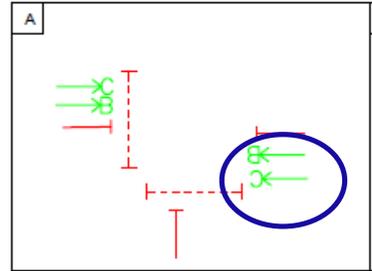


Figure 2.2 Swords Rd/ Old Airport
Rd/ Collinstown Ave Junction

Recommendation

The Design Team should ensure that the signal phasing for the Bus Lane and Cyclist movements are independent where a left turn is involved.

2.1.5 Problem

The drawings indicate the provision of cycle lights in close proximity within the junction in various locations. There is concern that the alternative green phase of these lights will cause cyclists confusion putting them into conflict with either vehicular traffic or other vulnerable road users.

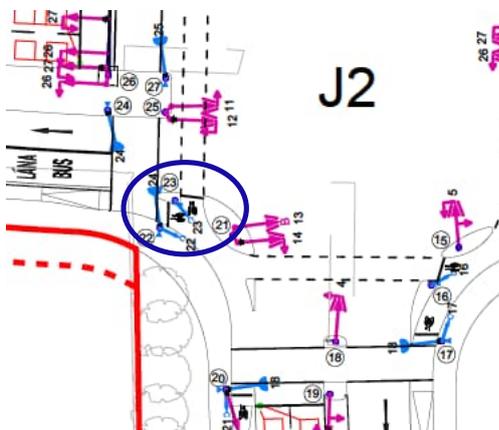


Figure 2.5 Swords Road/ Boroimhe Road

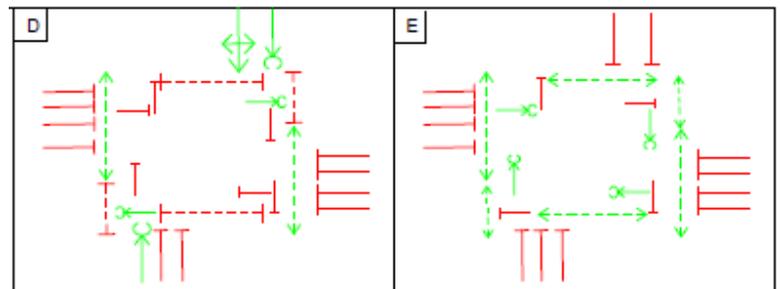


Figure 2.4 Swords Road/Borimhe Road
Phasing example

Recommendation

The Design Team should ensure cycle signals and associated stop lines are located in such a way not to cause confusion.

2.1.6 Problem

The drawings identify cycle lanes with associated stop line markings in close proximity to each other. There is a concern that there may be insufficient cycle stacking room for cyclists waiting at some locations who will have a red light while the adjacent cycle lane may have green. This could cause frustration and lead to some cyclists either mounting the footpath or entering the carriageway, putting them into conflict with other road users.

Recommendation

The Design Team should ensure there is sufficient stacking room for future level of cyclists need.

2.1.7 Problem

The Drawings identify all traffic signal heads having green arrows. This does not follow the junction layout where full aspects would be more appropriate and avoid driver confusion.

Recommendation

The Design Team should ensure the signal head and phasing design appropriately aligns with the proposed physical layout of the junctions.

2.1.8 Problem

The Audit team note that there are multiple pedestrian phases across the junctions. The Audit team are unclear how the audio tactile push buttons will operate where poles are in close proximity.

Recommendation

The Design Team should ensure that appropriate consideration is given to this element to ensure the visually impaired do not get confused with the audio indication from different phases of pedestrian crossing.

3. General Arrangement Drawings

3.1 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0001)

3.1.1 Problem

It is noted that the northbound bus lane on the southern arm of the proposed signalised junction is for left turn movements only. The Audit Team is concerned that there is insufficient advanced warning of this layout for taxis and private coaches which may use the bus lane and wish to continue straight. There is an increased risk of vehicles performing sudden lane-changing manoeuvres leading to side swipe or rear shunt type collisions due to late breaking.

Recommendation

The design team should provide advance warning signs and road markings are provided to inform buses and taxis to join the main traffic lanes in order to make a straight-ahead movement.

3.1.2 Problem

The Audit Team are concerned that cyclists turning right out of the proposed junction (Figure 3.1) will be unable to safely join the proposed cycle track and will be forced to mount the kerb, leading to an increased risk of loss of control type collisions.

Recommendation

The design team should ensure that cyclists can safely access the cycle track.

3.1.3 Problem

The Audit Team note that there are two consecutive right turn movements on the southern arm of the proposed junction (Swords Road). There is a risk of rear shunt type collisions due to motorists not anticipating right turn movements into the Travelodge Hotel prior to the right turn at the proposed signalised junction.

Recommendation

The design team should consider the installation of a traffic island, flexi-bollards or similar at this location to separate the two right turning lanes.

3.1.4 Problem

The Audit Team note that on the northern arm of the proposed junction (Dublin Road), there is a proposed signalised junction access on the western side to service future development. It is unclear as to how right turners on the minor arm will construe the road layout ahead with general traffic lanes located either side of the bus lane. There is a risk of unsafe manoeuvres due to unfamiliarity with the road layout and the proximity of the two signalised junctions to one another.

Recommendation

The design team should provide advance directional signage to ensure motorists are aware of the road layout ahead.



Figure 3.1 Access to Cycle Track for right turns

3.1.5 Problem

The Audit Team note that on the R132, south of the signalised junction, a ghost island junction is proposed providing access to Swords Veterinary Hospital. It is unclear from the drawings provided, whether a right turn out of the junction is permitted. The Audit Team is concerned that there is an increased risk of collision due a vehicle having to cross three lanes of traffic (bus lane/ westbound lane, and right turn pocket) before joining the eastbound lane, and eastbound traffic being unaware of a vehicle emerging.

Recommendation

The design team should ensure that right turns out of the junction are not permitted through appropriate road markings and signage.

3.1.6 Problem

The Audit Team note that on the Dublin Rd, north of the signalised junction, there are two private entrances where access is maintained adjacent to the signalised junction. The Audit Team is concerned that a vehicle may not be able to turn right out of the entrance due to queued vehicles be forced to sit in the westbound lane in order to force entry onto the eastbound lane, there is an increased risk of head on/ side impact type collisions.

Recommendation

The design team should ensure that box junction or “keep clear” road markings are provided to allow egress from the access when turning right.

3.1.7 Problem

The Audit Team note that the tie in of the footpath and cycle track on the R132 Swords Road have no provisions as there is currently no infrastructure beyond the site boundary lines. There is concern that users following the footpath and/cycle track will enter the carriageway, putting them into conflict with vehicular traffic.

Recommendation

The design team should ensure that there is an appropriate transition from the provision of new infrastructure to current alignment. This may involve the use of advance signage which informs users of the lack of facility ahead.

3.2 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0003)

3.2.1 Problem

On the Boraimhe Road eastbound, the Audit Team noted the presence of an existing entrance with a dished crossing facilitating vehicular access. The proposed Bus Stop at this location may inhibit the visibility splay at this access, increasing the risk of vehicular collision.

Recommendation

If this access is to be maintained, the Design Team should consider relocating the proposed bus stop.



Figure 3.2 Existing Access on Boraimhe Rd

3.3 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0003)

3.3.1 Problem

It is unclear from the drawings provided how access will be maintained at the accesses to the Texaco Petrol Station, and whether pedestrians and cyclists will have a change in level across the access. There is an increased risk of pedestrian & cyclist conflicts with vehicle if priority is not made clear.

Recommendation

The design team should ensure consistent approach to private accesses and consider a raised table and footpath crossing to encourage a "courtesy crossing" for pedestrians/ cyclists.

3.3.2 Problem

The Audit Team is concerned that at the Texaco Petrol Station, due to the provision of an additional lane, vehicles will have to join the left turn lane only initially and then cross the bus lane, to get to the 'straight ahead' or 'right turn lane'. There is an increased risk of driver frustration resulting in inappropriate manoeuvres.

Recommendation

The Design Team should provide suitable road markings to allow vehicle to safely access and egress from the development.

3.4 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0004)

3.4.1 Problem

The Audit Team is concerned that the proposed footpath and cycle lane may become blocked by parked cars in the vicinity of Joe Boland Motor Salvage, forcing cyclists into the carriageway or footpath in conflict with pedestrians or vehicles.

Recommendation

The design team should provide measures to ensure access to the footpath and cycle track is maintained at all times.



Figure 3.3 Parked Cars outside commercial premises

3.4.2 Problem

The Audit Team is concerned the removal of the existing deflection island preventing traffic turning right out of the N1 Business Park, may allow for vehicles to turn right in the future. A solid white line is noted in the centre of the carriageway, and adjacent junctions (Kettle Lanes) do not permit right turns out of the minor access.

Recommendation

The design team should consider implementing measures to advise against vehicles turning right from this business park

3.5 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0005)

3.5.1 Problem

The Audit Team note that the design is showing a proposed footpath on the southern side of kettles Lane where no verge or footpath presently exists. This could cause footpath users to enter the carriageway putting them in conflict with Vehicular traffic.

Recommendation

The Design Team should ensure there are appropriate measures for the tie in.

3.6 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0006)

3.6.1 Problem

The Audit Team is concerned that there are no cycle lane facilities for cyclists exiting the junction onto the Naul Road. There is a risk of Cyclist & Pedestrian conflicts during Signal Phase F when cyclists on the R132 Swords Road northbound turn left onto the Naul Road.

Recommendation

The Design Team should provide cyclist facilities to allow cyclists to travel safely westbound on the Naul Road from the R132 Northbound.

3.6.2 Problem

The Audit Team is concerned that on the Naul Road southbound, the road marking indicates a straight-ahead movement only. This may result in an increased risk of collision due to driver confusion

Recommendation

The Design Team should ensure the road marking are appropriate to cater for all traffic permitted traffic movement.

3.6.3 Problem

The Audit Team is concerned that on the R132 Swords Road, at Chainage A1,925, the proposed right turn lane is suddenly introduced. There is a risk of vehicles decelerating in conflict with traffic on the straight-ahead lane or side swipe collisions due to poor lane discipline.

Recommendation

The Design Team should provide appropriate hatching to introduce the right turn lane via a direct taper.

3.7 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0007)

3.7.1 Problem

The Audit Team are concerned that the two-way cycle lane commencing at chainage A2300, the cycle lane adjacent to the carriageway travels in the opposite direction to the flow of traffic.

Recommendation

The two-way cycle path should be in accordance with the National Cycle Manual where the with-flow cyclist is positioned closest to the traffic. This ensures lower relative speed between cyclist and traffic (Forgivingness Principle) and facilitates transitions.

3.7.2 Problem

The Audit Team notes the existing road markings indicate 'Yield' road markings at this existing priority junction at chainage A2,150m. Due to the existing vertical gradient, there is the increased risk of vehicular collision with some vehicles rolling forward before there is an acceptable a gap in oncoming traffic.



Figure 3.4 Existing road markings

Recommendation

The Design Team should provide 'STOP' road markings and warning signage at this priority junction.

3.8 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0008)

3.8.1 Problem

The orientation of the staggered pedestrian crossing on the western arm of the roundabout will result in pedestrians being forced to turn their back on the traffic stream which they are about to cross. This may result in pedestrians stepping off the footway into approaching traffic.

Recommendation

The Design Team should consider laying out the staggered crossings in such a way that pedestrians are forced to face the traffic stream which they are about to cross.

