Appendix M
Road Safety Audit

Stage 1 Road Safety Audit

Tallaght/Clondalkin to City Centre Core Bus Corridor
BCIDA – ACM - STY_ZZ – 0809_XX_00 – RP – ZZ – 0001

Client – National Transport Authority
Stage – Stage 1

Project reference: Project Reference
Project number: Project Number
BCIDA – ACM - STY_ZZ – 0809_XX_00 – RP – ZZ – 0001

Date (March 2023)

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1. Introduction

Overview

AECOM has been commissioned by the National Transport Authority (NTA) to undertake an updated Road Safety Audit of a proposed Core Bus Corridor (CBC) scheme running from Clondalkin to Drimnagh (CBC 8) and from Greenhills to Dublin City Centre (CBC 9).

This Stage 1 Audit will assess the safety implications of the scheme for all road users.

The Safety Audit Report indicates each of the problems identified, provides outline recommendations for solving the problems, presents the Audit Team Statement, and describes a schedule of documents reviewed.

The Road Safety Audit team membership, was as follows:

Team Leader: Rowan Lyons BEng CEng MIEI MCIHT MSoRSA

Principal Engineer, AECOM

(Certificate of Competency in Road Safety Audit)

Team Member: Brian McMahon BE MSc CEng MIEI

Associate Director, AECOM

(Certificate of Competence in Road Safety Audit)

The audit comprises of an examination of the proposed scheme drawings. The site was visited over two separate days:

Site Visit 1: 19th August 2022. The weather was dry with a dry road surface

Site Visit 2: 23rd August 2022. The weather was dry with a dry road surface

During the time of the site visits, there did not appear to be any circumstances that would suggest a deviation from normal traffic conditions. The traffic conditions on the local road network were moderate for the duration of the visits. Both site visits were undertaken between 09:30 and 14:00 (in daylight).

1.2 Road Safety Audit

This Safety Audit represents the response of an independent Audit Team to various aspects of the scheme. The recommendations contained therein are the opinions of the Audit Team and are intended as a guide to the designers on how the scheme as constructed can be improved to address issues of road safety.

The NTA has procured a traffic survey for each of the junctions along route 9, with existing traffic counts reviewed. However, future forecasts of pedestrian, cyclists, frequency of the buses, Dublin Bus or otherwise have not been provided.

The terms of reference of the Audit are as described in TII guidelines GE-STY-01024. The Road Safety Audit team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

The scheme has not been examined or verified for compliance with any other standards. However, in order to clearly explain a safety problem or the recommendation to resolve a problem, the Audit Team may on occasion have referred to a design standard for information only. Any Audit comments should not be construed as implying that a technical audit has been undertaken in any respect.

The Safety Audit guidelines do not provide a facility for the Audit Team to classify individual problems according to their severity, and hence the level of priority to be attached to each. It is instead the task of the design team and/or their representative to take a view on the validity of each of the recommendations and decide on an appropriate course of action.

The response of the Design Team to the Safety Audit should be prepared in the form of a Safety Audit Feedback Form, accepting the changes proposed by the Audit Team or providing an alternative solution to the problem. The Feedback Form is then returned to the Audit Team for review and verification. A template for a Safety Audit Feedback Form is included as Appendix B.

1.3 Background

The core bus corridor project proposes the provision of 230 kilometres of bus lanes on sixteen of the busiest bus corridors and 200 kilometres of cycle lanes and tracks.

The intention is to develop these bus corridors so that each will have continuous bus priority - in other words, a continuous bus lane in each direction as well as maintaining two general traffic lanes. In addition, it is proposed to provide safe cycling facilities, segregated where possible from other vehicular traffic. This will remove the delays currently experienced which will grow worse as congestion increases.

1.3.1 Clondalkin to Drimnagh Core Bus Corridor

The Clondalkin to Drimnagh Core Bus Corridor (CBC) commences on the R134 New Nangor Road at the junction with Woodford Walk and is generally routed via the R134 along the New Nangor Road as far as the junction with the Naas Road. From here it is generally routed along Naas Road as far as the junction with Walkinstown Avenue. The corridor continues down Walkinstown Avenue on to the R110 Long Mile Road to the junction with Walkinstown Road, where it joins the Greenhills Core Bus Corridor (CBC 9).

The CBC 8 is approximately 4km in length and will reduce bus journey times from 21 minutes down to 14 minutes. It is intended that CBC 8 will provide a high-quality transport system where priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both directions, with alternative measures proposed at particularly constrained locations. Dedicated cycle facilities will also be provided alongside the proposed CBC route.

1.3.2 Greenhills to City Centre Core Bus Corridor

The Greenhills to City Centre Core Bus Corridor (CBC) commences at Belgard Square West in Tallaght. From here the CBC is routed along Belgard Square West and Belgard Square North as far as the junction with Belgard Road. At this point the CBC continues across the junction, onto the Old Blessington Road and through Tallaght Main Street, taking a left off Main Street, through Old Greenhills Road, exiting through a new bus only junction on Greenhills Road. From here the CBC is routed along the R819 Greenhills Road, Ballymount Avenue, Calmount Road, and Walkinstown Road as far as the junction with the R110 Long Mile Road.

It is proposed to realign the existing Greenhills Road in two locations on this section: along an existing road reservation between Parkview and Treepark Road, and through Ballymount Industrial Estate by way of extending both Ballymount Avenue and Calmount Avenue to connect to Greenhills Road at new signalised junctions.

From the junction of the R110 Long Mile Road and the R819 Walkinstown Road the CBC is routed along the R110 Drimnagh Road, Crumlin Road, Dolphin's Barn, Cork Street, St. Luke's Avenue, The Coombe, and Dean Street to the junction with the R137 Patrick Street. The CBC is then routed along Patrick Street and Nicholas Street to the junction with Christchurch Place where it will join the prevailing traffic management regime in the city centre.

The CBC is approximately 11km in length and will reduce bus journey times from 80 minutes down to 35-40 minutes. It is intended that CBC 9 will provide a high-quality transport system where priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both directions, with alternative measures proposed at particularly constrained locations. Dedicated cycle facilities will also be provided alongside the proposed CBC route.

2. Site Location

2.1 Overview

The scheme comprises of a Core Bus Corridor system linking Clondalkin to Drimnagh which links to the Core Bus Corridor system linking Tallaght to Dublin City Centre.

The Clondalkin to Drimnagh section of the CBC commences at the R134 New Nangor Road / Woodford Walk junction and is generally routed via the R134 along the New Nangor Road as far as the junction with the Naas Road. From here it follows the Naas Road as far as the junction with Walkinstown Avenue. The corridor continues down Walkinstown Avenue on to the R110 Long Mile Road to the junction with Walkinstown Road, where it joins the Greenhills Core Bus Corridor.

The Tallaght to City Centre section of the CBC commences on Belgard Square West in Tallaght and it is routed through Ballymount Industrial Estate, Walkinstown, Crumlin, Dolphins Barn and Christchurch Place where it will join the prevailing traffic management regime in the city centre.

The scheme includes redistribution of road space, provision of new CBC facilities as well as pedestrian and cycle facility upgrades.

Error! Reference source not found. provides a summary of the scheme location and context while the location of the CBC Route 9 is shown on **Figure 2.1.**

Table Error! No text of specified style in document.**.1: Summary of Scheme Location**

Location	Clondalkin to Drimnagh, and Belgard Square West (Tallaght) to Christchurch Place (City Centre)
Classification	Regional & Local Roads
Speed Limit	50 to 60 km/h
Local Authority Area	South Dublin County Council & Dublin City Council
Type of Roads	Single Carriageway Roads, Urban Environment

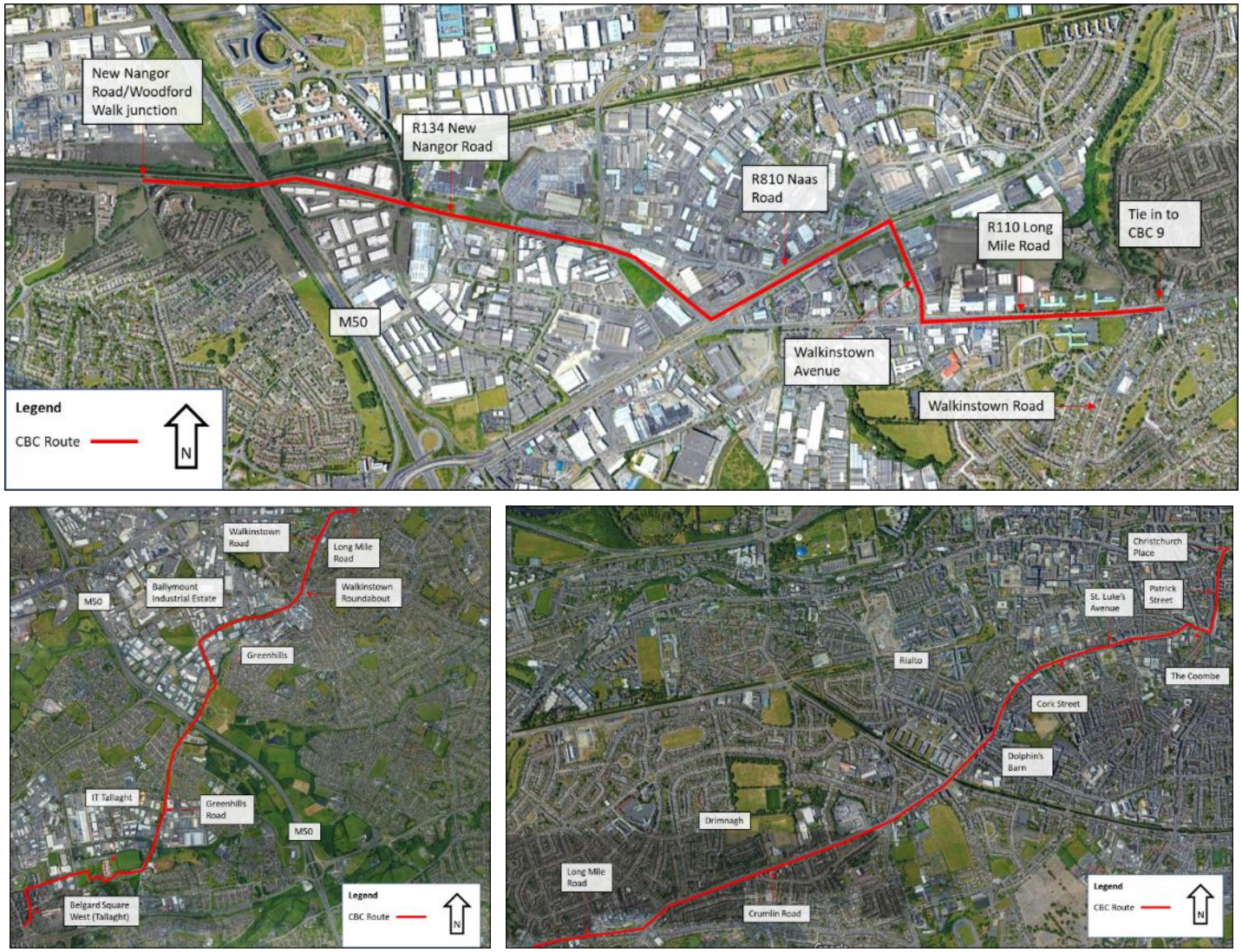


Figure.1: Site Location

2.2 Site Observations

The site visits were undertaken on Monday 19th August and Thursday 23rd August 2022; the weather was warm and dry for both visits. A number of site observations were noted. These observations are discussed below under a number of key headings.

Road Geometry

- The Clondalkin to Drimnagh section study area extends from the junction between the R134 New Nangor Road and Woodford Walk and is generally routed via the R134 along the New Nangor Road as far as the junction with the Naas Road. From here the CBC is routed along Naas Road as far as the junction with Walkinstown Avenue. The corridor continues down Walkinstown Avenue onto the R110 Long Mile Road to the junction with Walkinstown Road, where it joins the Greenhills Core Bus Corridor (CBC 9).
- The Tallaght to City Centre section study area extends from Belgard Square West in Tallaght to Christchurch Place in Dublin City Centre. The CBC is routed along the R819 Greenhills Road, Ballymount Avenue, Calmount Road, and Walkinstown Road as far as the junction with the R110 Long Mile Road. From the R110 Long Mile Road/R819 Walkinstown Road junction, the CBC is routed along the R110 Drimnagh Road, Crumlin Road, Dolphin's Barn, Cork Street, St. Luke's Avenue, The Coombe, and Dean Street to the junction with the R137 Patrick Street. The CBC is then routed along Patrick Street and Nicholas Street to the junction with Christchurch Place where it will join the prevailing traffic management regime in the city centre.
- There is an array of road types and geometries within the 15km route with some sections accommodating existing bus lanes e.g. Greenhills Road, Walkinstown Road, Long Mile Road, Cork Street and Patrick Street. There is a protected bus lane (northeast bound) on St. Luke's Avenue.

Vehicular Traffic

- Traffic flows during the site visit appeared to be normal for each particular road for the time of day.
- The busiest locations included Belgard Square, Walkinstown Roundabout and Christchurch Place.
- The speed limit on the road network within the study area varies between 50 to 60 km/h throughout, with traffic generally appearing to stay within this limit.

Pedestrians & Cyclists

- There are existing footpaths provided on both sides of the full route.
- There is a variety of existing cycle facilities along the route, from on-road, shared with bus, cycle tracks etc.
- Pedestrian and cyclist activity were busiest along Patrick Street and at Christchurch Place. High numbers of buses were observed at Belgard Square.

Street Lighting

- Public lighting is provided throughout the entire scheme extents. The site visit was carried out during daylight hours; lighting levels at the site during darkness hours were therefore not observed.

2.3 Collision History

A review of the collision data between the years 2005 and 2016 has been undertaken for the length of the Greenhills to City Centre CBC.

A review of the collision data between the years 2005 and 2016 has been undertaken for the length of the Clondalkin to Drimnagh CBC. This is attached in Appendix C of this report.

A total of 131 collision occurrences were reported along the 4km length route, which gives an average of 26 collisions per km.

A number of cluster sites have been identified along the scheme as follows:

- New Nangor Road / Woodford Walk junction to Riverview Business Park

- New Nangor Road to Killeen Road junction
- Naas Road to Old Naas junction

The implementation of the proposed scheme is expected to reduce the volume of conflicting movements between non-motorised users and traffic within the scheme.

3. Departures from Standards

3.1 General

No departures from standards have been notified to the audit team.

4. Items Raised at Previous Road Safety Audits

4.1 Overview

This Safety Audit has reported on issues relating to the proposed CBC Schemes (Route 8 and Route 9) Clondalkin to Drimnagh and Tallaght/Greenhills to Dublin City Centre. This is classified as a Stage 1 Road Safety Audit, as defined within the TII Road Safety Audit Guidelines.

The following information was not provided for Audit so therefore could not be commented upon:

- Drainage and Services;
- Lighting;
- Landscaping; and
- Autotrack analysis.

The report has been divided into general issues that are common throughout the scheme in Section 4.2, with specific areas highlighted in Section 4.3.

Earlier Stage 1 Road Safety Audits undertaken for the Clondalkin to Drimnagh scheme in May 2020 and for the Tallaght to City Centre scheme in June 2020 were issued to the Audit Team for information.