3.8.2 Problem

At the Airport Roundabout, the Audit Team are concerned that the proposed road markings may not fully explain the road layout ahead and result in an increased risk of driver confusion and sudden manoeuvres as follows:

- On the northern arm heading southbound, straight ahead arrows are provided for the nearside general traffic lane, but M1/M50 mentioned in text road markings indicating a left turn also
- On the southern arm heading northbound, straight ahead arrows are provided for the nearside general traffic lane, but an Airport Symbol is mentioned in text road markings indicating a left turn also.
- On the southern arm heading northbound, straight ahead arrows are provided for the offside general traffic lane, but M1/M50 is mentioned in text road markings indicating a right turn also.
- On the western arm heading eastbound, straight ahead arrows only are provided for the middle general traffic lane, but straight ahead/ right turn are present on the circulatory carriageway.

Recommendation

The Design Team should ensure the road markings are appropriate

3.9 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0009)

3.9.1 Problem

The Audit Team are concerned that the proposed table crossing at Chainage A3075 is not sufficiently aligned with the cycle lane, such that the southbound cycle lane adjacent to the carriageway crosses the entrance on the ramp leading to an increased risk of loss of control type collisions. A similar example is noted at chainage A3575.

Recommendation

The Design Team should ensure the cycle lane crosses the flat section of the table ramp.

3.9.2 Problem

The Audit Team note that at the green long-term car park and ALSAA, left turn filter lanes are proposed to be maintained in place. These additional crossing point for the cycle/foot way and increased merges/diverges for traffic increases the number of potential conflicts, resulting in side-swipe accidents, at this junction. It also increases the number of individual crossings for pedestrians/cyclists and thereby increases wait time throughout the full crossing resulting in the potential for user frustration and a subsequent lack of compliance.

Recommendation

The design team should consider rationalising the number of crossings at this location to reduce the number of potential conflicts and the total pedestrian/cyclist crossing time.

3.9.3 Problem

The Audit Team noted at chainage 3+000, the ponding of water on the carriage way at an existing pedestrian crossing. During cold condition this standing water could lead to an increased risk of trips and falls.

Recommendation

The design team should ensure gullies are located on the upstream side of the dished kerbs to prevent water flowing across the low kerbs and depositing loose debris underfoot of pedestrians.



Figure 3.5 Ponding at existing crossing

3.10 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0010)

3.10.1 Problem

The Audit Team are concerned that the drawings do not show how the existing footpath/ cycle track on the northern side of South Corballis Rd will tie into the proposed arrangements. It is assumed that cyclists will have to merge with general traffic on the left turn filter lane increasing the risk of collision

Recommendation

The Design Team should ensure an appropriate tie with the existing cross section is provided.



Figure 3.6 Existing Cycle Track/ Footpath on South Corballis Rd

3.11 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0012)

3.11.1 Problem

The Audit Team are concerned that the proximity of the Collinstown Cross Industrial Estate to the proposed junction. From the drawings provided it is unclear whether the existing junction is to be retained or where an alternative access is proposed. It is noted that a cycle ramp and signal is located at the mouth of the entrance

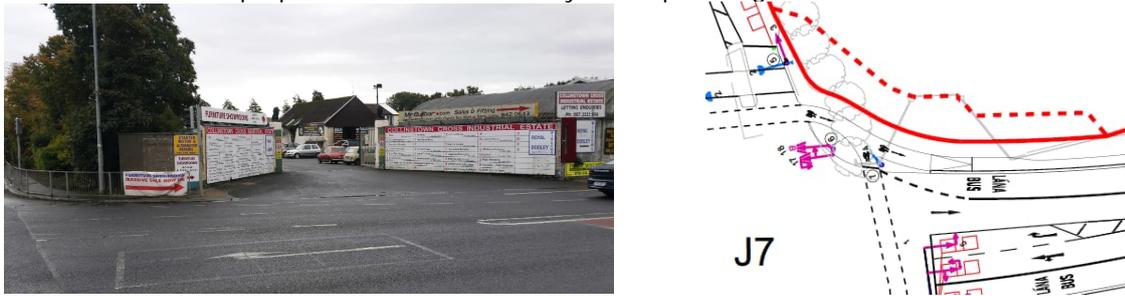


Figure 3.7 Existing access to Industrial Estate

Recommendation

The Design Team should ensure that safe access to the existing development is maintained at an alternative location.

3.11.2 Problem

The Audit Team noted deterioration of the pavement at the Quickpark entrance leading to ponding of water. This may lead to slips, trips and falls at the pedestrian crossing or loss of control during cold conditions.

Recommendation

The Design Team should ensure that the pavement design is sufficient to cater for the traffic volumes and loadings.



Figure 3.8 Quickpark Entrance

3.12 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0013)

3.12.1 Problem

The Audit Team are concerned that the proposed cycle ramp kerbing at chainage A4500, will inhibit access to an existing entrance. Motorists may be unaware of the presence of kerbing leading to loss of control type collisions.

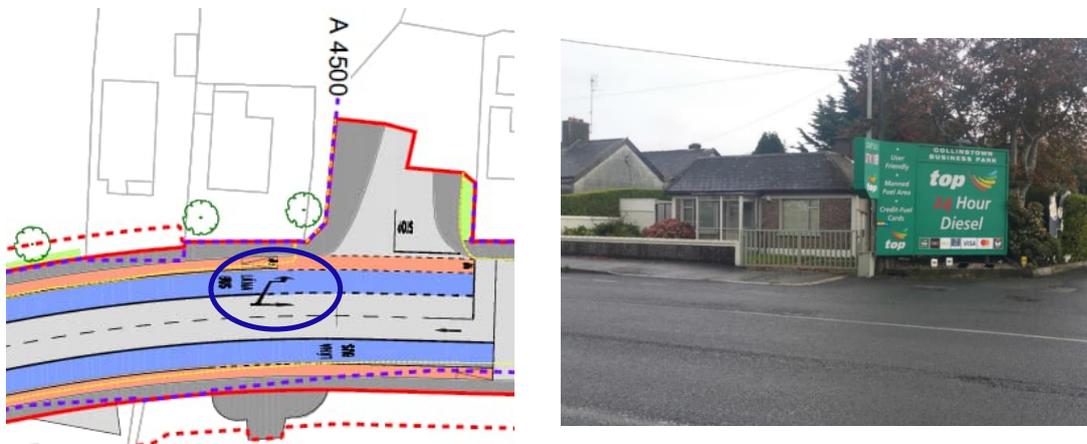


Figure 3.9 Conflict between cycle ramp and existing entrance

Recommendation

The Design Team should ensure the ramp is set back behind the existing entrance.

3.12.2 Problem

The Audit Team are concerned that the width of the Bus Stop Island at chainage A4550 and A4575 is insufficient and there is a risk of collision between cyclists and pedestrian standing in the cycle lane.

Recommendation

The Design Team should ensure that there is sufficient space to provide a Shared Bus Stop Landing Zone Arrangement at these locations.

3.13 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0015)

3.13.1 Problem

The Audit Team note that the removal of the left turn filter lane and the tightening up of the junction. It was noted during the site visit this manoeuvre has a high number of HGV movements and appeared tight for space. The Audit team are concerned that HGVs may mount the concrete islands if there is insufficient space potentially coming in conflict with VRUs.

Recommendation

The design team should ensure that appropriate vehicle tracking is undertaken to ensure there is sufficient space for all common vehicle types.

3.14 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0016)

3.14.1 Problem

The Audit Team note that there are two consecutive right turn ghost islands, southbound along the R132 Swords Road. There is a risk of rear shunt type collisions due to motorists not anticipating right turn movements into the Furry Park Industrial Estate prior to the right turn at the proposed signalised junction

Recommendation

The design team should consider the installation of a traffic island, flexi-bollards or similar at this location to separate the two right turning lanes.

3.14.2 Problem

The Audit Team note that there is an existing sudden change in levels at the edge of the footpath and a domestic entrance. The Audit team are concerned with the narrowing of the footpath at this location, this issue may be exacerbated resulting in increased slips/loss of footing particularly for the visually impaired users.

Recommendation

The design team should ensure all gradients on the footpath are within the design standard recommendations.



Figure 3.10 Sudden change in Footpath level

3.14.3 Problem

The Audit Team note that the location of the proposed bus stop northbound, has a steep gradient for the location where the footpath is to be widened. No details are provided with respect to any proposed retaining structure; therefore the audit team could not assess the potential safety impacts at this location. The audit team are concerned that there may be potential of fall from height risk at this location.



Figure 3.11 Level difference for proposed footpath widening

Recommendation

The design team should ensure any proposed structure will be safe for all users.

3.15 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0018)

3.15.1 Problem

At the entrance to Santry Park, the Audit Team is unclear as to how a cyclist exits the junction to join the off-line cycle track. In the absence of road markings (keep clear/ advisory cycle lane/ box junction and signal stop line), there is an increased risk of vehicle/ cyclist conflicts at this two-way entrance.

Recommendation

The Design Team should ensure the road markings are adequate.

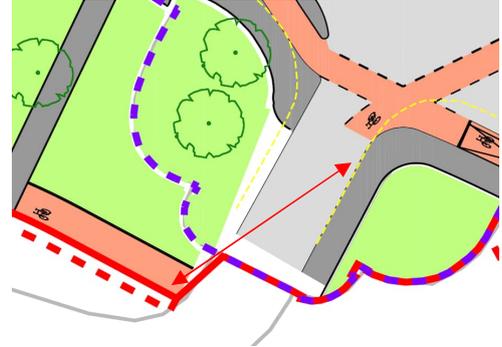


Figure 3.12 Entrance to Santry Pk

3.15.2 Problem

Along Coolock Lane westbound, the Audit Team is concerned there is an increased risk of side swipe type collisions due to two adjacent lanes turning left into three lanes southbound on the R132.

Recommendation

The Design Team should provide lane guidance line markings for the two left turn lanes.

3.16 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0019)

3.16.1 Problem

The Audit Team are concerned at the lack of cycling facilities to facilitate right turn movements on the Santry Avenue/ R132 and Church Lane Junction in the absence of toucan crossings.

Recommendation

The Design Team should provide jug turns where appropriate.

3.16.2 Problem

The Audit Team note there is no formal pedestrian crossing proposed across Church Lane, there is the risk of pedestrian/ vehicle conflicts as a result. The Audit Team also noted the lack of formal tactile paving to indicate the uncontrolled nature of the existing crossing.

Recommendation

The Design Team should determine if a signalised crossing is warranted and provide suitable tactile paving to indicate the type of crossing.

3.16.3 Problem

The Audit Team note the proximity of existing electricity lines to existing High Mast Pole Mountings on the northern side of the carriageway at Chainage A6700. There is a hazard risk during maintenance of the signal heads.



Figure 3.13 Existing OH Electricity Line

Recommendation

The Design Team should ensure the existing overhead lines are ducted underground.

3.16.4 Problem

At chainage A6740 and A6800, the Audit Team note the presence of accesses where a kerbed cycle track is proposed. There is a risk of loss of control type collisions due to having to mount the kerb to access the property.

Recommendation

At detailed design stage, the Design Team should consider a consistent approach to access whether using a bevel kerb or dished crossing.

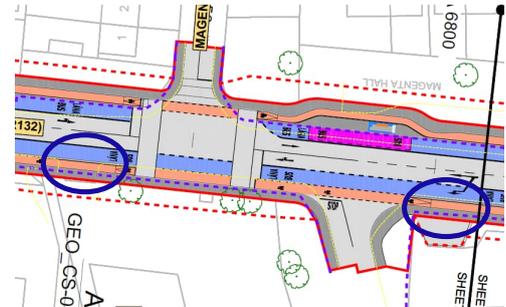


Figure 3.14 Maintaining access to existing entrances

3.16.5 Problem

The Audit Team are concerned that the lack of a yellow box junction in front of the priority junction at CH A6775 will prevent movements occurring when traffic is queueing at the nearby junction leading driver frustration.

Recommendation

The Design Team should ensure there are appropriate markings provided for this junction.

3.17 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0020)

3.17.1 Problem

The Audit Team observed vehicles turning right out of the shopping centre and demonstrating poor lane discipline, leading to an increased risk of side swipe type collisions

Recommendation

The Design Team should provide lane guidance line markings for the two right turn lanes.

3.18 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0023)

3.18.1 Problem

The Audit Team are concerned that the proposed road markings at this five-arm junction may increase the risk of driver confusion and number of collisions.

Recommendation

The Design Team should ensure

- No Entry Road Markings and Signage (Red Circle) as per existing
- The proposed road marking is replaced with straight ahead and right turn arrows and lane guidance line markings are provided.

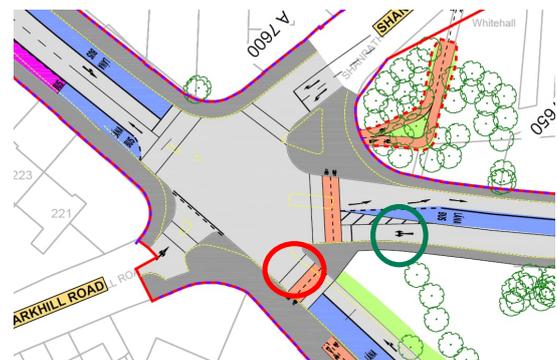


Figure 3.15 Road Markings

3.18.2 Problem

The Audit Team is concerned that large HCVs such as a refuse lorry exiting Shanrath Road and turning left may not have adequate room to safely complete the manoeuvre with the removal of the left filter lane and tightening up of the junction.

Recommendation

The Design Team should ensure there is a complete swept patch analysis to ensure that HCVs can make this left turn manoeuvre safely.

3.18.3 Problem

It is noted that there is no provision for cyclists westbound along the Swords Road over the Santry Bypass (M50) as part of the proposed scheme. The Audit Team is concerned that cyclists looking to access Santry are likely to take this natural desire line leading to an increased risk of vehicular/ cyclist conflicts.

Recommendation

The Design Team should ensure there are cycling facilities along the Swords Road.

3.18.4 Problem

Due to the existing vertical alignment of the Swords Rd over the Santry Bypass (M50), the Audit Team is concerned that the forward visibility eastbound is poor leading to an increased risk of vehicles overshooting the stop line or rear shunt type collisions.

Recommendation

The Design Team should ensure there are High Mast Pole Mountings for eastbound traffic approaching the junction.

3.19 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0024)

3.19.1 Problem

The Audit Team is concerned that the southbound cycle lane adjacent to Ellenfield Park may have insufficient width to cater for the anticipated volume of cyclists, forcing cyclists onto the footpath or carriageway in conflict with pedestrians or vehicles.

Recommendation

The Design Team should ensure the cycle width is appropriate to the requirements of the National Cycle Manual and the volume of cyclists anticipated.

3.19.2 Problem

It's unclear from the drawings provided whether it is intended to retain the existing shelter at Chainage A7750. The Audit Team is concerned that the location of the existing bus stop shelter, if retained, is set out from the existing boundary wall, blocking the footpath. There is an increased risk of conflict between cyclists, pedestrians and patrons departing a bus.

Recommendation

The Design Team should consider providing a Shared Bus Stop Landing Zone Arrangement (Urban Centres) at this location.



Figure 3.16 Existing Bus Shelter

3.19.3 Problem

The Audit Team is concerned about the lack of existing signage at the direct merge at CH A7900. The lack of warning signage on the ramp may lead to increased risk of side swipe collisions between traffic on the main line and traffic merging.

Recommendation

The Design Team should ensure that appropriate signage is included in the design.

3.20 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0025)

3.20.1 Problem

It's unclear from the drawings provided due to the extension of the hatching, whether access to the existing church car park is to be retained and if a right turn out is permitted. There is a risk of driver confusion as a result.

Recommendation

The Design Team should ensure that appropriate road markings are provided to permit a right turn out of the car park.

3.20.2 Problem

The Audit Team is concerned that the left turn slip on Collins Avenue eastbound is retained as part of the proposed scheme. Conflicts between the large turning vehicles and cyclists / pedestrians on left slip lanes present a significant risk. Slip lanes often give drivers an unreasonable sense of priority, and by virtue of their oblique geometry, they restrict views of cyclists and pedestrians, while also noting in Phase A of the signals, a vehicle on the slip lane would yield to a cyclist on green

Recommendation

The Design Team should remove the left turn slip and provide a Modifying Existing Left Hand Pocket as per the National Cycle Manual

3.20.3 Problem

The Audit Team noted that the existing footpath at chainage A8150 narrows due to the proximity of tree stumps. There is an increased risk of pedestrians entering the carriageway in conflict with vehicles due to the insufficient width.

Recommendation

The Design Team should ensure a footpath of minimum width of 2.0m is provided.



Figure 3.17 Existing footpath

3.21 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0027)

3.21.1 Problem

The Audit Team is concerned that at the Swords Rd/ Highfield Hospital/ Plunkett College, it's unclear as to how a cyclist will make a right turn manoeuvre into the Hospital or College. There is an increased risk of cyclist/ vehicle conflicts as a result.

Recommendation

The Design Team should provide a Toucan Crossing at this location.

3.22 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0028)

3.22.1 Problem

The Audit Team is concerned that there are no facilities for cyclists to turn right into the Bonington Hotel/Seven Oaks or Griffith Downs. There is a risk of cyclists having to cross both the bus lane and carriageway in order to make this turn

Recommendation

The Design Team should consider converting the proposed pedestrian crossing at Ch 8950 to a toucan crossing and relocating it further north as a combined crossing facility for both developments.

3.22.2 Problem

It's unclear from the drawings provided due to the extension of the hatching, whether access to the Home Farm Football Club is to be retained and if a right turn out is permitted. There is a risk of driver confusion as a result.

Recommendation

The Design Team should ensure that appropriate road markings are provided to permit a right turn out of the development.

3.22.3 Problem

The Audit Team observed that a on road cycle lane has been developed along Griffith Avenue as part of a safe routes to school initiative by Dublin City Council. It's unclear from the drawings provided how this scheme will tie into the off road cycle lane on the Griffith Avenue/ Swords Road junction.

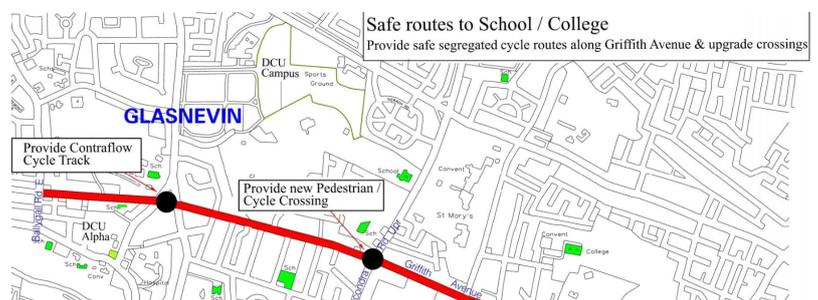


Figure 3.18 Safe routes to School

Recommendation

The Design Team should ensure the proposed off-road cycle lanes tie into segregated on road cycle route on Griffith Avenue

3.23 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0029)

3.23.1 Problem

The Audit Team is concerned that along Upper Drumcondra Road, it is unclear as to how a cyclist will make a right turn manoeuvre onto Home Farm Road. There is an increased risk of cyclist/ vehicle conflicts as a result.

Recommendation

The Design Team should provide a Toucan Crossing at this location.

3.23.2 Problem

The Audit Team notes a lack of stop markings and stop sign for traffic exiting the Village (A9200). There is concerns that vehicles exiting this development may not give priority to pedestrians and cyclists.

Recommendation

The Design Team should ensure that markings are placed in appropriate location.

3.23.3 Problem

The Audit Team notes the stop line marking on Wellpark Avenue is located at the edge of the Cycle track. The Audit Team is concerned that this may put pedestrians at risk of conflict with vehicular traffic.

Recommendation

The Design Team should ensure that markings are placed in appropriate location.

3.23.4 Problem

The Audit team notes the current arrangement is for 2 right turn lanes out of Home Farm Road. The proposed design is for a single lane however the existing kerb lines are not being adjusted. There is concern that this extra space will allow 2 lanes to be created informally thus increasing the risk of side swipe collisions across the junction.

Recommendation

The Design team should consider narrowing the carriageway through the implementation of cycle lane and associated advanced stop line.



Figure 3.19 Homefarm Road

3.24 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0030)

3.24.1 Problem

The Audit Team is concerned that an existing access to Clonturk Avenue at chainage A9560 may be impacted by cycle ramp and cycle track. There is a risk of loss of control type collision due to vehicle having to mount the kerb to access this lane.

Recommendation

The Design Team should ensure the cycle ramp and raised cycle tracks do not impact upon existing entrances.

3.24.2 Problem

The Audit Team are concerned that the width of the Bus Stop Island at chainage A9730 and A9770 is insufficient and there is a risk of collision between cyclists and pedestrian standing in the cycle lane.

Recommendation

The Design Team should ensure that there is sufficient space to provide a Shared Bus Stop Landing Zone Arrangement at these locations.

3.25 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0031)

3.25.1 Problem

The Audit Team is concerned that along Upper Drumcondra Road, it is unclear as to how a cyclist will make a right turn manoeuvre onto Botanic Avenue. There is an increased risk of cyclist/ vehicle conflicts as a result.

Recommendation

The Design Team should provide a Toucan Crossing at this location.

3.25.2 Problem

The Audit Team notes the existing marking for traffic exiting Millbourne Avenue are not being replaced. This could cause driver confusion as some may try to undertake unsafe manoeuvres.

Recommendation

The Design Team should reinstate the existing markings and left turn only exit from this road.

3.25.3 Problem

The Audit Team notes existing vehicular access behind the bus stop at CH A10100. There is concern that vehicles access these entrances may not be able to safely complete their manoeuvre with the presence of Kassel Kerbs

Recommendation

The Design Team should ensure safe vehicular access is maintained to these properties.

3.25.4 Problem

The Audit Team notes the tabletop ramp on Holly Bank Road, the sloped part of the ramp is within the desire line of pedestrians on the footway. There is concerns that this may lead to increased risk of slips for pedestrians crossing the road.

Recommendation

The Design Team should ensure the tabletop ramp is sufficiently wide to cover the pedestrian desire lines.

3.26 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0032)

3.26.1 Problem

At chainage A10500, the Audit Team is concerned that a ramp is proposed at the pedestrian crossing, which may lead to an increased risk of trips and falls for vulnerable road users

Recommendation

The Design Team should ensure the traffic table extends to the back of the footpath.

3.27 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0033)

3.27.1 Problem

The Audit Team note that it is proposed to provide a signalised pedestrian crossing under the Dublin Sligo Rail Line. The Audit Team noted water dripping from the above structure. There is an increased risk of trips and falls due to the formation of ice during cold condition.



Figure 3.20 Underneath Sligo Dublin Rail Bridge

Recommendation

The Design Team should highlight the issue to Irish Rail for resolution.

3.27.2 Problem

At chainage A10600, the Audit Team is concerned that the proposed bus stop may restrict access to an existing driveway on the eastern side of the Drumcondra Road Lower.

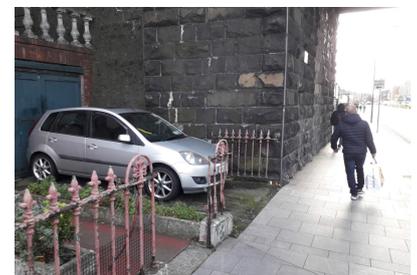


Figure 3.21 Existing driveway

Recommendation

The Design Team should ensure that access to the private property is maintained.