These previous Clondalkin to Drimnagh and Tallaght/Clondalkin to City Centre Stage 1 Road Safety Audits were carried out by AECOM in May and June 2020. The current RSA team determined that the following 26 no. previously noted problems are still relevant to the current Core Bus Corridor (CBC) scheme from the Stage 1 Road Safety Audits, Report reference: BCIDA-ACM-STY_SP-0008_XX_00-RP-ZZ-0001 and BCIDA-ACM-STY_SP-0009_XX_00-RP-ZZ-0001.

For ease of reference to these 2020 audits, the problem numbers are retained in the list below.

4.2 General Issues

The following general issues are common to the earlier Stage 1 Road Safety Audits.

4.2.1 Road Geometry

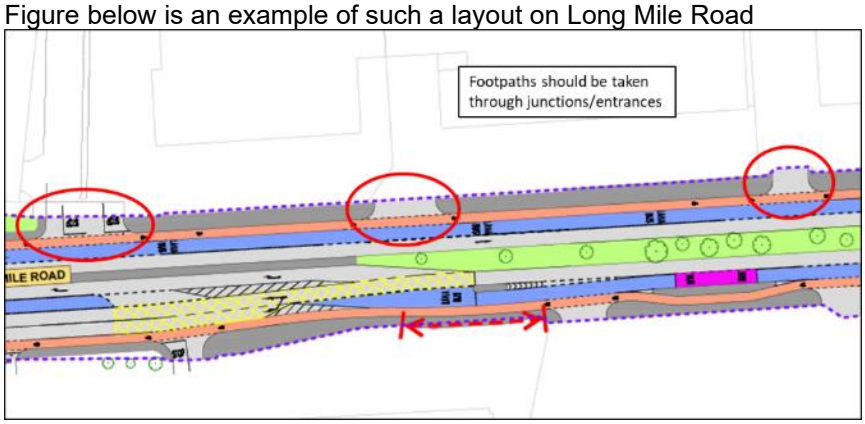
4.2.1 Problem	
Location:	Throughout the Scheme
Summary:	Auto Tracking has not been provided
Description:	
Tracking for buses (and other large vehicles) has not been provided for any of the junctions throughout the scheme. If there is insufficient space within the carriageway for all vehicle types to safely complete a turning manoeuvre there is a risk of vehicles over-running, or striking, the kerb or entering the footpath/cycle lane where there is the potential for collisions with vulnerable road users.	
***Recommendation*:**	
The swept path of all vehicles should be accommodated within the extents of the traffic lanes at all junctions within the Scheme. Where larger vehicles (e.g. buses and HGVs) may over-run adjacent traffic lanes when turning ensure stop lines are sufficiently set back from the junction and that mirrored turning manoeuvres are on separate signal phases.	

4.2.2 Problem	
Location:	Throughout the Scheme
Summary:	Kerb height of cycle track
Description:	
No details have been provided regarding the level difference between the cycle track and adjacent carriageway. In accordance with the National Cycle Manual, the cycle tracks and carriageway should be physically separated by verge or height difference. Failure to provide adequate segregation between the cycle track and adjacent carriageway may result in collisions, with motorists more likely to encroach on the cycle track.	
***Recommendation*:**	
The cycle track should be constructed at a higher level (25 to 50mm) than the adjacent carriageway.	

4.2.3 Problem	
Location:	Throughout the Scheme
Summary:	Tie-ins to existing
Description:	
There are a number of locations through the scheme where proposed cycle tracks, footpaths and kerblines do not tie-in with the existing infrastructure. Failure to provide adequate tie-ins at these locations may result in confusion amongst all road users which, in turn, may lead to collisions.	
***Recommendation*:**	
Adequate tie-ins should be provided between the scheme and existing carriageway.	

4.2.2 Pedestrians & Cyclists

.2.5 Problem	
Location:	Throughout the Scheme
Summary:	Relocating bus stops
Description:	
There are proposals to relocate a number of bus stops through the scheme. For example, the eastbound bus stop on Nangor Road has been relocated approximately 100m to the east from its current location at the Woodford Walk junction. The current location of the bus stop is on the pedestrian desire line being adjacent to a controlled crossing. However, the new location of the bus stop will create a pedestrian desire line away from the existing signalled crossing. This is likely to result in pedestrians crossing Nangor Road away from the designated crossing thus increasing the risk of collisions.	
***Recommendation*:**	
All bus stops should be located close to existing pedestrian desire lines.	

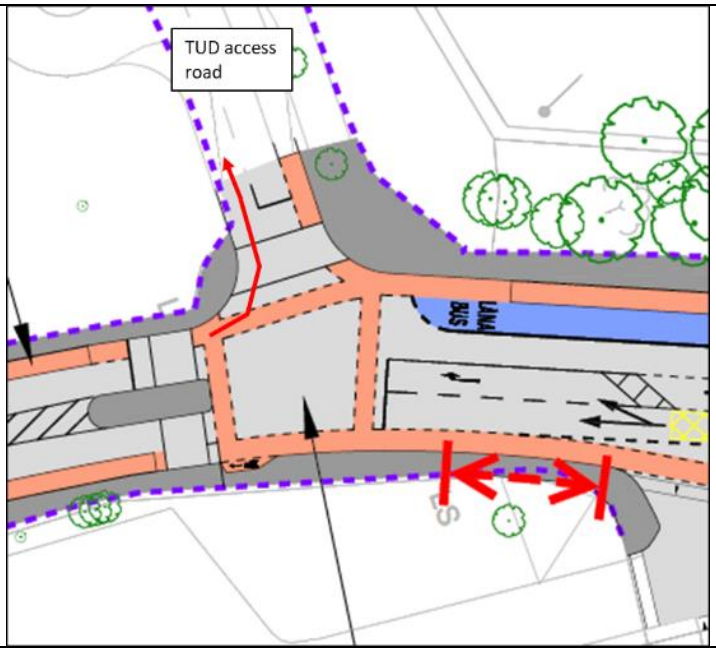
4.2.6 Problem	
Location:	Throughout the Scheme
Summary:	Discontinuation of footpath across junctions /entrances
Description:	
The footpath has been discontinued at a number of junctions and accesses through the scheme. Failure to provide a footpath across the junctions/entrances would give motorists priority and therefore increase the risk of collisions with pedestrians. Figure below is an example of such a layout on Long Mile Road  **Figure: Junctions and accesses along Long Mile Road** The following are examples of other locations where this layout is proposed: • Sheets 10 and 11 of 12: Accesses off Long Mile Road	
***Recommendation*:**	
The footpaths should be continued across all entrances, giving priority to pedestrians.	

4.3 Specific Areas

Tallaght/Clondalkin to City Centre

4.3.4 Problem

Location:	At Greenhills Road / TU Dublin Access Road
Drawing:	Sheets 07 of 47
Summary:	Absence of cycle facilities at TU Dublin



Description:

There are no facilities provided for cyclists wishing to travel north into TU Dublin. Cyclists will be required to either cycle on the footpath or share the carriageway with vehicles thus increasing the risk of collisions with pedestrians and motorists.

Recommendation:

Adequate and safe facilities should be provided for northbound cyclists into TU Dublin.

4.3.13 Problem

Location:	Calmount Road
Drawing:	Sheet 16 of 47
Summary:	On street parking will be displaced

Description:

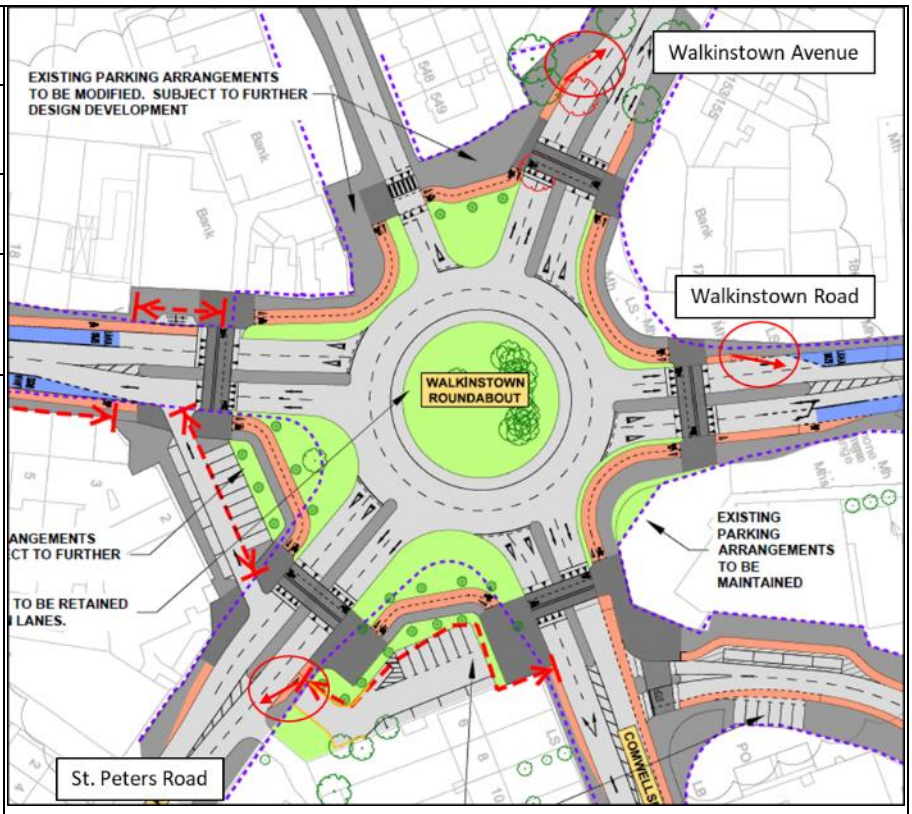
On-street parking along the existing Calmount Avenue was observed. There is a risk that motorists will continue to park on Calmount Avenue due to the shortfall in parking within the various adjacent commercial premises. The presence of parked vehicles on Calmount Avenue will obstruct the bus lane and result in buses having to suddenly divert onto the regular lane. This is likely to lead to collisions.

Recommendation:

Enforcement measures should be implemented to discourage motorists from parking along Calmount Avenue.

4.3.14 Problem

Location:	Walkinstown Roundabout
Drawing:	Sheet 19 of 47
Summary:	Cyclists entering carriageway



Description:

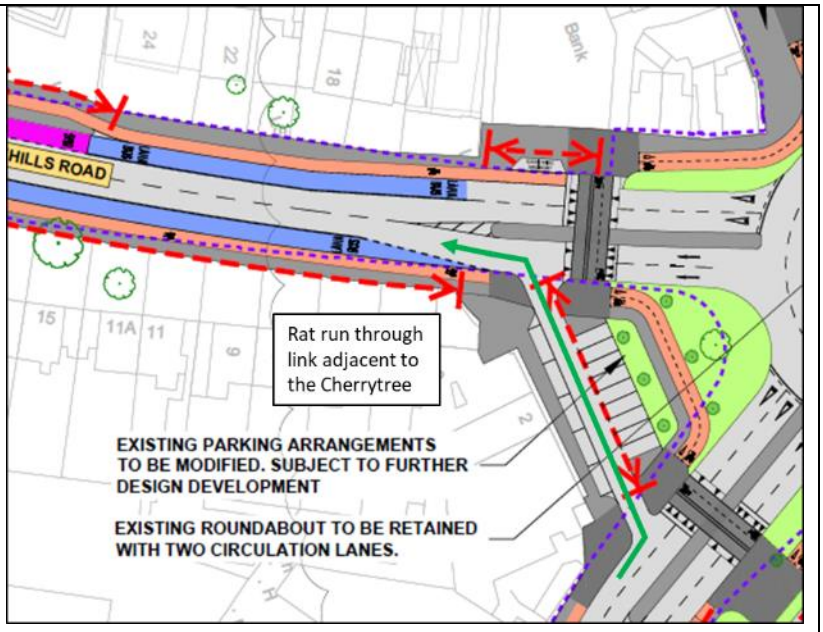
Cyclists accessing Walkinstown Avenue, Walkinstown Road and Saint Peters Road will be required to enter the carriageway at the termination of the cycle track. At each of these locations, the transition between the cycle track and carriageway is short and is likely to result in collisions between motorists and cyclists as cyclists suddenly enter the carriageway.

Recommendation:

A smoother/longer transition between the cycle track and carriageway should be provided.

4.3.15 Problem

Location:	Walkinstown Roundabout
Drawing:	Sheet 19 of 47
Summary:	Motorists using link between Greenhills Road and St. Peter's Road



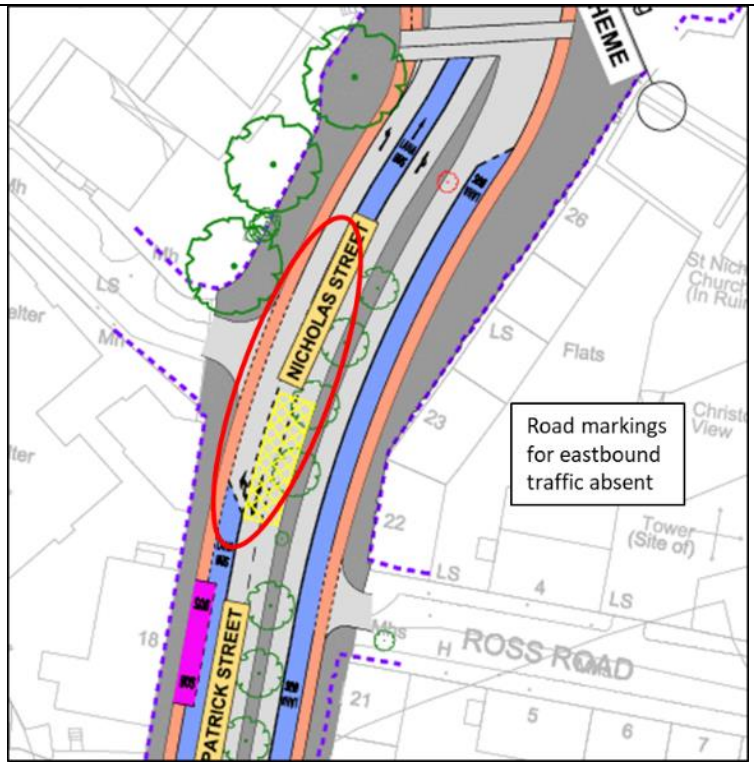
Description:

The link between St. Peter's Road and Greenhills Road will remain open. It was observed that a relatively high volume of motorists opt to use this link as a rat run rather than negotiate the roundabout and this is likely to continue following the implementation of the scheme. The proposed parking arrangement to the front of the Cherrytree will require motorists to reverse to/from the perpendicular parking spaces onto this link road. This is likely to result in conflicts between vehicles manoeuvring to

or from these spaces and vehicles rat running through the link.
Recommendation:
Measures to discourage rat running should be considered along this link.

4.3.25 Problem

Location:	Nicholas Street/High Street/Christchurch Place junction
Drawing:	Sheet 34 of 47
Summary:	Conflicts between northbound buses and vehicles on adjacent lane as they switch lanes



Description:

Northbound buses and vehicles on the adjacent lane wishing to turn left onto Back Lane or High Street are required to switch lanes as they approach the Nicholas Street/High Street/Christchurch Place junction. The buses will switch onto a straight-ahead lane for buses only while other motorists wishing to turn left onto Back Lane or High Street will be required to a left turn lane. This is likely to result in conflicts on occasions when buses and other vehicles are switch lane simultaneously.