3.27.3 Problem

At chainage A10750 and A10800, the Audit Team is concerned that the width of the pedestrian crossing (>4 lanes) may result in vulnerable road users having insufficient time to cross the carriageway.

Recommendation

The Design Team should ensure that sufficient green time is provided to allow vulnerable road user to cross the road in a single movement.

3.27.4 Problem

At chainage A10800, the Audit Team is concerned that there are no facilities for cyclists on the Royal Canal towpath to safely cross the Drumcondra Road Lower. It is noted the Royal Canal Greenway is planned at this location linking Dublin to Longford.

Recommendation

The Design Team should upgrade the pedestrian crossing to a Toucan Crossing.

3.28 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0034)

3.28.1 Problem

At the Gardiner St Upper/Dorset St/ Synott Place junction, the Audit Team note an Advanced Stacking Lane is proposed with no cycle lane linked to it. If no feeder cycle lane can be provided, this will only frustrate cyclists and increase the risk of cyclists mounting the footpath in conflict with pedestrians.

Recommendation

The Design Team should remove the advance stacking lane, and provide a jug turn for right turning cyclist.

3.28.2 Problem

At chainage 11150, the Audit Team noted vehicle parking on the footpath. The Audit Team is concerned that parking will continue at this location, increased the risk of the cycle lane being blocked, forcing cyclists on the carriageway in conflicts with vehicles



Figure 3.22 Parking on the footpath

Recommendation

The Design Team should consider measures to prevent ad-hoc parking on the footpath.

3.28.3 Problem

The audit Team observed a conflict between existing road markings and signal with respect to a straight-ahead movement from Belvedere Road to Innisfallen Parade. The current arrangement may lead to an increased risk of driver confusion.



Figure 3.23 Signal/ Road Marking Conflict

Recommendation

The Design Team should highlight the issue to Dublin City Council for resolution.

3.29 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0035)

3.29.1 Problem

At chainage A11250, the Audit Team observed a vehicle making a sudden right turn manoeuvre from Dorset St Lower into Leo Street/ Eccles Place, across existing hatching. This inappropriate turn could lead to an increased risk of side impact/ head on type collisions.

Recommendation

The Design Team should provide measures to prevent this inappropriate turning movement.

3.29.2 Problem

At the Eccles St/ Dorset St/ Hardwicke Place junction (Chainage A11350), the Audit Team notes an Advanced Stacking Lane is proposed with no cycle lane linked to it. If no feeder cycle lane can be provided, this will only frustrate cyclists and increase the risk of cyclists mounting the footpath in conflict with pedestrians.

Recommendation

The Design Team should remove the advance stacking lane, and provide a jug turn for right turning cyclist.

3.29.3 Problem

The Audit Team note that on Eccles Street, two lanes have a straight ahead movement, but on Hardwicke Place, this reduces to a single lane, with no detail provided as to who has priority. There is an increased risk of side swipe type collisions as a result

Recommendation

The Design Team should ensure the road markings are appropriate.

3.29.4 Problem

The Audit Team observed a number of non-public service vehicles making a left turn movement from Dorset St Lower onto North Frederick Street and subsequently turning left into Hardwicke Lane

Recommendation

The Design Team should amend the fillet of the junction to discourage left turns into Hardwicke Lane.

3.30 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0036)

3.30.1 Problem

The Audit Team are concerned that the bell mouth of Parnell Sq. West/ Parnell Sq. North junction is very wide, leading to an increased risk of high entry speeds and pedestrians/ vehicle conflicts.

Recommendation

The Design Team should reduce the width of the bell mouth and determine if a controlled crossing is warranted.

3.30.2 Problem

The Audit Team are concerned that the tie in cross section of Parnell Sq. North adjacent to North Frederik Street does not match existing, and may cause confusion for cyclists and motorists



Figure 3.24 Parnell Sq Bellmouth

Recommendation

The Design Team should provide a suitable tie in with the existing cross section.

3.30.3 Problem

The Audit Team are concerned that the lack of road markings on Rutland Place/Cavendish Row junction may result in vehicle turning left into a one-way street leading to an increased risk of head on type collisions.

Recommendation

"No Entry" road markings should be provided.

3.30.4 Problem

The Audit Team note that a cycle lane is proposed (southbound) in the centre of the carriageway between Chainage 200 and 380m. The Audit Team is concerned that a cyclist is exposed to vehicles on either side over a long distance and particularly at the junction with Cavendish Row, where the bus lane and cycle lane dissect one another.

Recommendation

The design team should consider

- provision of a concrete island to segregate the cycle lane from the bus lane.
- Provision of a two-way cycle lane on the western side of Parnell Square East with Toucan Crossings at chainage 150 and 440

3.31 General Arrangement Drawing (BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0037)

3.31.1 Problem

The Audit Team are concerned that no buffer zone has been provided between the on road cycle lane and the parallel parking between chainage A11620 and A11670. There is the increased risk of cyclists swerving onto the carriageway due to the opening of car doors.

Recommendation

The Design Team should ensure a buffer zone between the car parking and cycle lane.

3.31.2 Problem

The Audit Team are concerned that Dorset St Upper westbound approaching the junction is to be reduced from 2 lanes to one lane which results in a wide carriageway lane. There is a risk of head collisions with the Dorset St Upper eastbound lane

Recommendation

The Design Team should provide appropriate road markings and concrete islands to channel vehicles through the junction and reduce vehicle speeds.

3.31.3 Problem

The Audit Team note that west of Dorset St Upper, two lanes have a straight ahead movement, but further east, this reduces to a single lane, with no detail provided as to who has priority. There is an increased risk of side swipe type collisions as a result

Recommendation

The Design Team should ensure the road markings are appropriate.

3.31.4 Problem

The Audit Team are concerned of the risk of side swipe collisions with 2 lanes of traffic turning right from Granby Row to Dorset Street Upper.

Recommendation

The Design Team should consider providing Lane guidance markings across the junction.

4. System Design Drawings

4.1 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0001

4.1.1 Problem

The Audit Team is concerned that the signal phasing (stage B) indicates that vehicles in the bus lane can undertake a straight-ahead movement. This would conflict with the proposed kerbing which facilitates a left turn only manoeuvre. There is a risk of driver confusion and vehicles mounting the kerb.

Recommendation

The design team should revise the signal phasing to permit a left turn only on the bus lane.

4.1.2 Problem

The Audit Team is concerned that the signal phasing (stage E) indicates that the pedestrian and cyclist movements on all arms occur at the same time. There is the risk of collisions between pedestrians crossing and cyclists undertaking straight ahead movements.

Recommendation

The design team should revise the phasing to separate conflicting movements.

4.1.3 Problem

The Audit Team notes that the phasing of the lights particularly stage B does not align with the road markings as there is not dedicated bus lane. This may cause driver confusion

Recommendation

The design team should revise the design to minimize driver confusion.

4.2 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0002

4.2.1 Problem

The Audit Team notes the bus lane does not seem to be included in the phasing diagrams. The audit team are unable to assess any potential safety impacts for this element of the works

Recommendation

The design team should ensure there are no safety impacts relating to this element of the works

4.3 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0004

4.3.1 Problem

The Audit Team is concerned that the signal phasing (stage B) indicates that northbound right turn movement will conflict with the southbound straight-ahead movement increasing the risk of head on, side impact collisions.

Recommendation

The design team should revise the signal phasing at this location.

4.4 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0005

4.4.1 Problem

It is noted that on the R132, the proposed cross section consists of five lanes southbound, the refuge and three lanes northbound. The Audit Team is concerned mobility impaired pedestrians will not have sufficient time to cross the carriageway in a single movement during Phase F of the signal phasing.

Recommendation

The design team should ensure sufficient green time is provided for pedestrians to cross in a single movement and Push Button Units along with the required signals are provided within the refuge. The Design Team should also remove the flashing amber lights phases to prevent vehicles moving forward not realising pedestrians are still on the median or far side of the crossing.

4.5 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0010

4.5.1 Problem

The Audit Team is concerned that there are no cycle lane facilities for cyclists exiting the junction onto the Old Airport Road. There is a risk of Cyclist & Pedestrian conflicts during Signal Phase F.

Recommendation

The Design Team should provide cyclist facilities to allow cyclists to travel safely westbound on the Old Airport Road.

4.6 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0013

4.6.1 Problem

The Audit Team note that a staggered pedestrian crossing is proposed on Turnapin Lane. Stage F of the signal phasing indicate pedestrians can cross this eastern arm in a single movement. The staggered layout may be confusing for the visually impaired leading to an increased risk of vehicles/ pedestrian conflicts.

Recommendation

The Design Team should replace the staggered crossing with a straight crossing to align with the natural desire line.

4.7 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0015

4.7.1 Problem

The Audit Team are concerned that traffic exiting Morton stadium at CH A6025 and turning right may not be able to see the traffic signal heads and therefore potentially drive onto the pedestrian crossing coming into conflict with other VRUs.

Recommendation

The Design Team should consider making this access a left turn only or alternatively ensure the signal heads are located in such a manner that ensure a vehicle exiting the stadium can see the lights.

4.8 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0019

4.8.1 Problem

The Audit Team is concerned that the cyclist crosses the left turn filter lane from Omni Shopping Centre in an uncontrolled manner leading to an increased risk of cyclist/ vehicle conflicts.

Recommendation

The Design Team should ensure that cyclists cross this junction arm in a controlled manner.



Figure 4.1 Omni Shopping Centre exit

4.8.2 Problem

The Audit Team observed vehicles turning right out of the shopping centre and demonstrating poor lane discipline, leading to an increased risk of side swipe type collisions

Recommendation

The Design Team should ensure that cyclists cross this junction arm in a controlled manner.

4.8.3 Problem

The Audit Team are concerned with the length of the pedestrian crossing on the North and South Arms, 5 traffic lanes plus the central median, with no central PBUs. The audit team are concerned mobility impaired may not have sufficient time to complete this crossing.

Recommendation

The Design Team should ensure appropriate measures are included in the design such as an extended green time or additional PBUs in the central median.

4.9 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0022

4.9.1 Problem

The Audit Team are concerned that during Phase B of the signals, there may be an increased risk of side swipe between cyclists and motorists (including commercial vehicles) undertaking left turn movements at the same time.

Recommendation

The Design Team should offer protection to the cyclist around this turn through kerbing and ensure that the swept path of vehicles do not enter the cycle lane.

4.10 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0024

4.10.1 Problem

The Audit Team notes the pedestrian crossing on Swords Road (North Side of the Junction) is across 4 traffic lanes, bus lane, cycle track and an island as a single phase. There is concern that mobility impaired may not be able to complete this crossing in a single phase, putting pedestrians in conflict with vehicular traffic.

Recommendation

The Design Team should ensure the green phase for pedestrian is of a suitable length to ensure that pedestrians can complete the crossing in the allocated time. Additionally, the designers should consider adding an additional PBU to the island between the Bus line and Vehicular traffic (Pole 32) which will allow pedestrians to demand a pedestrian phase for those that have not completed their crossing.

4.11 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0026

4.11.1 Problem

The Audit Team note from onsite observations, that there is an additional secondary signal head for northbound traffic adjacent to the Highfield Hospital entrance, which allows vehicle departing Highfield College to determine if it is safe to exit and sit in the box junction while pedestrians cross.

Recommendation

The secondary signal head should be retained.



Figure 4.2 Additional Secondary Signal

4.12 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0027

4.12.1 Problem

The Audit Team note that a secondary signal head is proposed on the nearside of the carriageway for northbound traffic. There is a risk that the primary and secondary signal may be blocked by vehicles in the bus lane, leading to a risk of vehicles in the traffic lane overshooting the stop line

Recommendation

The Design Team should consider provide an additional secondary signal head for northbound traffic on the eastern side of the carriageway where it is presently



Figure 4.3 Existing secondary signal

4.13 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0030

4.13.1 Problem

The Audit Team are concerned that the secondary signal head for southbound traffic on Upper Drumcondra Road may be obscured by buses in the bus lane.