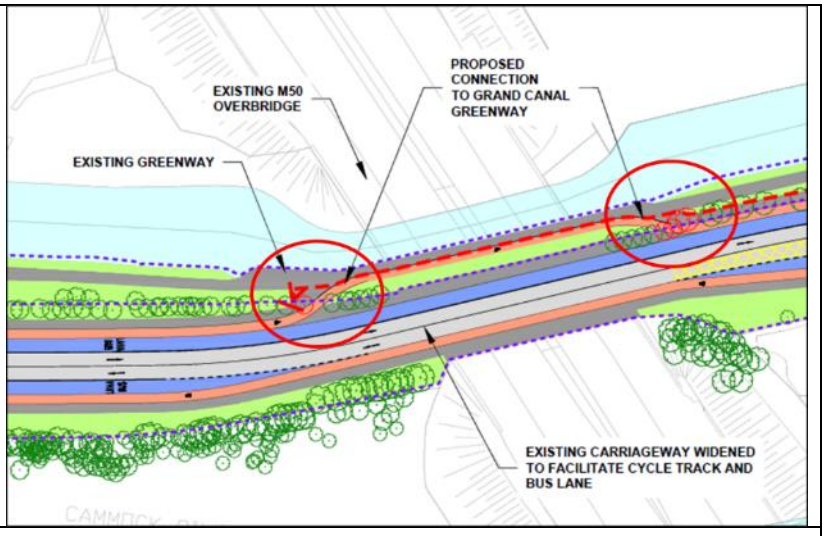
Recommendation:

The left turn lane should be provided closer to the junction to put some separation between the bus stop and junction.

Clondalkin to Drimnagh Section

4.3.2 Problem

Location:	Nangor Road at M50 overbridge
Drawing:	Sheet 02 of 12
Summary:	Cycle track crosses footpath



Description:

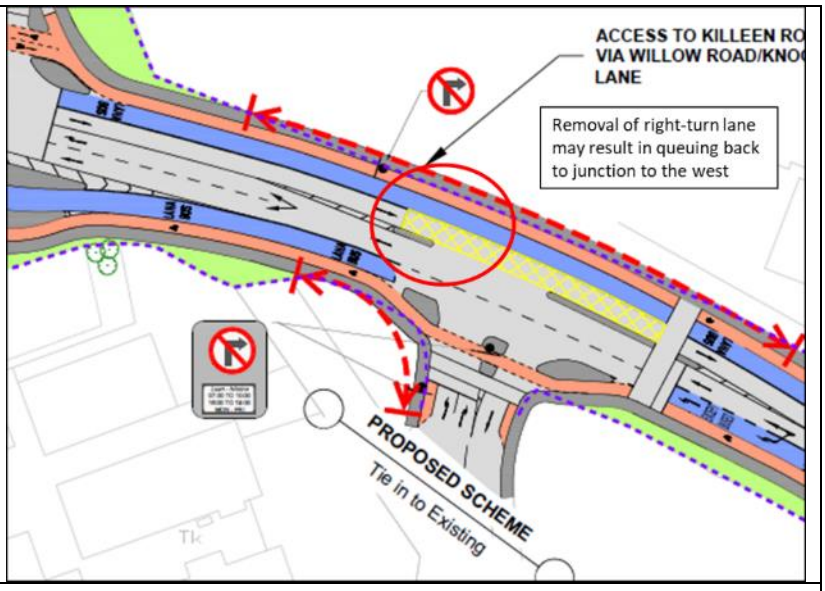
The eastbound cycle track on Nangor Road crosses the pedestrian footpath at two locations either side of the M50 overbridge. There are no road markings or any degree of advance warning indicating these conflicts. This is likely to result in collisions between pedestrians and cyclists.

Recommendation:

Road markings and appropriate signage warning cyclists of the footpath ahead should be installed. Priority should be given to pedestrians at these locations.

4.3.10 Problem

Location:	At Nangor Road / Killeen Road junction
Drawing:	Sheet 06 of 12
Summary:	Removal of right-turn lane



Description:

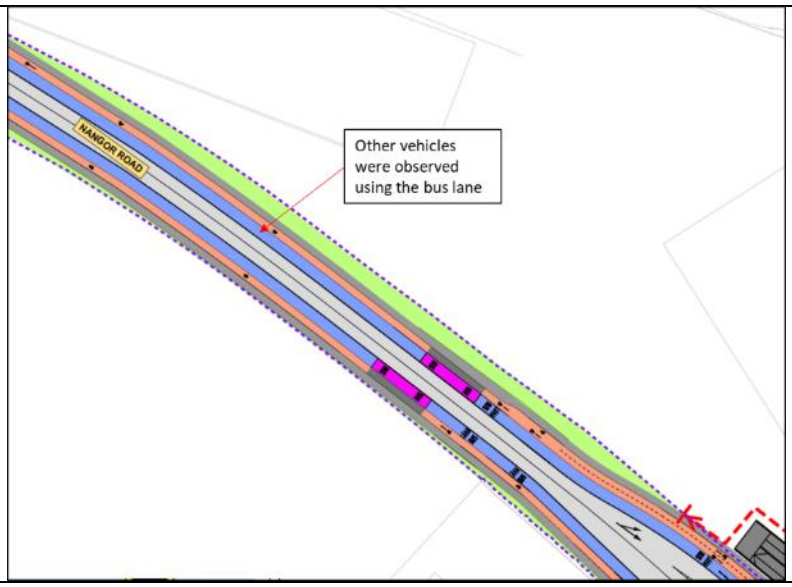
The existing right-turn lane serving Killeen Road (south arm) will be removed with access provided via Willow Road/Knockmitten Lane. It was observed that this right-turn is heavily trafficked particularly during peak periods. With the removal of this right-turn lane, there is a risk that motorists will attempt to turn right onto Killen Road resulting in queuing back to the junction to the west (Nangor Road/Killeen Road north arm). Vehicles on Nangor Road wishing to continue east/southeast are likely to use to bus lane in order to avoid queuing. This may result in collisions with buses.

Recommendation:

Adequate enforcement measures should be installed to prevent traffic from turning right onto Killeen Road. Sufficient advance warning should also be provided on the approach to the junction.

4.3.11 Problem

Location:	Nangor Road southeast bound bus lane
Drawing:	Sheet 06 of 12
Summary:	Vehicles observed using bus lane



Description:

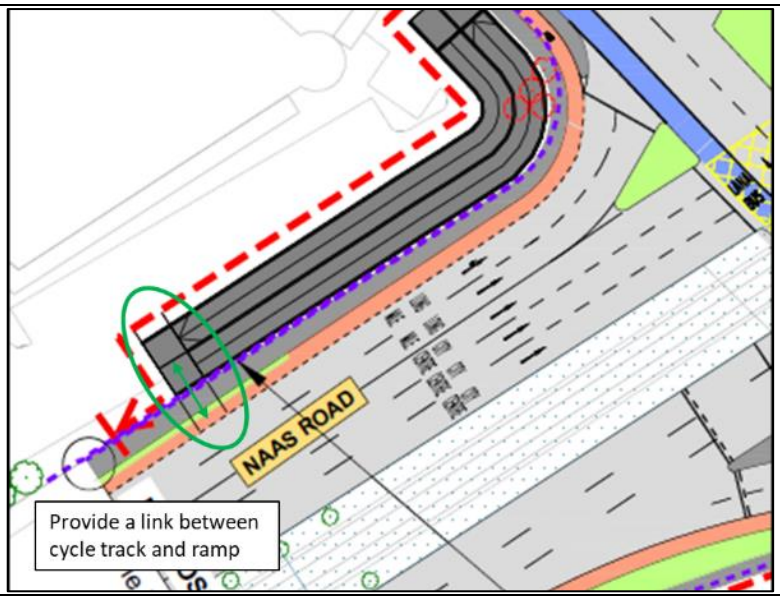
It was observed during the site visit that motorists often used the southeast bound bus lane on Nangor Road. Given the long queues noted from the Long Mile Road junction, having additional traffic using the bus lane is likely to result in bus delays or possible collisions between buses and other vehicles.

Recommendation:

Enforcement measures should be implemented to discourage motorists from using the bus lane.

4.3.14 Problem

Location:	At Nangor Road / Naas Road junction
Drawing:	Sheet 07 of 12
Summary:	Access to pedestrian and cycle bridge



Description:

It is not clear how cyclists on the eastbound cycle track on Naas Road will access the proposed pedestrian and cycle ramp. Failure to provide a safe link between the cycle track and ramp may result in cyclists having to dismount their bicycles in order to cross the grass verge and footpath or collisions between cyclists and pedestrians.

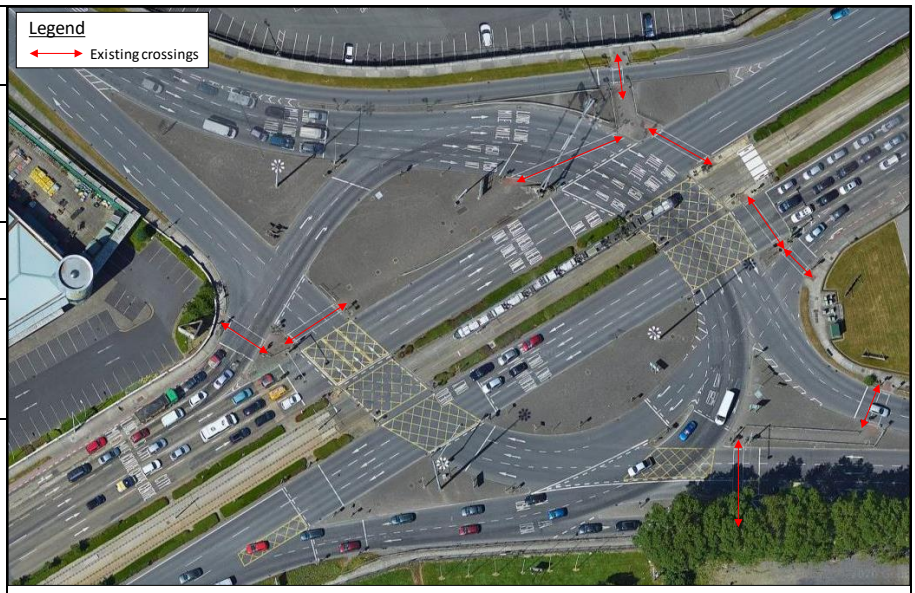
If an easy access onto the ramp is not provided, some cyclists may decide to continue on the carriageway thus increasing the risk of collisions with motorists.

Recommendation:

Provide a safe link between the eastbound cycle track on Naas Road and proposed pedestrian/cycle ramp.

4.3.16 Problem

Location:	At Nangor Road / Naas Road junction
Drawing:	Sheet 07 of 12
Summary:	Removal of pedestrian crossings



Description:

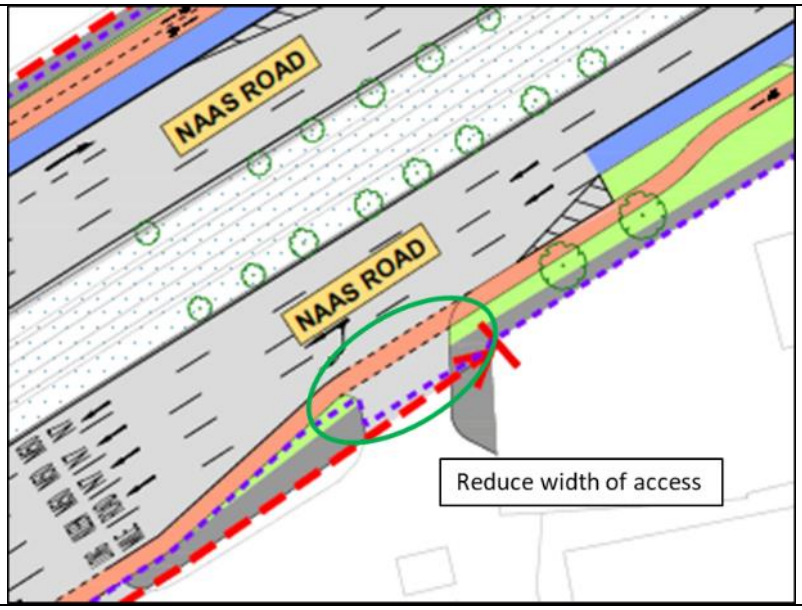
It is proposed to remove that existing at-grade pedestrian crossings with the installation of the pedestrian and cycle bridge over the junction. However, it is likely that pedestrians and cyclists will continue to cross the road at-grade due largely to shorter travel distances (rather than having to negotiate the ramp and bridge). This is likely to result in collisions.

Recommendation:

The at-grade pedestrian crossings should be retained.

4.3.18 Problem

Location:	Naas Road
Drawing:	Sheet 07 of 12
Summary:	Access to Beechlawn Motors encourages fast speeds



Description:

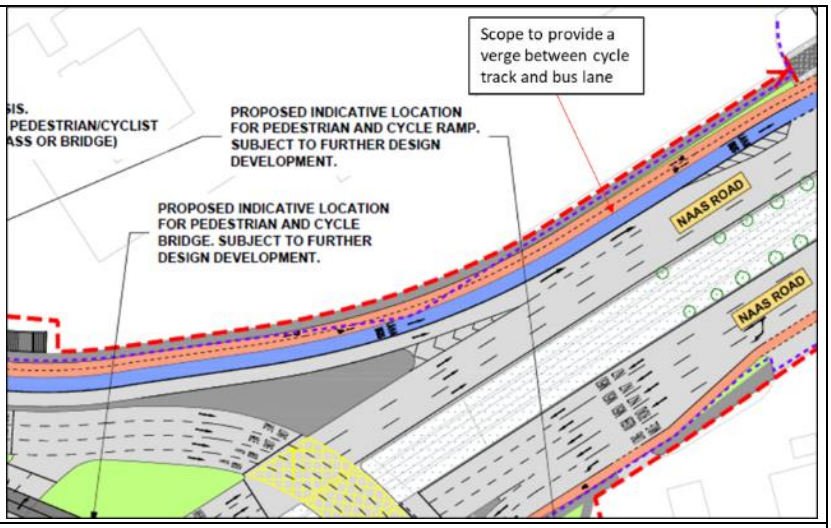
The orientation and width of the access to Beechlawn Motors from the southwest bound carriageway encourages motorists to enter the access at high speeds. This may result in collision with cyclists on the cycle track or pedestrians on the footpath.

Recommendation:

The width of the access should be reduced to reduce the speed of vehicles at they turn into Beechlawn Motors.

4.3.20 Problem

Location:	Naas Road/Nangor Road
Drawing:	Sheet 07 of 12
Summary:	Merge between traffic from Nangor Road and traffic on the Naas Road northeast bound carriageway



Description:

There is no level of separation between the bus lane and adjacent two-way cycle track at the Long Mile Road junction. It is stated in the National Cycle Manual that 'multi-lane district distributor and collector roads with infrequent crossing points should have a verge separating a cycle track and carriageway'. Failure to provide separation in the form of a grass verge is likely to result in collisions between buses and cyclists with buses likely to encroach on the cycle track or vice-versa.

Recommendation:

A grass verge should be provided between the cycle track and carriageway.

4.3.22 Problem

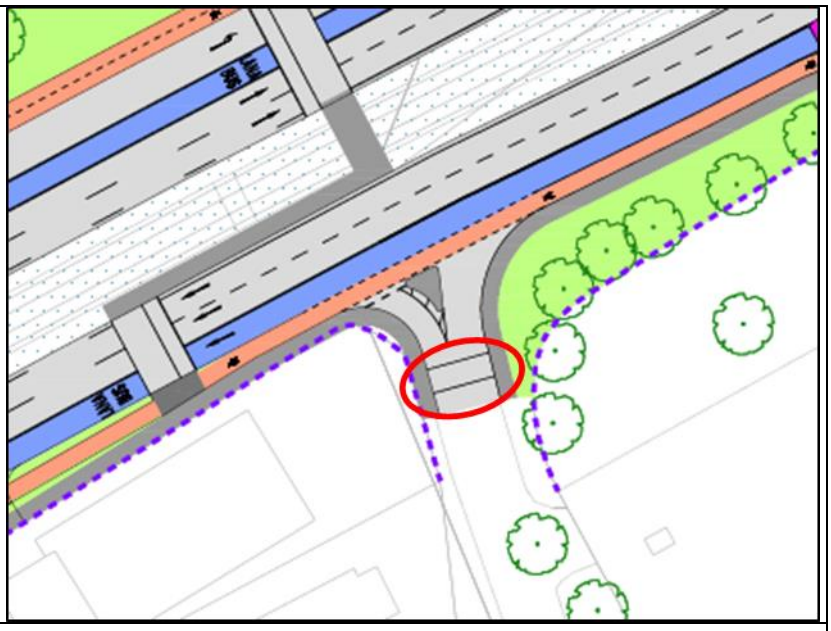
Location:	Naas Road/Robinhood Road
Drawing:	Sheet 09 of 12
Summary:	On-street parking at and close to junction

Description:

It was observed that on-street parking is an issue on Robinhood Road at and in close proximity to its junction with Naas Road. There was also vehicle parking on the footpath along the frontage of Naas Road Autos. Parking at these locations is likely to obstruct traffic flow and visibility between pedestrians and oncoming vehicles thereby leading to collisions.
Recommendation:
Enforcement measures should be implemented to prevent indiscriminate parking at these locations.

4.3.26 Problem

Location:	At Robinhood Road / Naas Road junction
Drawing:	Sheet 09 of 12
Summary:	Pedestrian crossing away from desire line

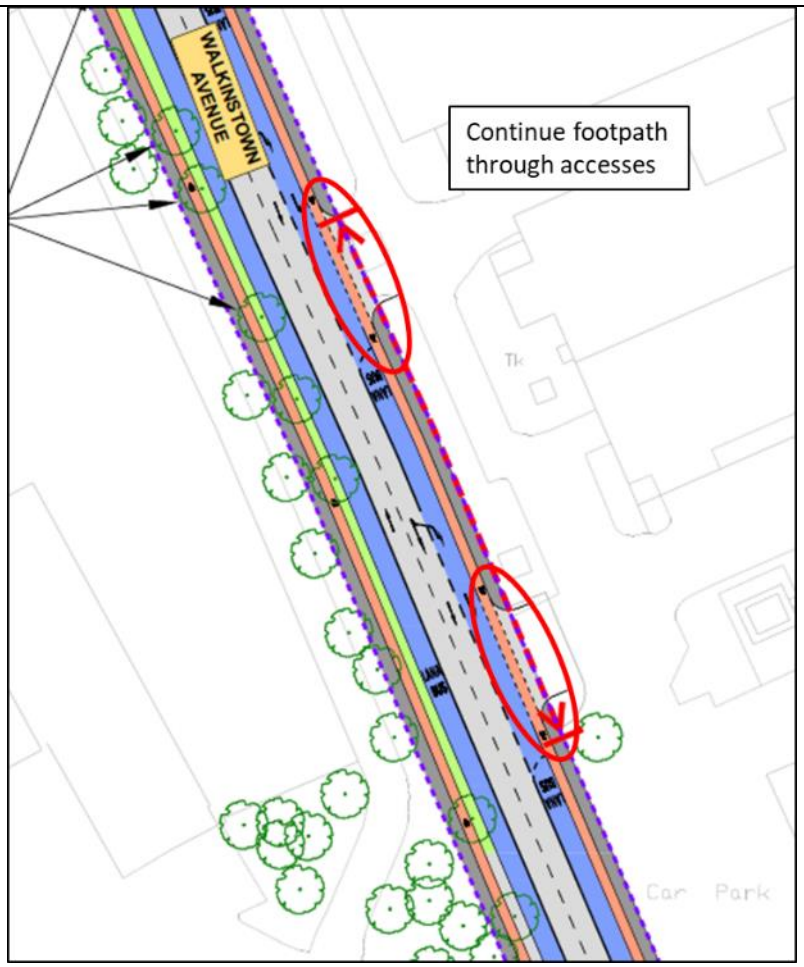


Description:

The pedestrian crossing proposed across Robinhood Road is located away from the pedestrian travel desire line. It is likely that pedestrians will not use this crossing. This is likely to result in pedestrians crossing at the Naas Road junction where no pedestrian facilities have been provided. This, in turn, is likely to result in pedestrians, particularly mobility impaired pedestrian, to trip over raised kerbing or possible collisions with motorists.
Recommendation:
The pedestrian crossing should be relocated across Robinhood Road at its junction with Naas Road.

4.3.28 Problem

Location:	Walkinstown Avenue
Drawing:	Sheet 09 of 12
Summary:	Footpath discontinued across access points



Description:

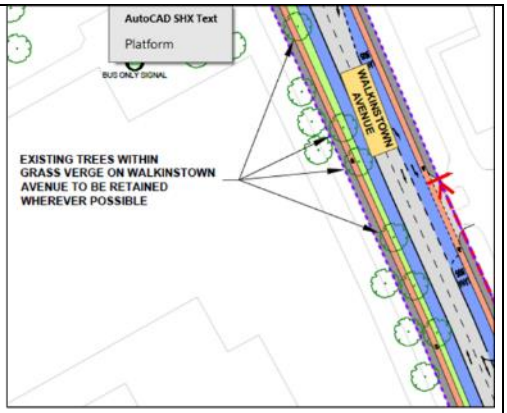
The footpath along the east side of Walkinstown Avenue should be continued across the junction to ensure pedestrians have priority. Failure to provide a footpath across the accesses would give motorists priority and therefore increase the risk of collisions with pedestrians.

Recommendation:

The footpaths should be continued across the accesses on Walkinstown Avenue.

4.3.30 Problem

Location:	Walkinstown Avenue
Drawing:	Sheet 09 of 12
Summary:	Trees adjacent to cycle track too low



Description:

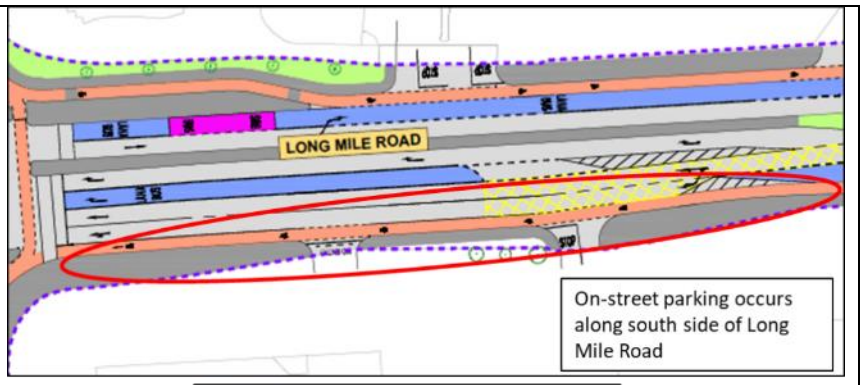
The existing trees to be retained along the west side of Walkinstown Avenue appear very low. There is a risk that cyclists may incur head or eye injuries should there not be sufficient headroom.

Recommendation:

A clear height of 2.5m should be maintained between the cycle track surface and trees.

4.3.36 Problem

Location:	South side of Long Mile Road
Drawing:	Sheet 10 of 12
Summary:	Parking on lay-by will be removed



Description:

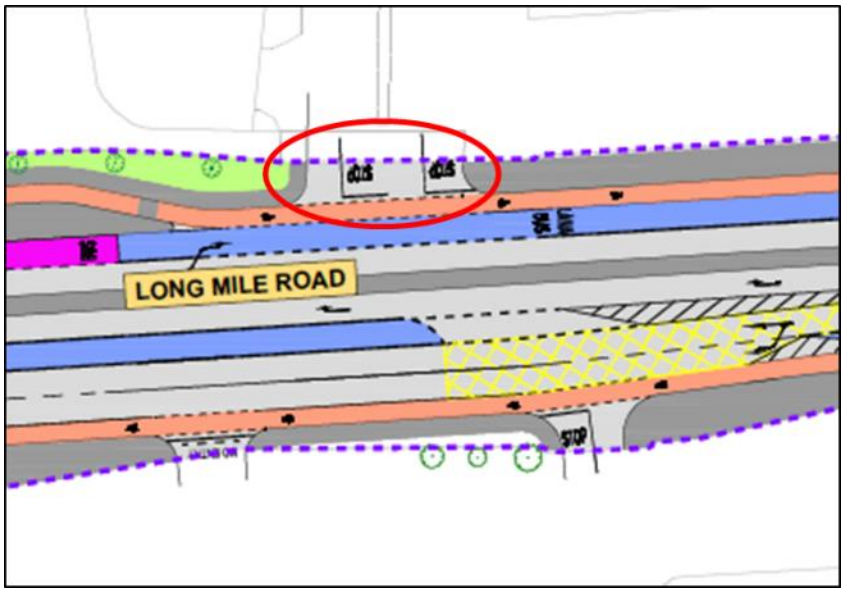
There is a layby fronting a number of commercial units along the south side of Long Mile Road with a number of vehicles noted parked partially on the right turn lane approaching the Walkinstown Avenue junction. It is unclear where these vehicles will be displaced to following the implementation of the scheme. There is a risk that vehicles will continue to park at this location thus increasing the risk of collisions.

Recommendation:

Parking enforcement measures should be implemented to prevent vehicles from parking along the south side of the Long Mile Road.

4.3.38 Problem

Location:	Long Mile Road at Finches Business Park Road and entrances to business
Drawing:	Sheet 10 of 12
Summary:	Discontinuation of footpath across entrances



Description:

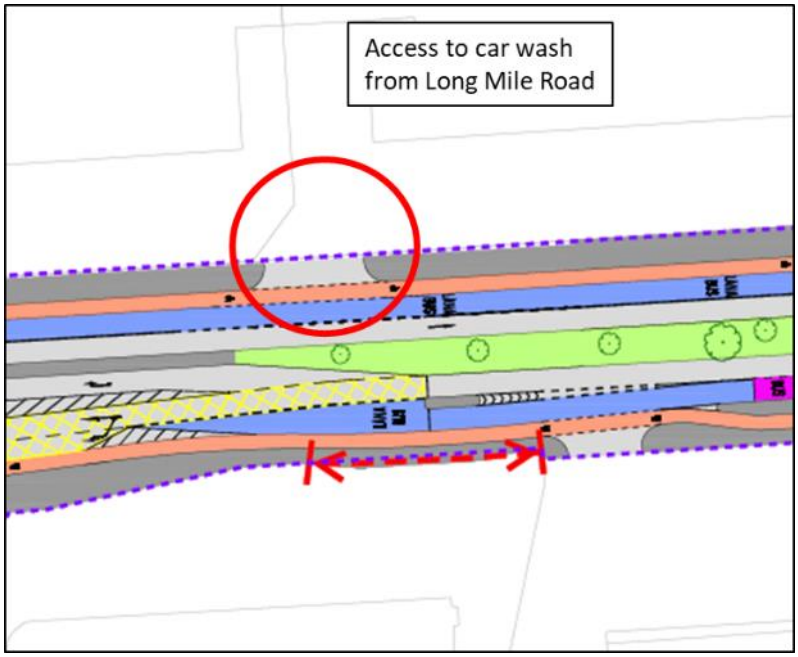
The footpath across the accesses to Finches Business Park Road and Des Kelly Interiors had been omitted. This absence of a footpath at this location is likely to result in conflicts between vehicle accessing/departing these properties and pedestrians.

Recommendation:

The footpath should be continued across the accesses thus giving priority to pedestrians.

4.3.39 Problem

Location:	Long Mile Road at access to car wash facility
Drawing:	Sheet 10 of 12
Summary:	Queuing traffic extends onto footpath and encroaches on cycle and bus lane



Description:

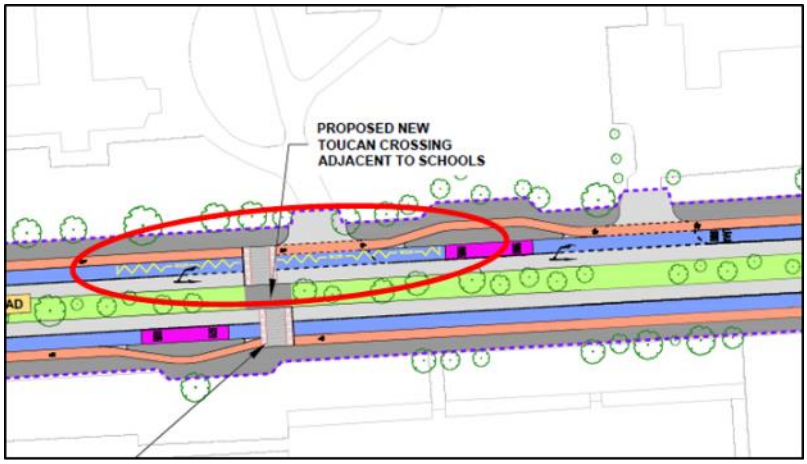
It was observed that vehicles queuing at the car wash facility off Long Mile Road (eastbound carriageway) extend back across the footpath and encroach on the bus and cycle lane. This will obstruct the flow of pedestrians, cyclists and buses. Sudden movements to avoid this queuing could result in collisions at this location. In addition pedestrians may be forced to enter the adjacent cycle track/carriageway to continue their journey resulting in potential conflict with cyclists/vehicles.

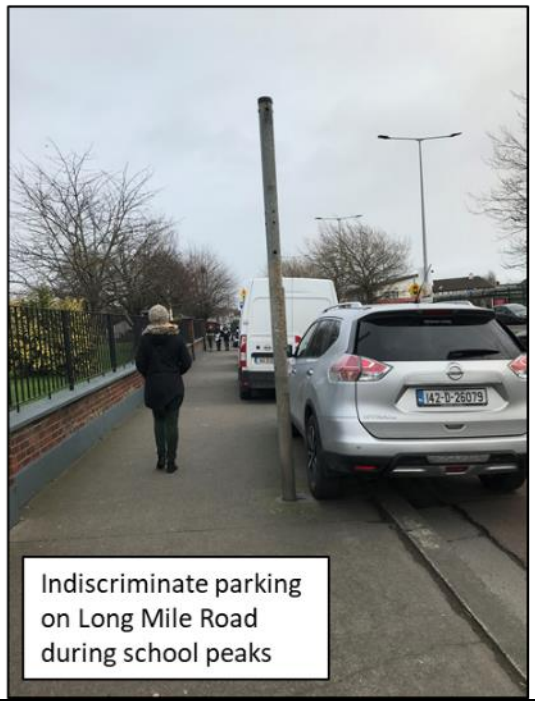
Recommendation:

The premises should be requested to provide a traffic/access management plan that will keep all traffic within their premises.