Recommendation

The Design Team should consider relocating this signal head to a more conspicuous location.

4.14 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0033

4.14.1 Problem

The Audit Team are concerned with the location of the secondary signal head for traffic waiting on Millmount Avenue. There is concern that visibility to this signal head may be obscured by signal on pole nine.

Recommendation

The Design Team should consider relocating this signal head to a more conspicuous location.

4.15 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0034

4.15.1 Problem

The Audit Team are concerned that there are no traffic signals proposed for Cian Park which is presently signalised. There is a risk that vehicles will exit the lane in an uncontrolled manner in conflict with other traffic phases.

Recommendation

The Design Team should ensure that this arm of the junction is signalised through provision of primary and secondary signal heads. Box Junction markings should match the existing layout.

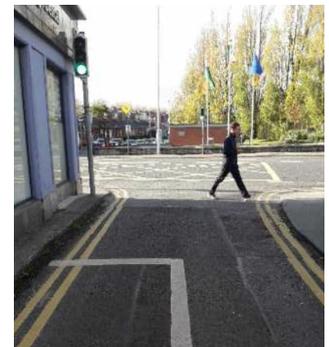


Figure 4.4 Existing Signals at Cian Pk

4.16 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0035

4.16.1 Problem

The Audit Team notes the signal head for cyclists turning right from Drumcondra Road Lower to Clonliffe Road, there is no proposed signal head to correspond with the cycle stop line on the west side of the junction. This may cause confusion with cyclists.

Recommendation

The Design Team should ensure all required signal heads are installed.

4.17 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0037

4.17.1 Problem

The Audit Team are concerned with the location of the secondary signal head for traffic traveling North on Dorset Street. There is concern that visibility to this signal head may be obscured.

Recommendation

The Design Team should consider relocating this signal head to a more conspicuous location.

4.18 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0038

4.18.1 Problem

The Audit Team are concerned with the location of the secondary signal head for traffic traveling east on North Circular Road. There is concern that visibility to this signal head may be obscured.

Recommendation

The Design Team should consider relocating this signal head to a more conspicuous location.

4.19 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0040

4.19.1 Problem

The Audit Team are concerned with the location of the secondary signal head for traffic traveling East on Eccles Street. There is concern that visibility to this signal head may be obscured.

Recommendation

The Design Team should consider relocating this signal head to a more conspicuous location (pole 4).

4.20 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0041

4.20.1 Problem

The Audit Team are concerned that cyclists may look to turn right from Frederick St North onto Dorset St Upper or go straight onto Blessington Street, but these movements are not facilitated from the signal phasing.

Recommendation

The Design Team should consider if these cycle movements should be facilitated. If these movements are not to be permitted, the Design Team should ensure appropriate road markings and signage is provided well in advance of the junction.

5. Fencing and Boundary Treatment

5.1 BCIDB-JAC-SPW_BW-0002_XX_00-DR-CR-0003

5.1.1 Problem

At chainage A850, the Audit Team is concerned that the proposed boundary walls at the back of the footpath will inhibit the visibility splay for vehicle departing from this entrance increasing the risk of collision with pedestrians, cyclists and vehicles.

Recommendation

The Design Team should ensure provision of a low height wall or wall set back behind an appropriate visibility splay. Any proposed landscaping should be clearly set back behind the visibility splay.

5.2 BCIDB-JAC-SPW_BW-0002_XX_00-DR-CR-0017

5.2.1 Problem

At the Morton Stadium, the Audit Team is concerned that the cycle lane follows the perimeter fence and depending on the fence specification, vehicles may exit the stadium in conflict with cyclists due to an insufficient visibility splay.

Recommendation

The Design Team should provide either a splayed entrance to the stadium or push the cycle track away from the proposed fenced boundary.

6. General Comments

- No detailed landscaping proposals were provided to the Audit Team. Landscaping proposals may inhibit visibility of pedestrian crossings, traffic signals and warning/ regulatory signage both in the edge of carriageway and central reserve. The design team should ensure that landscaping proposals are adequate.
- No lighting information has been provided, this information is required at Stage 2 Road Safety Audit to ensure all proposed facilities are adequately lit to prevent areas of darkness, which can contribute to collisions. Lighting columns should be placed at the back of the footpath/ cycle lane;
- Clear visibility splays shall be maintained at all junctions;
- Advanced Stacking Lanes (ASLs) should be provided to facilitate right turn for cyclists. The ASL should be "fed" by a cycle lane to ensure that cyclists can pass stationary traffic and get to them. This should be applied in locations such as Belvedere road and the North Circular Road (Eastern Arm).
- STOP signs and markings shall be included at all on-site junctions
- Clear forward visibility splays shall be maintained around alignment radii on the site;
- Drainage gullies should be located on the upstream side of the dished kerbs to prevent water flowing across the low kerbs and depositing loose debris underfoot of pedestrians;
- Use of Kassel Kerbs at Bus Stops.
- Box Junction road markings where currently present, should be reinstated as part of the proposed scheme (Collins Avenue-Eastern Arm).
- At chainage A5675, the footpath doesn't appear to tie in with the existing path along the Santry River.
- Accesses in close proximity to junctions should have "KEEP CLEAR" markings utilised to allow traffic turning right into these premises access while the arm is on a red Phase.

7. Supplementary Audit

7.1 General Problems

7.1.1 Problem

The Audit Team notes that the bus lane markings are continuous across some priority junctions, and business access with high potential for traffic. There is concerns that the lack of a dashed line will lead to driver confusion with respect to the legality of a manoeuvre into or out of these junctions/premises, leading to rear shunts and /or side swipe collisions due to last minute decisions.

Recommendation

The Design Team should provide dashed markings where there is the potential for high traffic volumes or unfamiliar users completing such manoeuvres.

7.1.2 Problem

The Audit Team notes that the Drawings indicate the provision of a cycle track across numerous accesses throughout the scheme. The drawings do not indicate how the accesses will be facilitated in terms of ramping etc. There are concerns the absence of ramps may lead to loss of control type of collisions between VRUs and vehicles.

Recommendation

The Design Team should ensure appropriate facilities/ramps are provided for all road users.

7.1.3 Problem

The Audit Team noted that the drawings indicate the positioning of bus shelters. At the chainages 4+575,5+940,6+050, 7+320, 7+775. Depending on the type of shelter used, there is the risk that the shelter's end wall may block a pedestrian's passage lead to risk of pedestrian/ cyclist conflicts.

Recommendation

The Design Team should ensure that the proposed bus shelter takes into account the space available for pedestrians to pass by.

7.2 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0001

7.2.1 Problem

The Audit Team notes there is a risk that vehicles exiting the Swords Veterinary Hospital onto the Swords Road, intending to turn right onto the R132, will not have sufficient time to cross the lanes leading to either rear shunts and or sideswipe collisions.

Recommendation

The Design Team should as a minimum provide a "KEEP CLEAR" box at the exit of the hospital.

7.2.2 Problem

The Audit Team notes there is no break in the bus lane markings for vehicles entering or exiting the Swords Veterinary Hospital from the R132. There are concerns that this could cause driver confusion with respect to the right to complete this manoeuvre.

Recommendation

The Design Team should provide a dashed bus lane marking across the junction.

7.3 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0004

7.3.1 Problem

The Audit Team notes there is no break in the bus lane markings for vehicles entering or exiting the N1 Business Park. There are concerns that this could cause driver confusion with respect to the right to complete this manoeuvre.

Recommendation

The Design Team should provide a dashed bus lane marking across the junction.

7.3.2 Problem

The Audit Team are concerned that the proposed entrance at Chainage A1 +200 may not be sufficiently wide to accommodate the entry and exit of commercial vehicles to McComish Ltd – Concrete products leading to an increased risk of side swipe type collisions.

Recommendation

The Design Team should ensure swept path analysis is carried out to ensure there is sufficient space for the manoeuvres to be safely completed.

7.4 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0005

7.4.1 Problem

The Audit Team notes the provision of a footpath on the southern side of Kettles Lane. This footpath does not tie into an existing footpath and there is a risk that pedestrians may cross in an uncontrolled manner.

Recommendation

The Design Team should consider provision of a footpath on the northern side of kettle Lane that could connect to the existing footpath outside Metropoint business Park.

7.5 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0006

7.5.1 Problem

The Audit Team notes the right turn filter lane on Stockhole Road commences at the entrance to the National Show Centre. There is a risk of rear shunt type collisions due to motorists not anticipating right turn movements into the National Show Centre prior to the right turn filter lane.

Recommendation

The Design Team should review the layout of the right filter lane and commence after the National Show Centre entrance.

7.6 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0008

7.6.1 Problem

The Audit Team notes on the southern approach to the Airport Roundabout (Swords Road R132), the directional arrow marking indicates straight ahead only yet the airport symbol marking is also present. There is a risk this will cause driver confusion resulting in side-swipe collisions with vehicles in the bus lane.

Recommendation

The Design Team should remove unnecessary markings.

7.7 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0009

7.7.1 Problem

The Audit Team notes a kerb line running in front of the vehicle access to Kealys Pub. There is concerns that this may cause loss of control type collisions for vehicles trying to cross the cycle track and enter the car park.

Recommendation

The Design Team should ensure appropriate facilities/ramps are provided for all road users.

7.8 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0012

7.8.1 Problem

The Audit Team notes there is a risk that vehicles exiting the Collinstown Cross industrial Estate onto the Swords Road (R132), intending to turn right onto the R132 (northbound), will not have sufficient time/ space to cross the lanes leading to either driver frustration, rear shunts and/ or sideswipe collisions.

Recommendation

The Design Team should as a minimum provide a "KEEP CLEAR" box on the northbound lanes.

7.9 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0015

7.9.1 Problem

The orientation of the staggered pedestrian crossing on the eastern arm of the junction will result in pedestrians being forced to turn their back on the traffic stream which they are about to cross. This may result in pedestrians stepping off the footway into approaching traffic.

Recommendation

The Design Team should consider laying out the staggered crossings in such a way that pedestrians are forced to face the traffic stream which they are about to cross.

7.10 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0018

7.10.1 Problem

The orientation of the staggered pedestrian crossing on the northern arm of the junction will result in pedestrians being forced to turn their back on the traffic stream which they are about to cross. This may result in pedestrians stepping off the footway into approaching traffic.

Recommendation

The Design Team should consider laying out the staggered crossings in such a way that pedestrians are forced to face the traffic stream which they are about to cross.

7.11 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0019

7.11.1 Problem

The orientation of the staggered pedestrian crossing on the southern arm of the junction will result in pedestrians being forced to turn their back on the traffic stream which they are about to cross. This may result in pedestrians stepping off the footway into approaching traffic.

Recommendation

The Design Team should consider laying out the staggered crossings in such a way that pedestrians are forced to face the traffic stream which they are about to cross.

7.11.2 Problem

The Audit Team note there is an inconsistent approach in the provision of Cyclist Waiting Area Detail at Toucan crossing at chainage A 6+750, where it is not provided for southbound cyclists leading to a risk of cyclist conflicts due to cyclists queuing on the lane.

Recommendation

The Design Team should provide a waiting area for cyclists wishing to turn right

7.12 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0020

7.12.1 Problem

It is unclear from the drawing how cyclists access the toucan crossing at chainage A7+000. Cyclists may be forced to wait in the bus lane in conflict with passing buses/ coaches.

Recommendation

The Design Team should provide Cyclist Waiting Area Detail at the Toucan crossing on both sides.