4.3.40 Problem

Location:	Drimnagh Castle Primary School
Drawing:	Sheet 10 of 12
Summary:	Indiscriminate parking on the Long Mile Road in proximity to the school





Description:

On-street parking on Long Mile Road at Drimnagh Castle Primary School was observed. Vehicle parking at this location would obstruct both cyclists and buses on the new scheme. Buses and cyclists would be required to deviate suddenly from their designated lanes possibly resulting in conflicts with traffic on the main east bound lane.

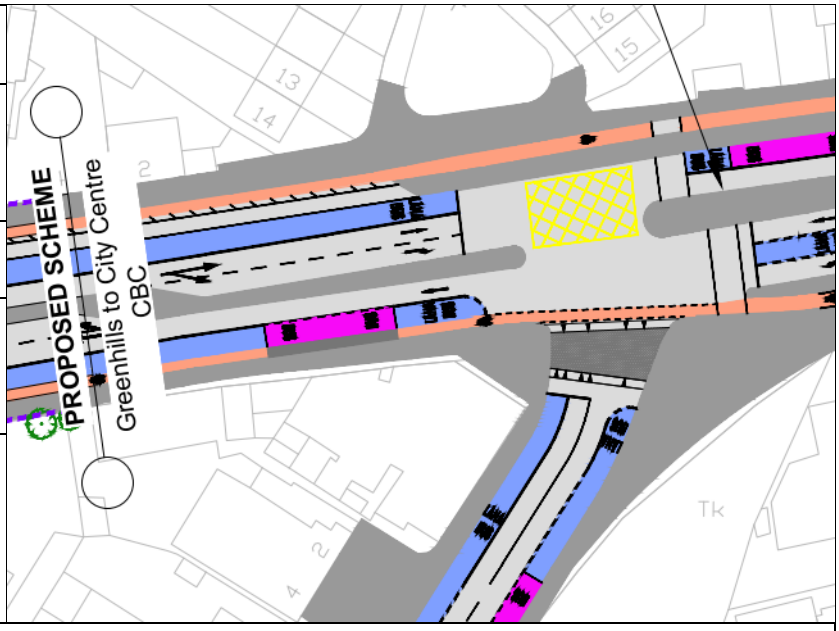
Furthermore, parked vehicles are likely to obscure visibility between approaching eastbound traffic and pedestrians crossing at the Toucan Crossing. This may result in collisions between motorists and pedestrians.

Recommendation:

Parking enforcement measure should be implemented to prevent motorists from parking on the Long Mile Road adjacent to the school.

4.3.45 Problem

Location:	Long Mile Road/Walkinstown Road/Drimnagh Road junction
Drawing:	Sheet 12 of 12
Summary:	Westbound bus stop located close to Walkinstown Road junction



Description:

The westbound bus stop on Long Mile Road is located in close proximity to the Walkinstown Road junction. There are concerns that this may result in buses queuing back to the junction while passengers' mount/dismount. This is likely to result in congestion at the junction where buses approaching from the east will be required to wait while buses queue at the bus stop. Buses approaching from Walkinstown Road and Drimnagh Road may get caught on the junction as they will be unable to access the bus lane. This may result in appropriate or dangerous turning movements which may lead to collisions.

Recommendation:

The bus stop should either be relocated further to the west or extend the bus stop so it can accommodate additional buses thus reducing impacts on the operation of the junction.

5. Items Resulting from this Stage 1 Road Safety Audit

5.1 General Issues

The following information was not provided for Audit so therefore could not be commented upon:

- Drainage and Services;
- Lighting;
- Landscaping; and
- Autotrack analysis.

The report has been divided into general issues that are common throughout the scheme in Section 5.1, with specific areas highlighted in Section 5.2

Problem: 5.1.1

Location(s):	Throughout the scheme
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001-0056
Summary:	Tactile paving is not indicated

Description:

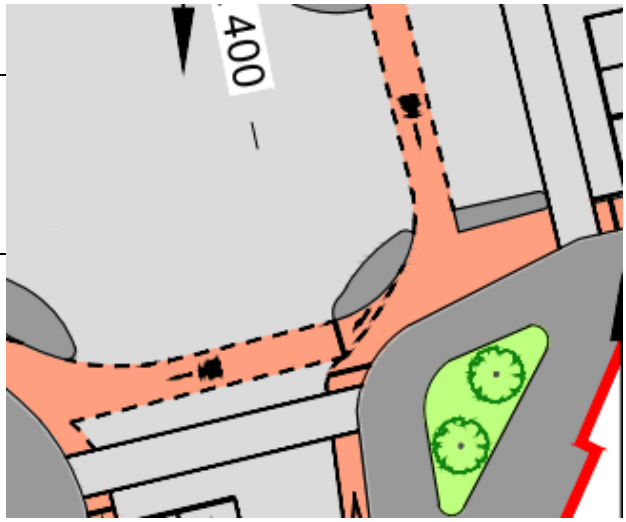
The proposals are to provide a variety of crossing types and shared areas across the scheme. It is necessary to ensure that the appropriate tactile paving is provided at these locations to ensure that pedestrians, particularly the vision impaired, are aware that they are entering a shared space or using a controlled / uncontrolled crossing. Should incorrect or no tactile paving be provided this could result in these users unknowingly walking into the carriageway resulting in a vehicle pedestrian collision or a cycle track and being struck by a cyclist.

Recommendation:

Ensure appropriate tactile paving is provided across the scheme in accordance with the 'Guidance on the Use of Tactile Paving Surfaces'.

Problem: **5.1.2**

Location(s):	Throughout the scheme
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001-0056, & BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001-0056
Summary:	Unclear if sufficient stacking capacity for right turning cyclists.



Description:

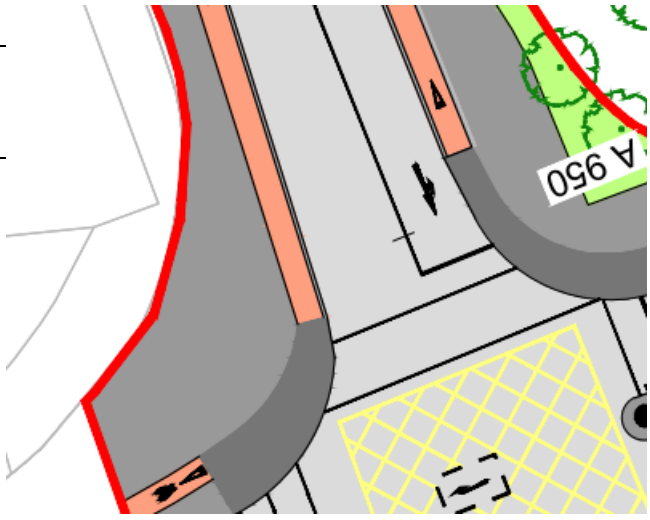
The scheme proposes to provide dedicated cycle facilities and remove cycle traffic from the mainline flow of traffic. It is unclear if there is sufficient stacking capacity, at some locations, for cyclists intending to turn right at the corners of the junctions, as illustrated in the extract above on the southeast corner of Belgard Square North/Belgard Square West If sufficient stacking capacity or sufficient width are not provided at these locations, this could result in instances where cyclists that are waiting to turn right are struck by passing cyclists or cyclists that are continuing straight through could collide with the kerb.

Recommendation:

Ensure adequate stacking capacity and cycle track width is provided at these locations.

Problem: **5.1.3**

Location(s):	Throughout the scheme
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-9001 to 0056
Summary:	Lack of tactile paving at end of Cycle Lanes into Shared Use areas.



Description:

The cycleway traverses the signalised pedestrian crossing on the Lucan Road. Stop lines are provided within the cycleway in both directions in advance of the pedestrian crossing. When the pedestrian phase is called, the traffic signals will turn red. These signal aspects will be visible to all eastbound traffic.

If no tactile paving is provided in an advance of the shared use area and advance of cycle lanes from a shared use area, cyclists may not be aware that it is a shared use area, which can lead to cyclists colliding with pedestrians resulting in pedestrian and cyclist falls, or the visually impaired may enter into the cycle lane and onto the carriageway.

Recommendation:

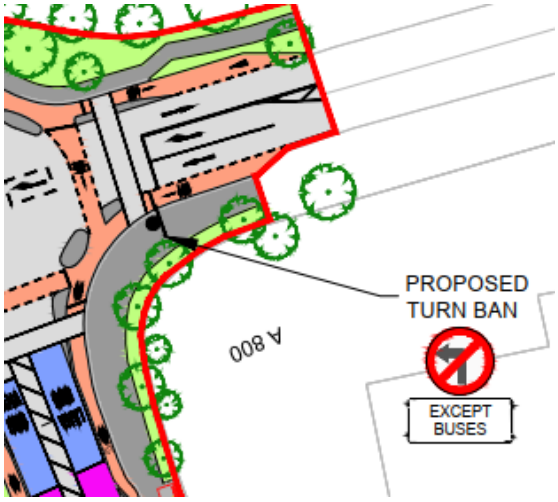
Appropriate tactile paving should be installed at the start and end of all cycle lanes where shared use is proposed throughout the scheme.

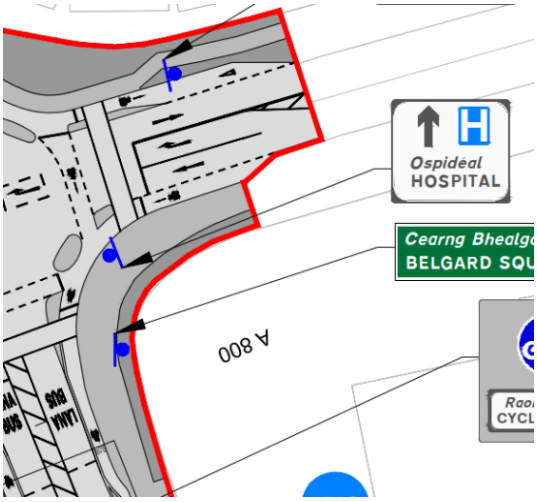
Problem: 5.1.4

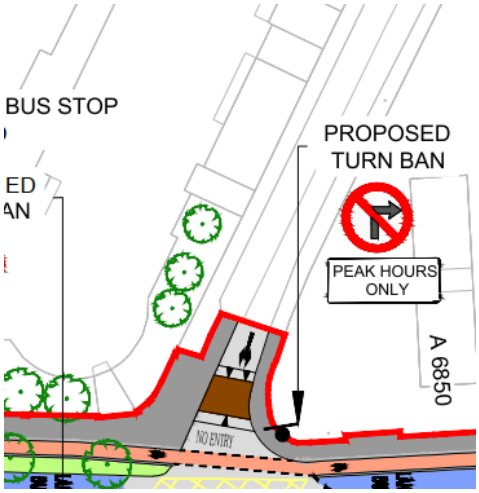
Location(s): Scheme wide

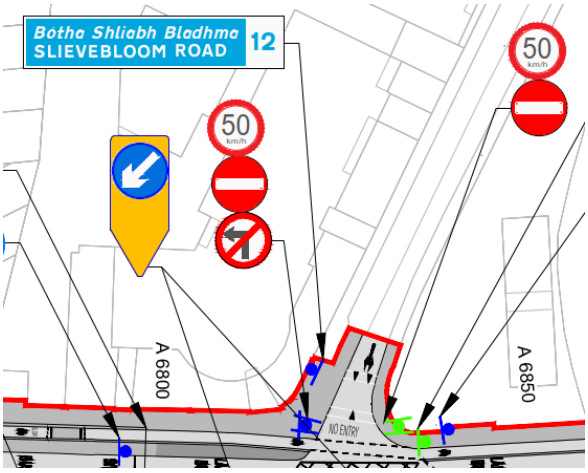
Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001 - 0056
BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001 - 0056

Summary: Conflicting/missing signage/ on different series dwgs









Description:

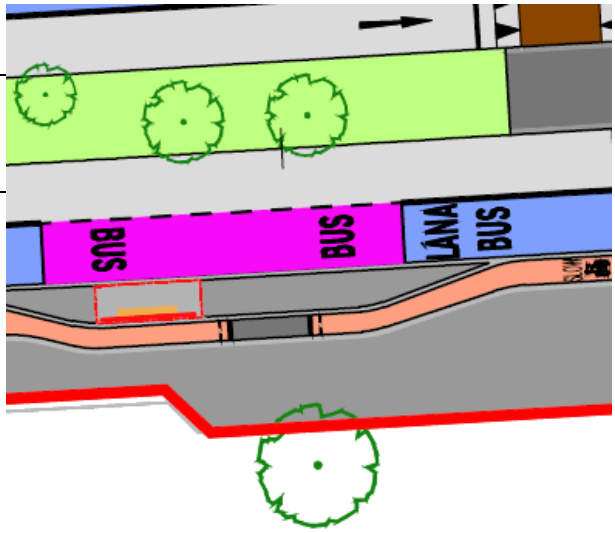
It is noted that there are several inconsistencies between the separate drawing series. For example, as shown above on the westbound approach on the Belgard Square North Road to the junction with the Belgard Square East, when comparing the General Arrangement drawing to the Traffic Signs & Road Marking drawing, the signage is different for each drawing. Inconsistencies in layout arrangement on construction drawings can lead to appropriate signage not being provided which could result in driver confusion or taking inappropriate manoeuvres which could lead to collisions.

Recommendation:

Ensure the proposed signage is consistent across all proposed drawing series.

Problem: 5.1.5

Location(s):	Throughout the scheme
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001-0056,
Summary:	No yield, direction or symbol road markings are provided on the cycle lane at the bus stop crossings.



Description:

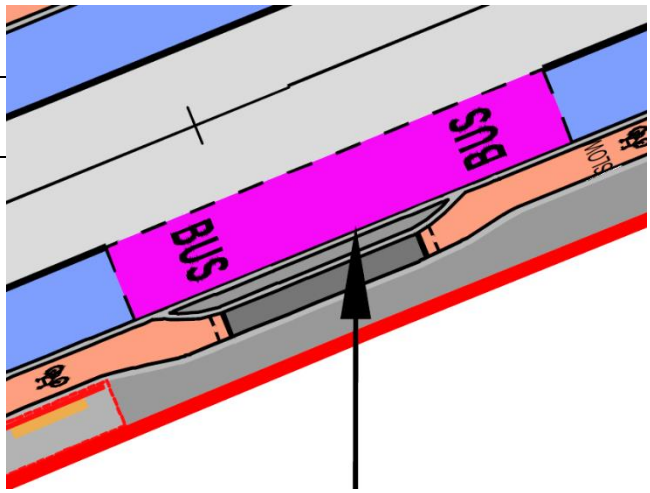
It is proposed to provide raised shared surfaces at the bus stops located along the route of the cycle tracks / lanes to facilitate pedestrian access from the footpath to the floating bus islands. On approach to these shared surfaces, it is noted that no yield, arrow or cycle symbol are indicated on the cycle lanes. These road markings inform cyclists that they are entering a shared space and may be required to yield to pedestrians. A lack of these road markings could lead to cyclists failing to yield resulting in a pedestrian cyclist collision at these locations.

Recommendation:

Road markings should be provided in accordance with the 'National Cycle Manual'.

Problem: 5.1.6

Location(s):	Throughout the scheme
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001-0056
Summary:	Lack of adequate width on island can lead to cyclist/pedestrian conflicts.



Description:

The segregation island at the bus stops, for example on Greenhills Rd west of Mayberry Road, and Calmount Road. tapers to a small radius to the front of the bus stop and appears to be less than the recommended width, particularly at the front of the bus stop.

Without the appropriate width of pavement on the segregation island, there may be a lack of manoeuvrability and passing space between passengers boarding and alighting from the bus. This can lead to pedestrians stepping into the cycleway to avoid other NMUs and coming into conflict with cyclists which could result in pedestrian/cycle collisions.

Recommendation:

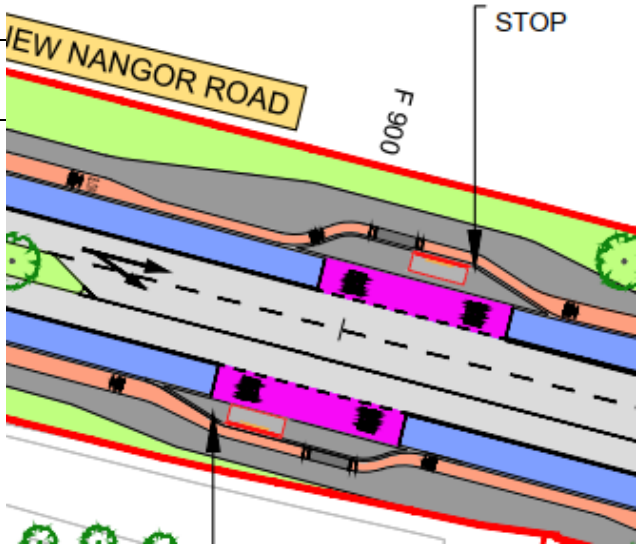
Ensure that there is adequate width on all segregation islands at bus stops, particularly in the locations of the bus doors, to facilitate adequate space for boarding and alighting bus passengers.

Problem: 5.1.7

Location(s): Throughout the Scheme

Drawing(s): BCIDA-ACM-GEO_GA-0006_XX_00-DR-CR-0001-0056

Summary: Risk of cyclists losing control due to geometry of cycleway, leading to falls.



Description:

There are several locations along the route where the cycle track narrows on the approach to a bus stop and the geometry of the radii of the uni-directional cycle route appears tight. This could cause issues for users on longer bicycles, such as recumbent, cargo or tandem bicycles.

This could lead to cyclists losing control, particularly in wet conditions, which could lead to cyclist falls, resulting in cyclist injuries.

Recommendation:

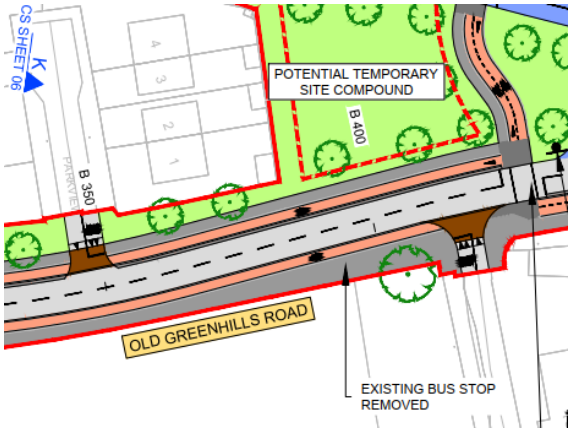
It is recommended that swept path analysis is undertaken on the proposed layouts using different types of bicycles and that the design is appropriately amended, if required.

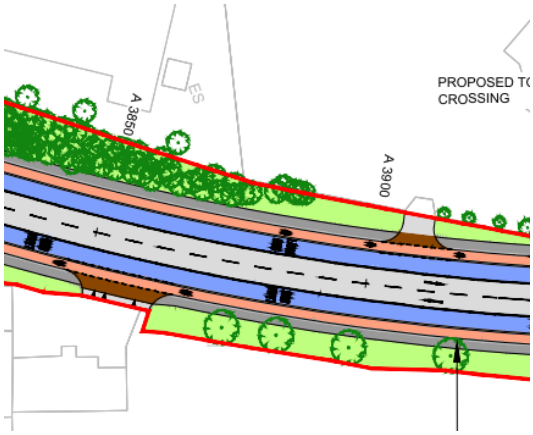
Problem: 5.1.8

Location(s): Scheme wide

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001-0056

Summary: Conflicting access arrangements across cycle lane





Description:

It is noted that there are different forms of junction arrangements across the cycle lanes. For example, as shown above on the Old Greenhills Road west of the M50 overbridge, a raised table crossing is provided to the edge of the carriageway whereas on the Greenhills Road just west of the M50 overbridge, the raised table crossing is provided to the edge of the nearside edge of the cycle lane.

Such difference in access arrangements at junctions can lead to vehicles encroaching into the cycle lanes which could result in vehicle collisions with cyclists.

Recommendation:

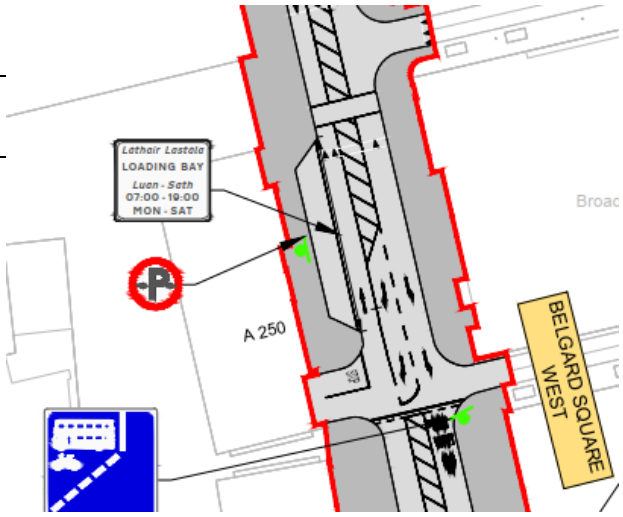
Ensure the raised table arrangements at all side road accesses are consistent throughout the scheme.

5.2 Specific Areas

This Safety Audit has reported on issues relating to the proposed CBC Schemes Route 8 & Route 9, Clondalkin to Drimnagh and Greenhills to Dublin City Centre respectively. This is classified as a Stage 1 Road Safety Audit, as defined within the TII Road Safety Audit Guidelines

Problem: **5.2.1**

Location(s):	Belgard Square West
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0002
Summary:	There is no 'No Entry' signage provided in advance of bus lane.



Description:

Southbound vehicles on Belgard Square West have no advanced warning of no through access to the Old Blessington Road due to a bus only lane ahead which results in these vehicles only able to turn right into a private car park or left to a narrow circular shared pedestrian zone around Broadfield Hall. Drivers not familiar with the area may undertake erratic turning manoeuvres to remain on the main carriageway.

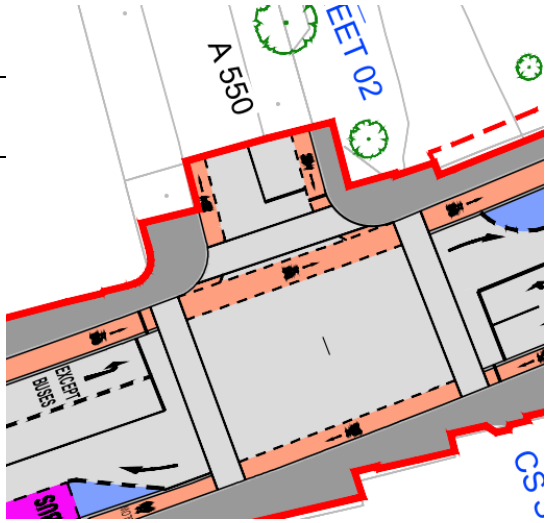
This can result in vehicle/vehicle conflicts and also conflicts between vehicles and pedestrians which can lead to vehicular/pedestrian collisions.

Recommendation:

Provide advance direction and warning signage to inform drivers of a restriction to through traffic southbound on Belgard Square West.

Problem: **5.2.2**

Location(s):	Belgard Square North
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0000
Summary:	Conflicts between eastbound vehicles and westbound cyclists from side road.



Description:

Westbound cyclists exiting the side road will be required to cross over the adjacent vehicle lane to access the westbound Belgard Square North cycle track. Vehicles turning left onto Belgard Road North from the side road are in conflict with adjacent cyclists turning right.

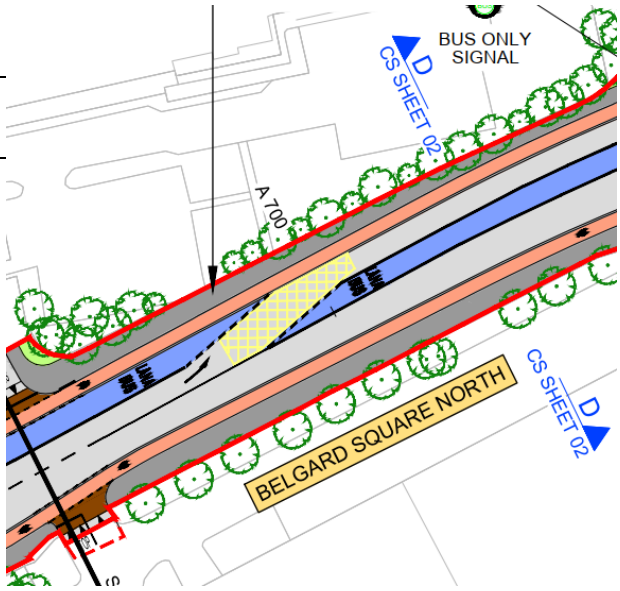
This can result vehicles not giving way to cyclists or cyclists not proceeding until the end of the signal phase which can lead to cycle vehicle collisions.

Recommendation:

Provide an advanced stop line for cyclists on the side road.

Problem: 5.2.3

Location(s):	Belgard Square North
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0004
Summary:	Conflicts between eastbound buses and vehicles on adjacent lane as they switch lanes.



Description:

Eastbound buses and vehicles on the adjacent lane are required to switch lanes as they approach the Belgard Square North/Belgard Square East junction. The buses will switch onto a right-turn lane for buses only while other motorists will be required to cross over onto the straight-ahead and left turn lane. In the current arrangement vehicles may approach to the beginning of the yellow box. This is likely to result in conflicts on occasions when buses and other vehicles are switching lane simultaneously which can lead to side swipe collisions.

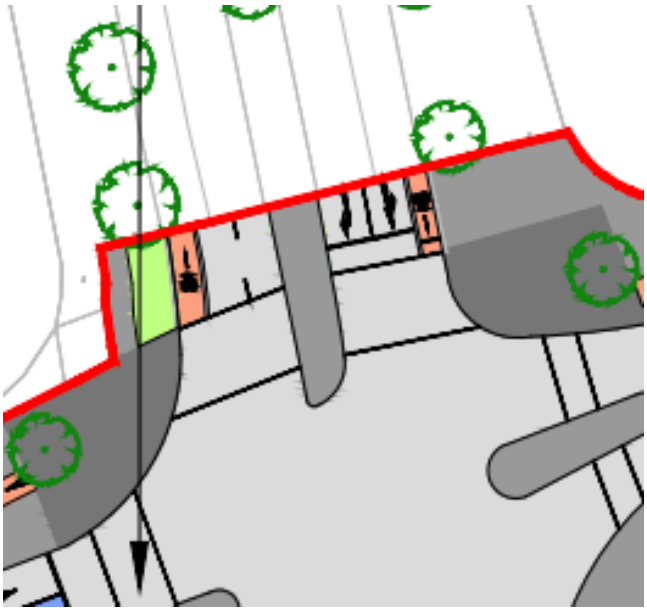
Recommendation:

Extend the yellow box hatching back to the solid carriageway line at end of approach of Bus Lane to allow buses to proceed to the right turning offside bus lane during the red signal stage. Undertake a swept path analysis to ensure that a bus can make a smooth cross over manoeuvre through the hatching.

Problem: 5.2.4

Location(s):	Belgard Road / Blessington Road junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0004

Summary: Length of pedestrian crossing is very long for a single-phase crossing.



Description:

The length of the pedestrian crossing across the Belgard Road is quite long. The crossing traverses four lanes of traffic plus two cycle tracks. A splitter island is provided between northbound and southbound traffic lanes. This pedestrian crossing is staggered from the crossing across the Belgard Road. There is a single-phase pedestrian crossing proposed for all four arms of the junction

For vulnerable pedestrians to cross safety in a single stage would require long red times, which would result in the formation of large queues and traffic congestion at the junction. In addition, the distance of the crossing is likely to be excessive for mobility impaired pedestrians to negotiate safely (prior to the green signal for traffic).

Recommendation:

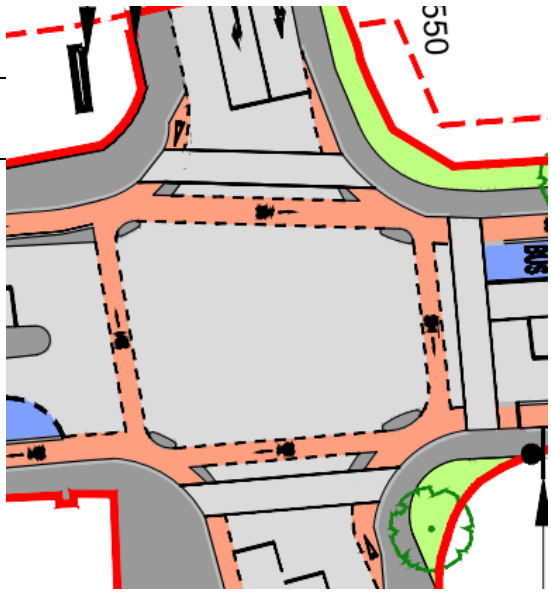
The design should ensure that sufficient green time is provided for pedestrians to cross in a single movement. Flashing amber phases should not be included as this may encourage motorists to move forward while vulnerable NMUs are still on the carriageway.

Problem: 5.2.5

Location(s): Greenhills Road / Hibernian Industrial Estate junction

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0008

Summary: No stacking area is provided for right turning cyclists



Description:

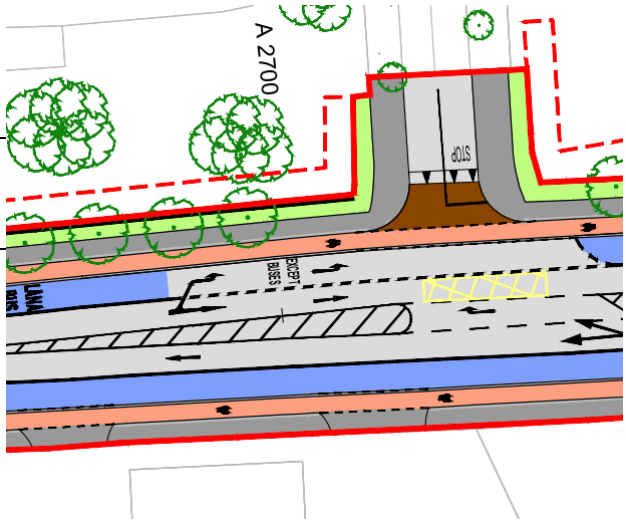
The cycle facilities at this location are run on 2 separate signal phases, east-west and north-south. There is no provision for cyclists intending to turn right at the corners of the junctions. If stacking zones are not provided at these locations, this could lead to instances where cyclists that are waiting to turn right are struck by following cyclists or cyclists that are continuing straight through could collide with the inside kerb resulting in cyclist falls.