7.13 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0021

7.13.1 Problem

It is noted a raised table crossing is proposed on the minor arm (Shanowen Road) of a controlled crossing (A7+340). The Audit Team are concerned that this arrangement may be confusing to pedestrians who may believe they have priority over vehicles, leading to an increased risk of pedestrian/ vehicle conflicts

Recommendation

The Design Team should remove the raised table at this crossing.

7.14 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0023

7.14.1 Problem

The Audit Team is concerned the lack of lane guidance markings through the junction for right turning traffic travelling from Shantalla Road to Shanrath Road, may lead to driver confusion due to the number of arms on the junction.

Recommendation

The Design Team should provide lane guidance markings through the junction.

7.15 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0024

7.15.1 Problem

The Audit Team is concerned there is a lack of connectivity between the toucan crossing at Chainage A8+020 and the on road cycle lane along the old Swords Road. There may be a desire line at this location leading to a risk of loss of control type collisions due to the verge and kerb height

Recommendation

The Design Team should provide a link to connect this potential cyclist desire line.

7.16 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0026

7.16.1 Problem

The Audit Team is concerned the tie into the existing cross section is not clear at this location due to the narrowing of the footpath and introduction of the bus lane may lead to an increased risk of driver confusion and side swipe collisions.

Recommendation

The Design Team should provide for an appropriate tie in to the existing cross section and ensure suitable road marking and signage is provided to introduce the bus lane.

7.17 BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0036

7.17.1 Problem

The Audit Team is concerned that large delivery type vehicles travelling from Parnell Square North on to Frederick Street North, or Parnell Square East, may have insufficient road space to safely make the turn, thereby potentially putting vulnerable road users at risk of conflict.

Recommendation

The Design Team should ensure swept path analysis is carried out to ensure there is sufficient space for the manoeuvres to be safely completed.

7.18 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0016

7.18.1 Problem

The Audit Team notes traffic signal phase C, there is a potential conflict between cyclists going straight ahead (northbound) and the left turn from the R104 into Santry Park.

Recommendation

The Design Team should consider measures to remove this conflict.

7.19 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0018

7.19.1 Problem

The Audit Team notes traffic signals for traffic traveling Northbound on Swords Road and wishing to turn right into Magenta Crescent, are a full aspect only. The presence of a right turn pocket would indicate that a right arrow aspect should be provided. The lack of a right turn aspect may lead to driver frustration resulting in drivers attempting to complete the manoeuvre at in appropriate time resulting in a T-bone collision with oncoming traffic.

Recommendation

The Design Team should ensure appropriate signal heads are provided to suit the signal phasing and road layout.

7.20 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0021

7.20.1 Problem

The Audit Team notes the signal heads on pole 18 is for traffic traveling on Shantalla Road and Santry Bypass Off Slip. There is concerns that Road users waiting at the stop line, may see the signals for the other road resulting in driver confusion, and vehicles attempting to complete their manoeuvre at the wrong time leading to side swipe collisions.

Recommendation

The Design Team should ensure the signal heads for alternative arms on the junction are not visible when waiting at the stop lines.

7.20.2 Problem

The Audit Team are concerned with the movements in Phase D with traffic exiting from Shanrath Road on Green arrows which implies right of way over traffic exiting from Larkhill. There is concern that vehicles intending to turn left or go straight ahead out of Larkhill will assume they have right of way leading to increased risks of side swipe type collisions.

Recommendation

The Design team should ensure all signals and phasing is appropriate to the possible movement available.

7.21 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0022

7.21.1 Problem

The Audit Team is concerned the signal head for the cyclist does not differentiate between straight and left turning cyclists. There is a risk during phases A & B that cyclists wishing to travel straight westbound on Shantalla Road will be put in conflict with other vehicles traveling in the opposite direction and turning right onto Santry Bypass Slip Road.

Recommendation

The Design Team should ensure the signal heads are clear in terms of the allowed movements. Where this cannot be provided, the cyclists shall be given a separate phase.

7.22 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0024

7.22.1 Problem

The Audit Team is concerned of the conflict between pedestrians and cyclists in Phase D on the Northern and Western Arms.

Recommendation

The Design Team should provide separate phases to remove this conflict

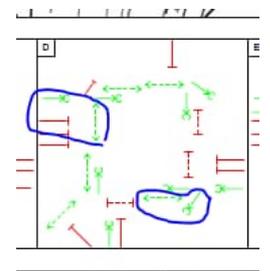


Figure 7. 1 Signal Conflict

7.23 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0025

7.23.1 Problem

The Audit Team is concerned with the concurrent movement of left turning vehicles and Cycle straight ahead for Phase B of the signals.

Recommendation

The Design Team should provide separate these movements into separate phases or consider use of 'flashing amber' to allow vehicles to proceed while yielding to cyclists continuing straight.

7.24 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0029

7.24.1 Problem

The Audit Team is concerned with the concurrent movement of cyclists during Phase F where it is unclear as to who has priority at the merge locations (Red Arrows). This may lead to an increased risk of collision between cyclists

Recommendation

The Design Team should provide road markings to define priority or remove these angled lanes.

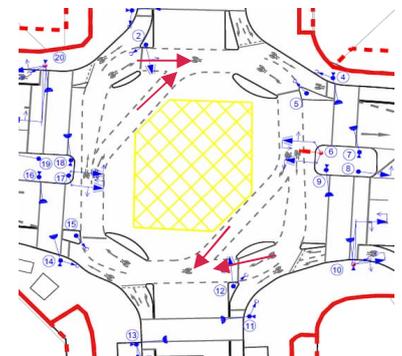


Figure 7. 2 Potential cyclist conflict locations

7.25 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0036

7.25.1 Problem

The Audit Team is concerned with the concurrent movement of left turning vehicles and cycle straight ahead for Phase A of the signals. The Bus Lane road marking indicates left turns are permitted leading to increased risk of conflict between bus and cyclists

Recommendation

The Design Team should provide separate these movements into separate phases or consider use of 'flashing amber' to allow vehicles to proceed while yielding to cyclists continuing straight.

7.26 BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0038

7.26.1 Problem

The Audit Team is concerned with the concurrent movement of left turning vehicles and cycle straight ahead (northbound) for Phase B and C of the signals. Due to the distance between the lanes and the potential for a bus waiting in the bus lane there is a risk that vehicles turning left will not see the cyclist, putting them at risk of a collision.

Recommendation

The Design Team should provide separate these movements into separate phases or consider use of 'flashing amber' to allow vehicles to proceed while yielding to cyclists continuing straight.

7.27 BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-0001 to 0037

7.27.1 Problem

The Audit Team notes a traffic signal ahead signs are placed in advance of signalised junctions, even where not required. The presence of unnecessary signage brings a risk of sign clutter, additional unnecessary street furniture posing a hazard particularly for visual impaired.

Recommendation

The Design Team should place signs as required by the traffic signs manual e.g, where speed limit is greater than 60km/hr, or where deemed necessary due to higher speeds and or inadequate visibility to the signal heads.

7.27.2 Problem

The Audit Team notes that throughout the scheme. F360 (Start of nearside with-flow bus lanes) are provided. In locations where off road cycle lanes are provided, cycle symbols are also included in the F360 signs but not in the RUS 028 (With-flow nearside bus lane) which may result in cyclists confusion and increased risk of bus cyclist conflicts.

Recommendation

The Design Team should consider if use of cycle symbol on bus lane signage is appropriate where adjacent off road facilities are available. The Design Team should encourage use of the cycling facilities through provision of appropriate signage where they exist.

7.28 BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-00035

7.28.1 Problem

The Audit Team note along Dorset St Upper (Chainage 11+560); a RUS 028 (With-flow nearside bus lane) is provided with the cycle symbol omitted which contradicts the road marking where a cycle symbol is provided within the bus lane.

Recommendation

The Design Team should include a cycle symbol on the sign to reinforcement the need to share the road space with cyclists.

7.29 BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-00006

7.29.1 Problem

The Audit Team notes there is no advanced directional sign proposed on Naul road. This could lead to indecision or hesitation by drivers at the junction resulting in either rear shunts or side swipe type collisions.

Recommendation

The Design Team should provide a sign to be consistent with all other junction approaches.

7.29.2 Problem

The Audit Team are concerned with the location of the directional flag sign within the central reservation, for traffic turning right from Naul Road onto Swords Road. There is concern that vehicles may attempt to travel in front of the sign leading to head on collision with North bound traffic on Swords Road.

Recommendation

The Design Team should relocate the sign to a more appropriate position. Where this is not possible junction lane guidance markings should be used.

8. Audit Team Statement

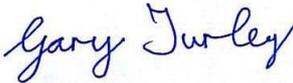
We certify that we have examined the drawings and documents listed in the appendices to this report.

The examination and subsequent report was made with the sole purpose of identifying any features of the scheme that could be removed or modified in order to improve the safety of the proposals.

The problems identified have been noted in this report together with associated safety improvement suggestions, which we recommend should be studied for implementation.

No one on the Audit Team has been involved in any way with the scheme design.