Recommendation:

Ensure adequate cycle stacking space and capacity and width of cycle track is provided at this location.

Problem: 5.2.6

Location(s):	Greenhills Road / Broomhill Road Junction, Long mile Road / Walkinstown Parade and Ballymount Avenue
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0009 & 0055
Summary:	Road marking may confuse drivers



Description:

Beyond the end of the eastbound Bus Lane on Greenhills Road on the approach to the Broomhill Road Junction 'Turn Left' arrows are located on the road in advance of Broomhill Road. The road marking text 'Except Buses' is located between the left turn arrows. As the dedicated bus lane has terminated before this junction and begins again after this junction, it may be unclear to vehicles wishing to turn left into Broomhill Road that they can use this section of carriageway.

This confusion may lead to driver hesitation resulting in rear end shunt collisions or drivers undertaking erratic manoeuvres to turn left after this text which could result in side swipe collisions.

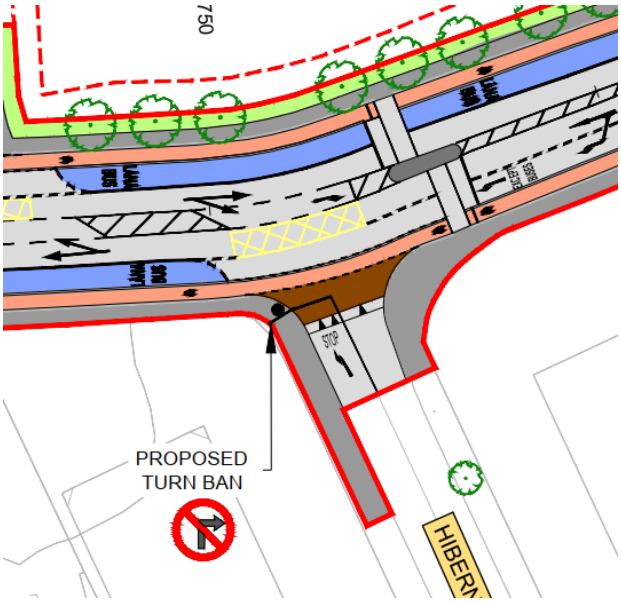
Recommendation:

Ensure all road markings and signage are clear and unambiguous to all road users.

Problem: 5.2.7

Location(s):	Greenhills Road/Hibernian Industrial Estate access road
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0009

Summary: Right-turn onto Greenhills Road prohibited



Description:

Vehicles on Hibernian Industrial Estate access road are prohibited from turning right onto Greenhills Road. Drivers may still attempt the right turn manoeuvre to reduce their travel distance around the Hibernian Industrial Estate, and particularly if there is likely to be queuing at the western estate road exit. This may result in conflicts with buses and other vehicles on the Greenhills Road not expecting right turning vehicles which could lead to side impact or rear end collisions.

Recommendation:

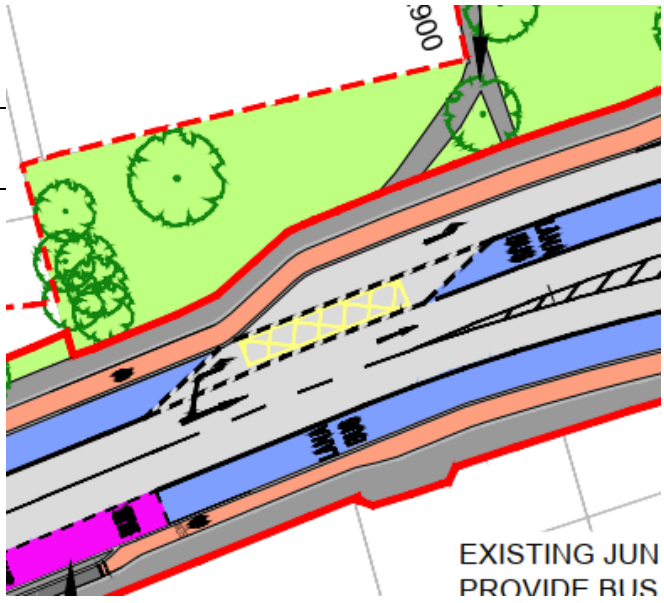
Extend the pedestrian splitter island, on the eastern side of the junction, westwards towards the end of the hatching in front of the right turn lane on Greenhill Road.

Problem: 5.2.8

Location(s): Greenhills Rd / Mayberry Rd junction

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0009

Summary: Conflicts between northtbound buses and vehicles on adjacent lane as they switch lanes.



Description:

Northbound buses have a straight through lane and vehicles on the adjacent offside lane may switch lanes as they approach the Greenhills Rd / Mayberry Rd junction to turn left. This is likely to result in conflicts on occasions when buses are approaching the end of the bus lane before the yellow box and other vehicles are switching lanes to turn left which can lead to side swipe collisions.

Recommendation:

Extend the yellow box hatching back to the solid carriageway line at end of approach of Bus Lane to allow buses to proceed to the advance bus lane during the red signal stage.

Problem: 5.2.9

Location(s):	Greenhills Rd / Mayberry Rd junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0009
Summary:	Left turning HGVs may conflict with waiting cyclists/vehicles.

Description:

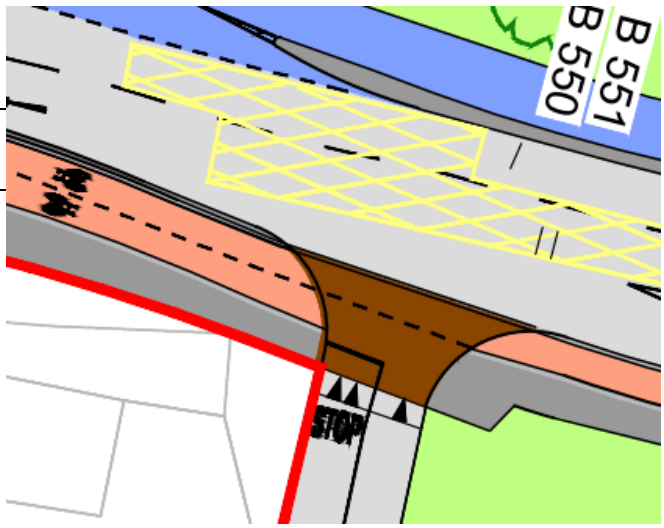
The protected junction on the northeast side of the Greenhills Rd / Mayberry Rd junction restricts road space at this location. It is unclear if HGVs have sufficient space to turn left from the Greenhills Road into Mayberry Road. If there is insufficient space within the carriageway for all vehicle types to safely complete this left turning manoeuvre there is a risk of vehicles over-running, or striking the kerb, entering the cycle lane or overrunning the stop line on the Mayberry Road. This could lead to collisions with cyclists or vehicles waiting at the stop line on Mayberry Road.

Recommendation:

Undertake swept path analysis to ensure that all vehicle types can turn left from Greenhills Road into Mayberry Road within the carriageway extent provided and impacting on other road users.

Problem: 5.2.10

Location(s):	Old Greenhills Rd / Tymon Lane junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0011
Summary:	Cycle route terminates without onward direction.



Description:

The eastbound cycle lane on the Old Greenhills Road, terminates at the junction with Tymon Lane. There is a uni-directional cycle lane on the eastern side of this junction to accommodate westbound cyclists but there is no indication of direction or signage of onward travel for eastbound cyclists.

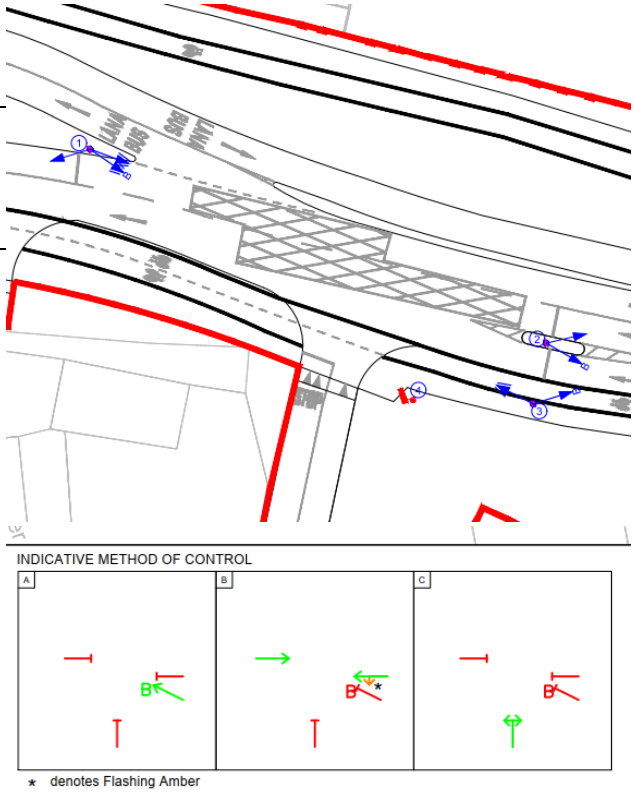
This can lead to cyclists continuing their eastbound journey on the westbound cycle lane or on the footpath. Eastbound cyclists or pedestrians may not be expecting cyclists on the eastbound cycle lane or on the footpath which could lead to cyclist/cyclist or pedestrian/cyclist resulting in injury to pedestrians or cyclists.

Recommendation:

Provide clear direction to enable cyclists to continue their journey in a safe environment to minimise conflict with vehicles and pedestrians.

Problem: **5.2.11**

Location(s):	Old Greenhills Rd / Tymon Lane junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0011 & BCIDA-ACM-TSM_GA-0809_XX_00-DR-TR-0022
Summary:	Form of vehicle control from Termon Lane is unclear.



Description:

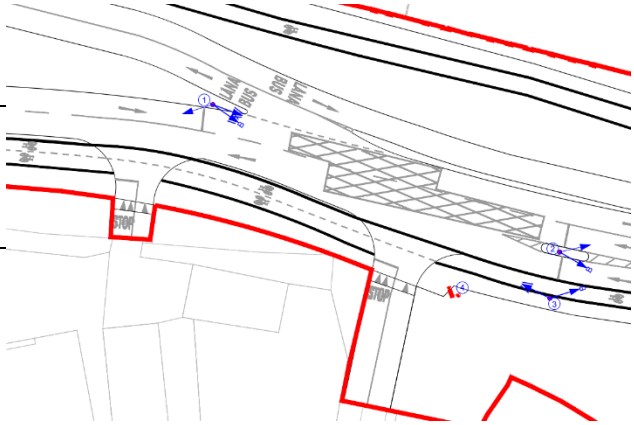
The phasing diagram for this junction indicates a 3-way signal-controlled junction, but the drawing only shows traffic signals for the general traffic and buses on the Old Greenhills Road and southbound bus lane. The road marking on Tymon Lane is indicated as a Stop. If right turning vehicles exiting Termon Lane are not held during the green phase for the southbound bus movement, this could lead to side impact collisions between this Tymon Lane traffic and buses travelling southbound.

Recommendation:

Provide traffic signals for all arms of this junction to ensure vehicles on all arms are aware of the priority movements.

Problem: 5.2.12

Location(s):	Old Greenhills Rd / Tymon Lane junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0011 & BCIDA-ACM-TSM_GA-0809_XX_00-DR-TR-0022
Summary:	Secondary signals may not be clearly visible to drivers.



Description:

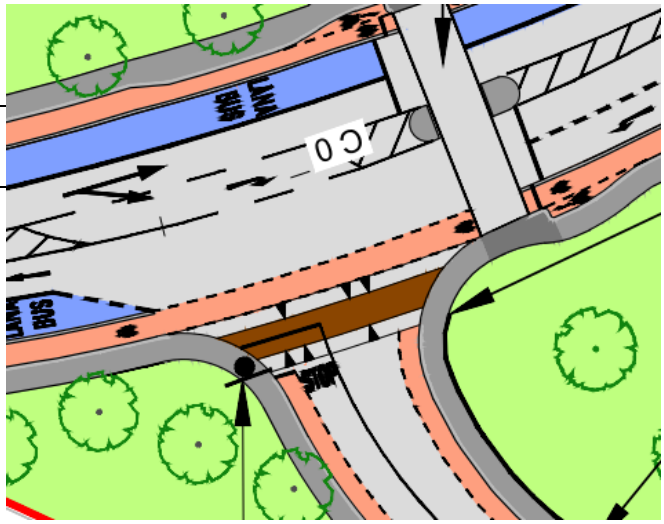
The secondary signals for the northbound traffic on the Old Greenhills Road are located on the footpath at the stop line of the southbound bus lane. Vehicles northbound on the Old Greenhills Road approaching this junction are travelling at an angle which takes their direct line of sight away from the offside of the carriageway, i.e away from the secondary signals. If a driver's line of sight is obstructed to the primary signals by high vehicles, this could result in abrupt braking and lead to rear end shunt collisions.

Recommendation:

Relocate the secondary signal for the northbound traffic to the separation island between the southbound carriageway and bus lane.

Problem: 5.2.13

Location(s):	Greenhills Rd / Ballymount Avenue junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0013
Summary:	No linkage provided between cycle routes.



Description:

There are uni-directional cycle lanes on each side of the Greenhills Road, which start and terminate prior to the raised crossing at the junction with Ballymount Avenue. There are also uni-directional cycle lanes on both sides of Ballymount Avenue. There is no provision to link these cycle lanes to allow a safe transition from the cycle lane on one road to the other. For example, southbound cyclists on Greenhills Road intending to travel northbound on Ballymount Avenue have no clear direction to access the northbound cycle lane

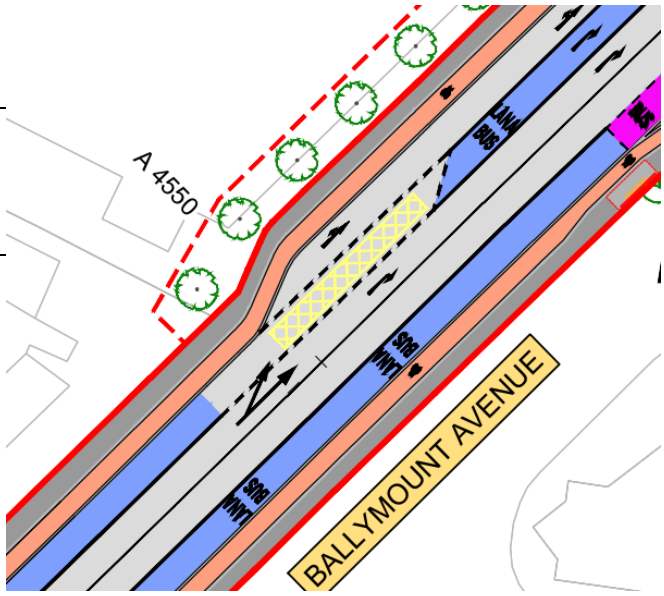
This can lead to cyclists entering onto the footpath or onto the carriageway to cross. Vehicles or pedestrians may not be expecting cyclists on the carriageway or on the footpath which could lead to vehicle/cyclist or pedestrian/cyclist resulting in injury to pedestrians or cyclists.