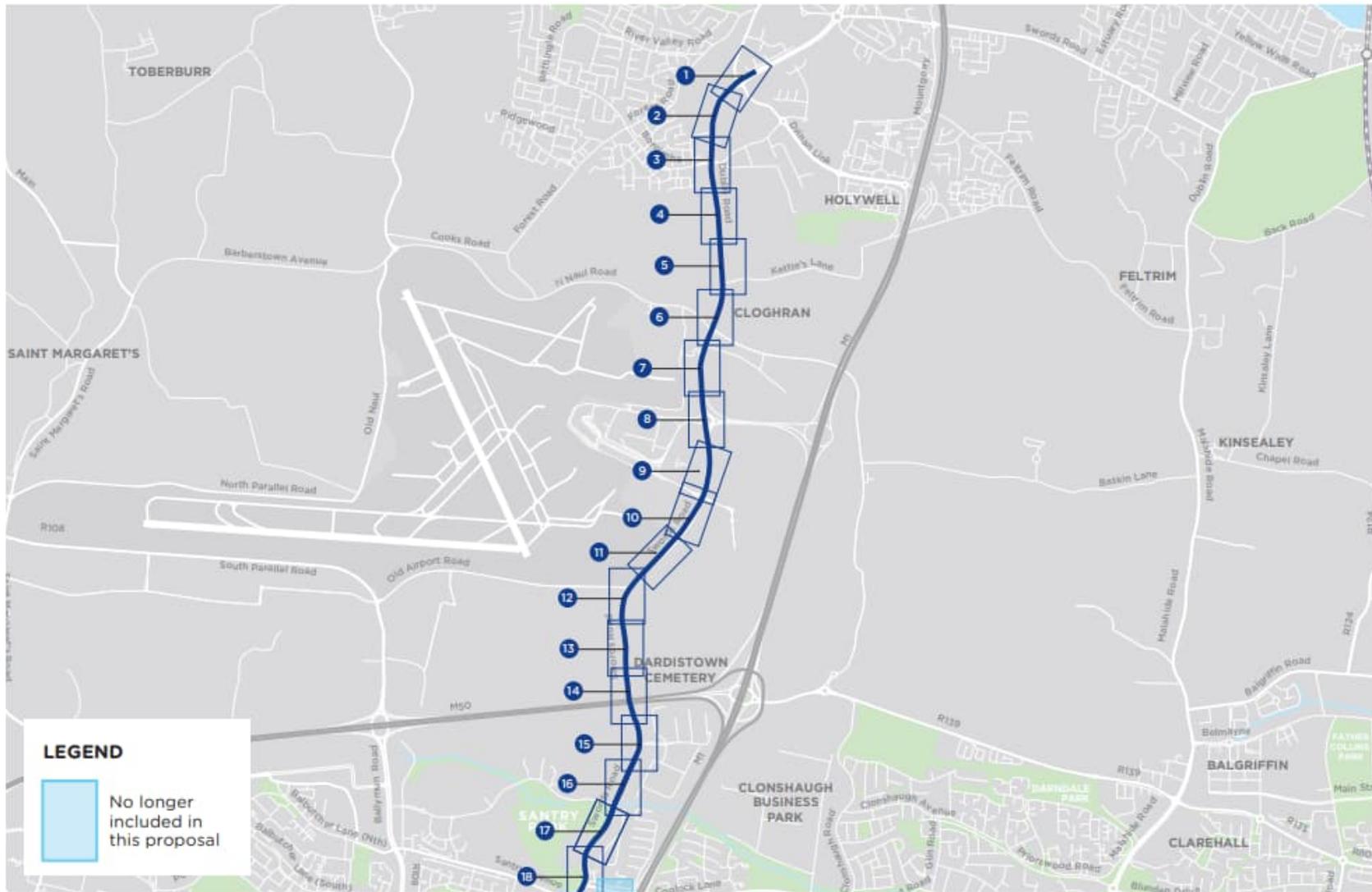
Audit Team Leader

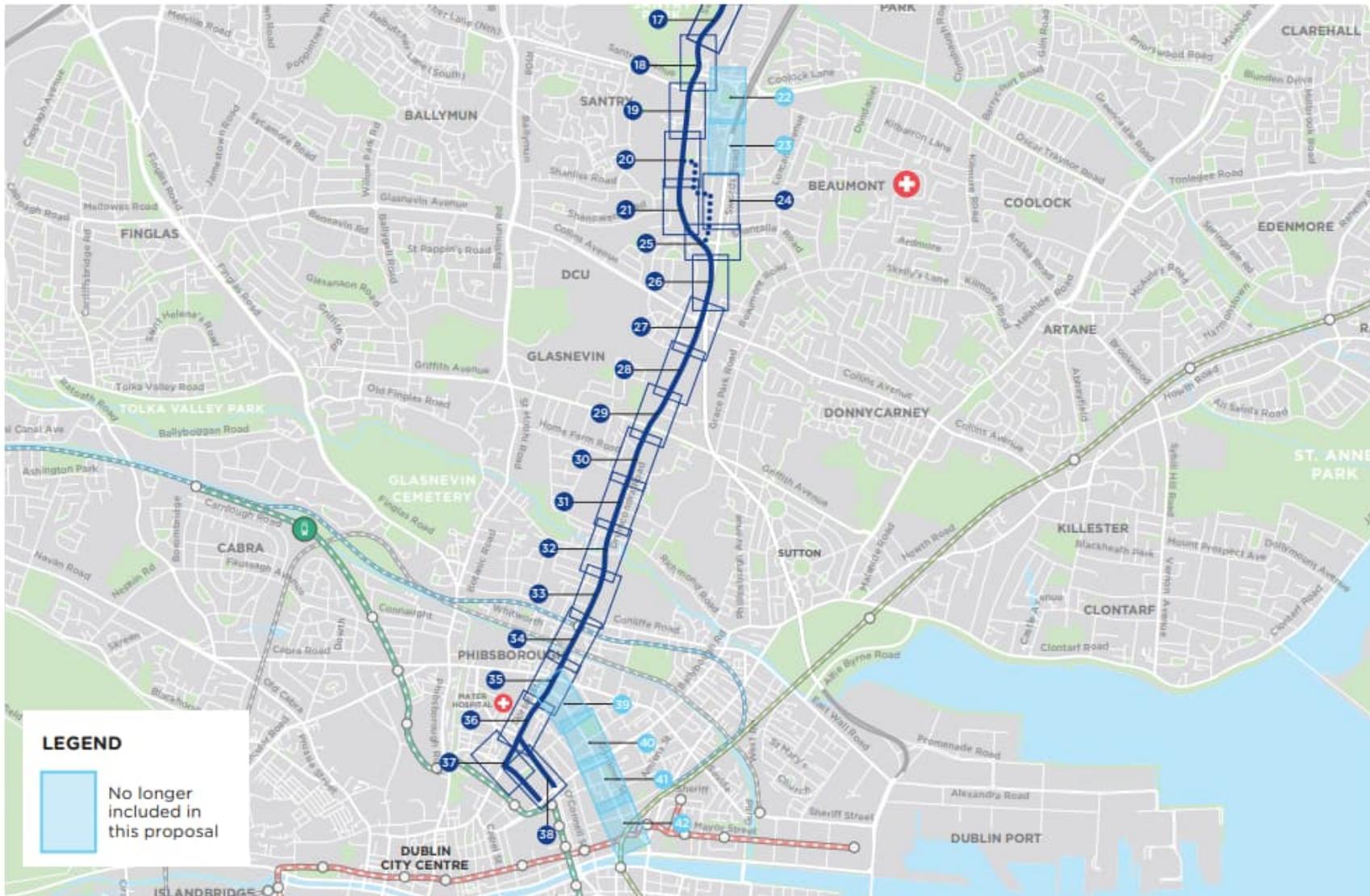
Name:	G Turley	Signed:
	MEng HDip H'ways & Geo, HDip PM, CEng MIEI	
Position:	Senior Associate Director	Dated: 20 th May 2022
Organisation:	Jacobs Engineering	
Address:	Merrion House, Merrion Road, Dublin	

Audit Team Member

Name:	Paul Kelly	Signed:
	BEng MEng MIEI	
Position:	Senior Engineer	Dated: 20 th May 2022
Organisation:	Jacobs Engineering	
Address:	Merrion House, Merrion Road, Dublin	

Appendix A. Location Maps





Appendix B. Initial Drawings & Documents Supplied

Drawings			
Series	Dig No	Rev	Drawing Title
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0001 to 0037	L02	GENERAL ARRANGEMENT PLAN SHEETS 1 TO 37
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-SPW_BW-0002_XX_00-DR-CR-0001-0037	L01	FENCING AND BOUNDARY TREATMENT SHEETS 1 TO 37
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0001	L01	SWORDS ROAD / DUBLIN RD JUNCTION (PINNOCK HSGL JUNCTIONS)
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0002	L01	SWORDS ROAD / AIRSIDE / BOROIMHE ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0003	L01	SWORDS ROAD / N1 BUSINESS PARK PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0004	L01	SWORDS ROAD / KETTLES LANE PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0005	L01	SWORDS ROAD / NAUL ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0006	L01	SWORDS ROAD / COACHMANS INN ACCESS PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0007	L01	SWORDS ROAD / AIRPORT ACCESS / M1 LINK JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0008	L01	SWORDS ROAD / GREEN LONG-TERM CAR PARK / KEALY'S JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0009	L01	SWORDS ROAD / SOUTH CORBALLIS ROAD / RED LONG-TERM CAR PARK
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0010	L01	SWORDS ROAD / OLD AIRPORT ROAD/ COLLINSTOWN AVENUE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0011	L01	SWORDS ROAD / QUICK PARK CAR PARK JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0012	L01	SWORDS ROAD / ROYAL COLLEGE OF SURGEONS GROUND PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0013	L01	SWORDS ROAD / TURNAPIN LANE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0014	L01	SWORDS ROAD / NORTHWOOD AVENUE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0015	L01	SWORDS ROAD / MORTON STADIUM PEDESTRIAN CROSSING

CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0016	L01	SWORDS ROAD / COOLOCK LANE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0017	L01	SWORDS ROAD / SANTRY AVENUE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0018	L01	SWORDS ROAD / MAGENTA CRESENT PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0019	L01	SWORDS ROAD / OMNI PARK / LORCAN ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0020	L01	SWORDS ROAD / SHANOWEN ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0021	L01	SWORDS ROAD / SHANRTH JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0022	L01	SWORDS ROAD / SHANTALLA ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0023	L01	SWORDS ROAD / HOLY CHSGD CHURCH PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0024	L01	SWORDS ROAD / COLLINS AVENUE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0025	L01	SWORDS ROAD / IVERAGH ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0026	L01	SWORDS ROAD / HIGHFIELD HOSPITAL PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0027	L01	SWORDS ROAD / SEVEN OAKS JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0028	L01	SWORDS ROAD / GRIFFITH DOWNS PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0029	L01	SWORDS ROAD / GRIFFITH AVENUE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0030	L01	UPPER DRUMCONDRA ROAD / HOME FARM ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0031	L01	UPPER DRUMCONDRA ROAD / EBYLON HOTEL PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0032	L01	UPPER DRUMCONDRA ROAD / ORMOND ROAD PEDESTRIAN CROSSING
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0033	L01	UPPER DRUMCONDRA ROAD / RICHMOND ROAD / MSGLMOUNT AVENUE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0034	L01	UPPER DRUMCONDRA ROAD / BOTANIC AVENUE / CIAN PARK JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0035	L01	DRUMCONDRA ROAD LOWER / CLONLIFFE ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0036	L01	DRUMCONDRA ROAD LOWER / WHITWORTH PLACE / WHITWORTH ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0037	L01	DORSET STREET LOWER / BELVIDERE ROAD / INNISFALLIN PARADE JUNCTION

CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0038	L01	DORSET STREET LOWER / NORTH CIRCULAR ROAD JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0039	L01	DORSET STREET LOWER / SYNOTT PLACE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0040	L01	DORSET STREET UPPER / ECCLES STREET JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0041	L01	DORSET STREET UPPER / BLESSINGTON STREET / NORTH FREDRICK STREET JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0042	L01	NORTH FREDRICK STREET / PARNELL SQUARE NORTH JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0043	L01	DORSET STREET UPPER / GRANBY ROW / ST. MARY'S PLACE JUNCTION
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-0043	L01	GRANBY ROW / PARNELL SQUARE NORTH PEDESTRIAN CROSSING

Appendix C. Road Safety Feedback Form

ROAD SAFETY AUDIT FEEDBACK FORM

Scheme: CBC 02 SWORDS TO CITY CENTRE

Audit Stage: Road Safety Audit Stage 1

Date Audit Completed: 12th November 2020

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
2.1.1	Yes	Yes		
2.1.2	Yes	Yes		
2.1.3	Yes	Yes		
2.1.4	Yes	Yes		
2.1.5	Yes	Yes		
2.1.6	Yes	Yes		
2.1.7	Yes	Yes		
2.1.8	Yes	Yes		
3.1.1	Yes	Yes	The junction is not part of the Swords BusConnect Scheme. The recommendation to be addressed in the detailed design stage when the development access is finalised.	
3.1.2	Yes	Yes		
3.1.3	Yes	Yes		
3.1.4	Yes	Yes		
3.1.5	Yes	Yes		

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
3.1.6	Yes	Yes		
3.1.7	Yes	Yes		
3.2.1	Yes	Yes		
3.3.1	Yes	Yes		
3.3.2	Yes	Yes		
3.4.1	Yes	Yes	Bollard could be provided to prevent parking on the footpath. This issue will be addressed in the detailed design stage	
3.4.2	Yes	Yes		
3.5.1	Yes	Yes		
3.6.1	Yes	Yes		
3.6.2	Yes	Yes		
3.6.3	Yes	Yes		
3.7.1	No	No	The NTA recognises that there is an issue with this requirement in the NCM. The proposed arrangement follows the arrangement of driving on the left and is more intuitive.	Yes
3.7.2	Yes	Yes		
3.8.1	No	No	This is an existing crossing. Changing the staggered crossing arrangement as recommended will move the pedestrian crossing much closer to the exit arm of the roundabout, and in turn, reduce the stacking capacity of the westbound exit arm. Vehicles may stop on the	Yes

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
			<p>circulatory lane and create a risk of collision.</p> <p>It is proposed to maintain/replace the existing pedestrian guardrail in the widened Toucan crossing to guide the pedestrians and cyclists.</p>	
3.8.2	Yes	Yes		
3.9.1	Yes	Yes		
3.9.2	No	No	<p>The cycle track on the east side of the carriageway is not actually required for the scheme and has been removed from the drawings. There is no plan to modify this junction.</p>	Yes
3.9.3	Yes	Yes		
3.10.1	Yes	Yes		
3.11.1	Yes	Yes		
3.11.2	Yes	Yes		
3.12.1	Yes	Yes		
3.12.2	Yes	Yes		
3.13.1	Yes	Yes		
3.14.1	Yes	No	<p>Any physical island may encroach on vehicles exiting to the right from the most northerly access. This has been verified using auto track. A ghost island will be provided to distinguish the two separate right turn lanes. This is an existing arrangement, and the proposed design will be an improvement on</p>	Yes

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
			the existing arrangement and help to formalise the two accesses.	
3.14.2	Yes	Yes	This issue will be dealt with in the detailed design stage	
3.14.3	Yes	Yes		
3.15.1	Yes	Yes		
3.15.2	Yes	Yes		
3.16.1	Yes	Yes		
3.16.2	Yes	Yes		
3.16.3	Yes	Yes		
3.16.4	Yes	Yes	The overhead line will be undergrounded and will be dealt with in the detailed design stage.	
3.16.5	Yes	Yes		
3.17.1	Yes	Yes		
3.18.1	Yes	Yes		
3.18.2	Yes	Yes		
3.18.3	Yes	No	There is insufficient space to provide a cycle lane on the bridge over the N1. Cyclists on the corridor are expected to use the quiet street on the old Swords road. Local cyclists will share with vehicles on the bridge as is the present arrangement. There is no record of a road collision involving bicycles at this location in the RSA Collision Data between 2005 and 2016. The dominant cycle flow	Yes

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
			from the east is left turners inbound, with very few cyclists continuing straight ahead.	
3.18.4	Yes	Yes		
3.19.1	Yes	Yes		
3.19.2	Yes	Yes		
3.19.3	Yes	Yes		
3.20.1	Yes	Yes		
3.20.2	Yes	No	This is an extremely busy junction, and the left turn lane is required to be retained due to the volume of left turning traffic. The conflict between eastbound cyclists and left turning vehicles adjacent to the Swords road (after the signalled crossing) has been removed in the subsequent design. The junction with the old Swords road has been modified to tighten up the bell mouth and a raised crossing has been introduced	Yes
3.20.3	Yes	No	The width of the footpath at this location is reduced to 1.4 over a distance of 2m adjacent to each tree. At specific pinch points, the BusConnects Design Guide and Building for Everyone: A Universal Design Approach, defines acceptable minimum footpath widths as being 1.2m over a 2m length of path.	Yes
3.21.1	Yes	Yes		

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
3.22.1	Yes	Yes		
3.22.2	Yes	Yes	The right turn into the Home Farm Football Club is to be maintained. Additional sign and road marking to be provided in the detailed design stage	
3.22.3	Yes	Yes		
3.23.1	Yes	Yes		
3.23.2	Yes	Yes		
3.23.3	Yes	Yes		
3.23.4	Yes	Yes		
3.24.1	Yes	Yes		
3.24.2	Yes	Yes		
3.25.1	Yes	Yes		
3.25.2	Yes	Yes		
3.25.3	Yes	Yes		
3.25.4	Yes	Yes		
3.26.1	Yes	Yes		
3.27.1	Yes	Yes	The dripping water issue from the railway bridge will be dealt with in the detailed design stage	
3.27.2	Yes	Yes		
3.27.3	Yes	Yes		
3.27.4	Yes	Yes		

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
3.28.1	Yes	Yes		
3.28.2	Yes	Yes		
3.28.3	Yes	Yes		
3.29.1	Yes	Yes		
3.29.2	Yes	Yes		
3.29.3	Yes	Yes		
3.29.4	No	No	It is doubtful that the access restriction at the junction with Dorset street is meant to prevent access to Hardwicke Street, as the only other access is via Hardwicke Lane, which is unsuitable. Note the lane markings facilitate left turns from Nth Frederick Street onto Hardwicke Street.	Yes
3.30.1	Yes	Yes	The bell mouth of Parnell Sq West/North is part of the Parnell Square rehabilitation works and is to be addressed in the detailed design stage in consultation with DCC/.	
3.30.2	Yes	Yes		
3.30.3	Yes	Yes		
3.30.4	Yes	Yes		
3.31.1	Yes	Yes		
3.31.2	Yes	Yes		
3.31.3	Yes	Yes		

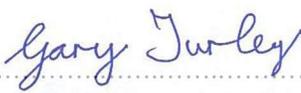
To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
3.31.4	Yes	Yes		
4.1.1	Yes	Yes		
4.1.2	No	No	During Stage E 'Pedestrian' stage only internal cycle phases run. Cyclists entering and exiting the junction, across pedestrian crossings, would be stopped by additional cycle stop lines / signal phases behind the pedestrian crossing points.	Yes
4.1.3	Yes	Yes		
4.2.1	No	No	The bus lane does not require independent 'Bus Green'. Bus lane would run with 'Ahead' general traffic. There would be 4 aspect traffic signal head with green bus symbol.	Yes
4.3.1	Yes	Yes		
4.4.1	No	No	The mainline pedestrian crossing incorporates 4m wide central island, which allows the crossings to be undertaken in two stages. Signal staging plan has been modelled in line with this arrangement. Additionally, the two stage crossings avoid long pedestrian intergreens, which inevitably impacts on overall junction performance. Push Button Units with accompanying signals will be provided on the central refuge.	Yes
4.5.1	Yes	Yes		

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
4.6.1	No	No	The staggered pedestrian crossing on Turnapin Lane would be crossed in two stages during Stage F. Pedestrians get opportunities to cross the longer south crossing in Stages E and F. Existing pedestrian crossing on Turnapin Lane east arm is completed in three stages. The current proposal reduces the crossing to two stages.	Yes
4.7.1	Yes	Yes		
4.8.1	Yes	Yes		
4.8.2	Yes	Yes		
4.8.3	Yes	No	Stage E incorporates all pedestrian stage. Sufficient intergreen would be provided, after the pedestrian green man, to allow pedestrians safely cross the north and south arms.	Yes
4.9.1	Yes	Yes		
4.10.1	Yes	Yes		
4.11.1	Yes	Yes		
4.12.1	Yes	Yes		
4.13.1	Yes	Yes		
4.14.1	Yes	Yes		
4.15.1	Yes	Yes		
4.16.1	Yes	Yes		
4.17.1	Yes	Yes		

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
4.18.1	Yes	Yes		
4.19.1	Yes	Yes		
4.20.1	Yes	Yes		
5.1.1	Yes	Yes		
5.2.1	Yes	Yes		

Signed:.....Designer

Signed:.....Employer

Signed:.....Audit Team Leader

Appendix D. Supplementary Audit Drawings & Documents Supplied

Drawings			
Series	Dig No	Rev	Drawing Title
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-0001 to 0037	L06	GENERAL ARRANGEMENT PLAN SHEETS 1 TO 37
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_SJ-0002_XX_DR-TR-0001 to 0044	L03	JUNCTION SYSTEM DESIGN SHEETS 1 TO 44
CBC 02 SWORDS TO CITY CENTRE	BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-0001 to 0037	L03	TRAFFIC SIGNS AND ROAD MARKINGS SHEETS 1 TO 37

Appendix E. Supplementary Road Safety Feedback Form

ROAD SAFETY AUDIT FEEDBACK FORM

Scheme: CBC 02 SWORDS TO CITY CENTRE

Audit Stage: Road Safety Audit Stage 1

Date Audit Completed: 20th May 2022

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
7.1.1	No	No	The entrance to business access is considered a local entrance; thus, we are not breaking the bus lane. This is the correct approach adopted in Bus Lane design. A broken Bus lane line is provided to all priority junctions.	Yes
7.1.2	No	No	The raised kerbed arrangement at local accesses is in line with BusConnects guidance. Refer to Figures 30 and 31 of the BC guidance document for the type of access arrangement	Yes
7.1.3	Yes	Yes		
7.2.1	Yes	Yes		
7.2.2	No	No	The entrance to the veterinary hospital is considered a local entrance; thus, we are not breaking the bus lane. This is the correct approach adopted in Bus Lane design.	Yes
7.3.1	No	No	The entrance to N1 Business Park is considered a local entrance; thus, we are not breaking the bus lane. This is the correct approach adopted in Bus Lane design.	Yes

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
7.3.2	No	Yes	The entrance to McComish Ltd was tracked with 16.5m HGV.	Yes
7.4.1	Yes	Yes		
7.5.1	Yes	Yes		
7.6.1	Yes	Yes		
7.7.1	No	No	The raised kerbed arrangement at local accesses is in line with BusConnects guidance. Refer to Figure 30a of the BC guidance document for the type of access arrangement	Yes
7.8.1	Yes	Yes		
7.9.1	Yes	No	<p>The provision of the desirable staggered arrangement as recommended will increase the inter-green time significantly and create undesirable delay to traffic .</p> <p>It is not proposed to provide pedestrian fencing on the median. Thus pedestrians will have full visibility of the crossing and the junction layout. A push-button and pole will be provided on the left-hand side of the crossing to encourage pedestrians to look in the direction of approaching traffic.</p> <p>The "Look Left/Right" with an arrow marking will be provided in detailed design to assist pedestrians in the direction of approaching traffic.</p>	Yes
7.10.1	Yes	No	Due to the geometry of the junction, it is not possible to provide the desirable staggered	Yes

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
			arrangement as recommended. It is not proposed to provide pedestrian fencing on the median. Thus pedestrians will have full visibility of the crossing and the junction layout. A push-button and pole will be provided on the left-hand side of the crossing to encourage pedestrians to look in the direction of approaching traffic. The "Look Left/Right" with an arrow marking will be provided in detailed design to assist pedestrians in the direction of approaching traffic.	
7.11.1	Yes	No	Due to the geometry of the junction, it is not possible to provide the desirable staggered arrangement as recommended. It is not proposed to provide pedestrian fencing on the median. Thus pedestrians will have full visibility of the crossing and the junction layout. A push-button and pole will be provided on the left-hand side of the crossing to encourage pedestrians to look in the direction of approaching traffic. The "Look Left/Right" with an arrow marking will be provided in detailed design to assist pedestrians in the direction of approaching traffic.	Yes
7.11.2	No	Yes	The right turning cyclist (southbound) is not expected to be high, so drop kerb as per Figure 29 of the BC Guidance Document is provided.	Yes
7.12.1	No	Yes	Drop kerb as per Figure 29 of the BC Guidance Document is	Yes

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
			provided at Toucan crossing to allow the cyclist to utilise the crossing	
7.13.1	Yes	Yes		
7.14.1	Yes	Yes		
7.15.1	Yes	Yes		
7.16.1	Yes	Yes		
7.17.1	Yes	Yes		
7.18.1	Yes	Yes		
7.19.1	Yes	No	The right turn box marking will be removed.	Yes
7.20.1	Yes	Yes		
7.20.2	Yes	Yes		
7.21.1	Yes	No	The westbound cycle signal head is removed, no separate cycle phase proposed.	Yes
7.22.1	Yes	Yes		
7.23.1	Yes	Yes		
7.24.1	Yes	Yes		
7.25.1	Yes	Yes		
7.26.1	Yes	Yes		
7.27.1	Yes	Yes		
7.27.2	Yes	Yes		
7.28.1	Yes	Yes		

To Be Completed by the Design Team				To Be Completed by the Audit Team
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended	Alternative measures or reasons accepted (yes/no)
7.29.1	Yes	Yes		
7.29.2	Yes	Yes		

Signed:.....Designer

Signed:.....Employer

Signed:.....Audit Team Leader