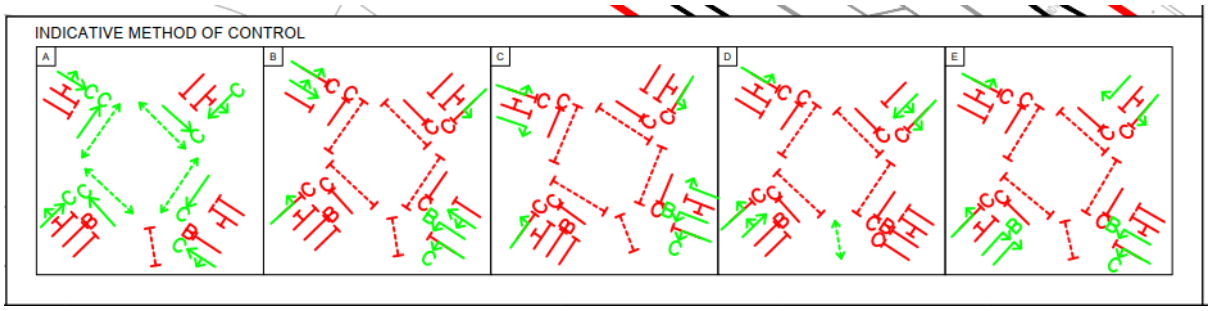
Recommendation:

Provide clear route direction to enable cyclists to continue their journey in a safe environment to minimise conflict with vehicles and pedestrians.

Problem: **5.2.14**

Location(s):	Ballymount Avenue / Calmount Road junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0014 & BCIDA-ACM-TSM_GA-0809_XX_00-DR-TR-0025
Summary:	Northbound buses may conflict with left turning traffic.





Description:

Northbound buses on Ballymount Avenue are directed into the central northbound lane on the approach to the junction with Calmount Road in order to turn right. The offside lane is a dedicated right turn lane for other vehicles. The nearside lane allows general traffic to turn left or go straight ahead at this junction.

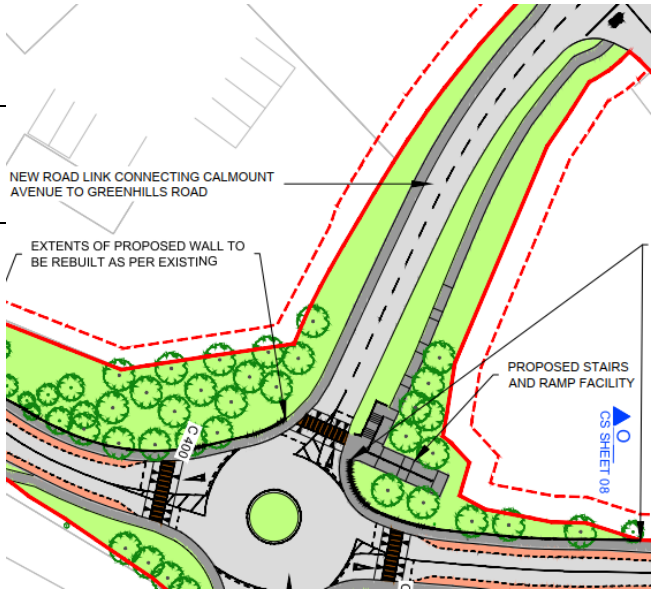
Vehicles intending to turn left or go straight through must switch lanes as they approach the Ballymount Ave / Calmount Rd. This is achieved by filtering into the nearside lane in advance of the northbound bus lane. The two right turning lanes on Ballymount Avenue are on a different signal stage from the nearside left turn and straight-ahead lane. The current layout can lead to the vehicles waiting between the bus lane and the yellow box which could lead to buses approaching this area manoeuvring into the offside lane to overtake these vehicles which could lead to side swipe collisions with vehicles in the offside lane.

Recommendation:

Extend the bus lane up to the yellow box hatching to allow buses to proceed to the advance bus lane at all times.

Problem: **5.2.15**

Location(s):	New link road between Calmount Avenue and Greenhills Road
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0015
Summary:	No provision for cyclists at the proposed roundabout or link road.



Description:

A new link road is proposed connecting Calmount Avenue to the Greenhills Road. A footpath is provided on both sides of the new link road adjacent to grass verges. A new roundabout is proposed on the Greenhills Road to accommodate this new link road. The advisory on-street cycle lanes on Greenhills Road start and terminate at the raised crossings on Greenhills Road. There is no facility for cyclists provided on the proposed new link road, therefore cyclists exiting from the cycle lanes on Greenhills Road have to enter onto the carriageway to negotiate the new roundabout and also to travel to/from the Calmount Business Park. This will lead to in cycle / vehicle interactions which could result in cyclist/vehicle collisions.

Recommendation:

Provide adequate cycle infrastructure to remove/minimise the vehicle/cycle interaction.

Problem: **5.2.16**

Location(s):	New link road between Calmount Avenue and Greenhills Road
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0017
Summary:	No provision for cyclists to Calmount Road.

Description:

The Greenhills Road is terminated to the south of the new Calmount Road extension. The advisory cycle lanes on Greenhills Road are also terminated at this location. A footpath is proposed at the end of the Greenhills Road to link with the footpath on the Calmount Road extension. No facility is provided for cyclists from the Greenhills Road to the Calmount Road extension.

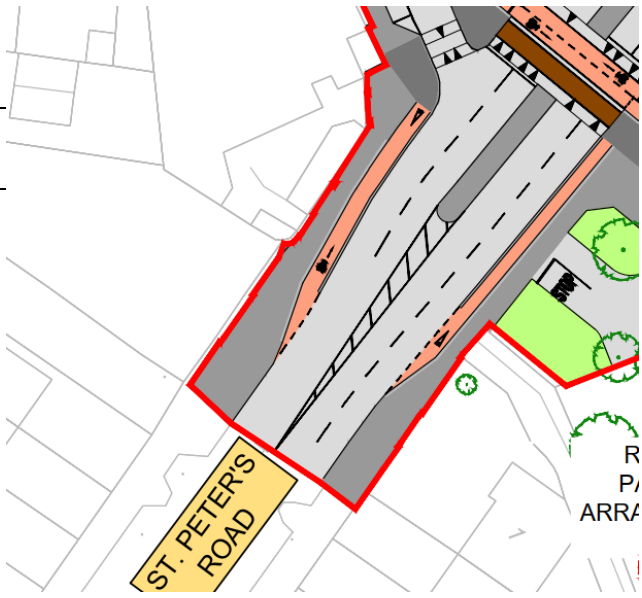
This can lead to cyclists using this new footpath link, pedestrians not being aware for the presence of cyclists which could result in cyclist/pedestrian collisions.

Recommendation:

Provide adequate cycle infrastructure link the Greenhills Road to the Calmount Road extension.

Problem: 5.2.17

Location(s):	St Peter's Road approach to Walkinstown Roundabout
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0019
Summary:	Absence of road marking to indicate merging lanes



Description:

There are no road markings proposed to indicate that two lanes will merge into one on the St. Peters Road exit arm of the roundabout. As vehicles exit the roundabout onto St. Peters Road, they will merge into one lane approximately 50m from the circulatory carriageway. The absence of merge road marking may result in side swipe collisions as two vehicles attempt to merge into the one lane simultaneously.

Eastbound buses and vehicles on the adjacent lane are required to switch lanes as they approach the Belgard Square North/Belgard Square East junction. The buses will switch onto a right-turn lane for buses only while other motorists will be required to cross over onto the straight-ahead and left turn lane. This is likely to result in conflicts on occasions when buses and other vehicles are switch lane simultaneously which can lead to side swipe collisions.

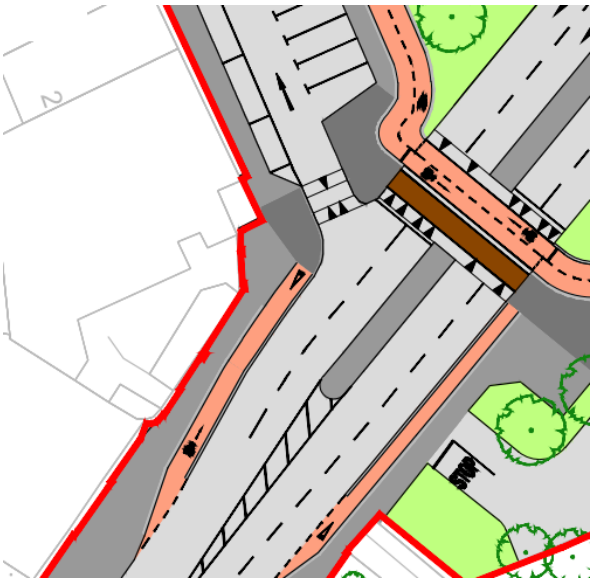
Recommendation:

Extend the yellow box hatching back to the solid carriageway line at end of approach of Bus Lane to allow buses to proceed to the right turning offside bus lane during the red signal stage. Undertake a swept path analysis to ensure that a bus can make a smooth cross over manoeuvre through the hatching.

Problem: 5.2.18

Location(s):	St Peter's Road approach to the Walkinstown Roundabout
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0019

Summary: Northbound cyclists on St Peter's Road have no access to cycle track.



Description:

Cyclists travelling northbound on St Peter's Road are diverted off-line onto a shared footpath area at the southern corner of the link road with Greenhills Road at the Cherrytree pub/restaurant. There is currently seating area for the restaurant on this corner of this footpath, which results in restricted space for cyclist and pedestrian manoeuvres. There is a Spar shop along this narrow southern footpath and together with other street furniture the footpath space is restricted.

Cyclists wishing to continue south to Greenhills Road may travel on the footpath along the frontage of the shops within this area which can result in collisions with pedestrians and other footpath users, or they may re-enter the carriageway between the car parking in this area which can result in vehicle/cyclist collisions.

Cyclists wishing to travel on to the other routes have no direct access to the cycle track which can result in conflicts with other cyclists already on the cycle track or with vehicles when trying to negotiate access onto the cycle track.

Recommendation:

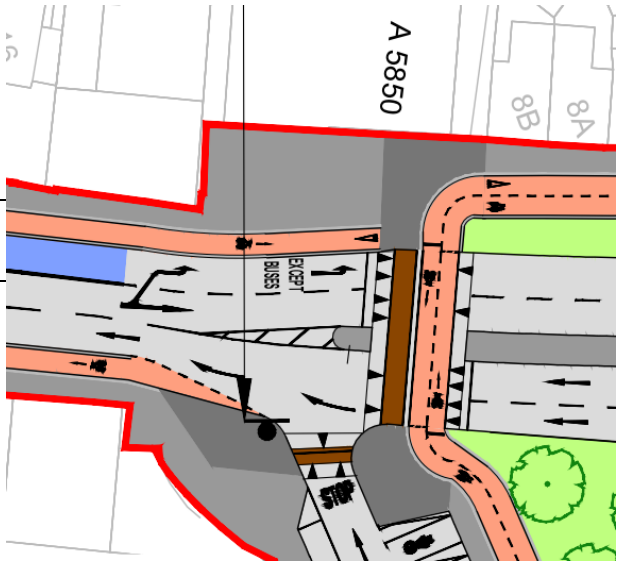
Extend the cycle track on St Peter's Road to beyond the side road fronting the Cherrytree and provide access onto the shared use area on the northern side of this link road, and a Yield linkage onto the cycle track to the rear of the perpendicular parking bays. Also ensure that this shared use area is fee from street furniture.

Problem: 5.2.19

Location(s): Greenhills Road, Walkinstown Avenue, Walkinstown Road, Comwellsfort Road and St Peter's Road exits from the Walkinstown Roundabout

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0019

Summary: Two lane exit may lead to side swipe or cyclist collisions.



Description:

2-lane exits from the roundabout are proposed for most of the connecting roads. In some locations a lane merge is proposed directly before or directly beyond the raised table pedestrian/cyclist crossing. This 2-lane exit can lead to vehicle drivers paying more attention to the adjacent vehicle in order to negotiate vehicle position into the single lane beyond, rather than paying attention to the cyclists or pedestrians approaching the controlled crossing.

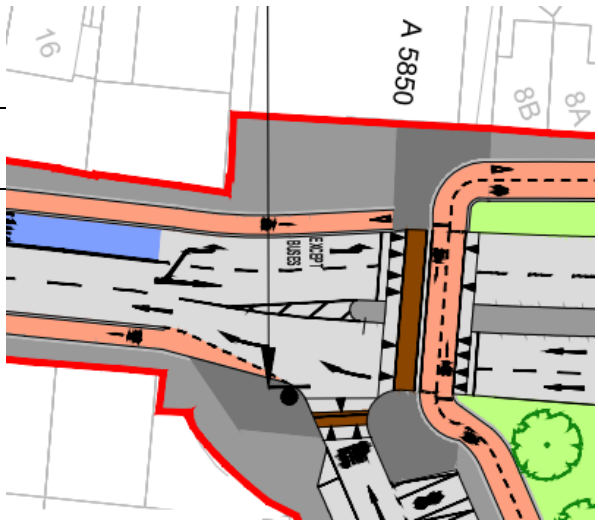
This can result in conflict between vehicles that are merging lane simultaneously or vehicles running a red light phase, which can lead to vehicular side swipe collisions or collisions with cyclists and pedestrians on the crossing.

Recommendation:

Provide a single exit lane from all arms of the Walkinstown Roundabout.

Problem: 5.2.20

Location(s):	Walkinstown Roundabout / Greenhills Road cycle track
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0019
Summary:	Unclear how cyclists access the cycle track.



Description:

The southbound cycle track on Greenhills Road appears to be accessed only from the carriageway. There does not appear to be any dropped kerb facilities and it is unclear how it is linked from the other cycle tracks.

This can lead to cyclists undertaking unexpected manoeuvres to access this cycle track which could lead to cycle/pedestrian or cycle/vehicular collisions.

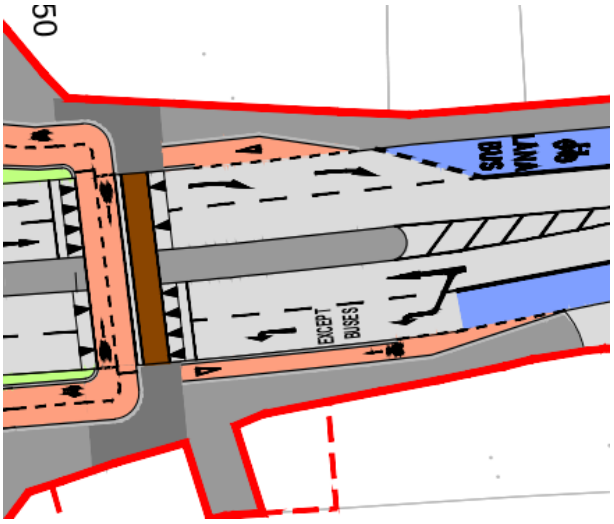
Recommendation:

Provide clear and direct access for all cycle routes to and from the cycle tracks.

Problem: 5.2.21

Location(s):	St Peter's Road and Walkinstown Road exit lanes downstream of the raised crossings
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0019

Summary: Conflicts between cyclists merging online and vehicles on adjacent lane.



Description:

On the exits of St Peter's Road and Walkinstown Road downstream of the raised crossings 2 lanes of carriageway merge into one lane. Also, at these locations cyclists are travelling from the off-line cycle track onto the carriageway. Vehicles merging at these locations may be looking to their right side focusing on adjacent offside vehicles and not be fully aware of cyclists on the nearside merging onto the carriageway. This could lead to vehicles colliding with merging cyclists of nearside vehicles undertaking sudden manoeuvres to avoid merging cyclists and causing side swipe collisions with adjacent vehicles.

Recommendation:

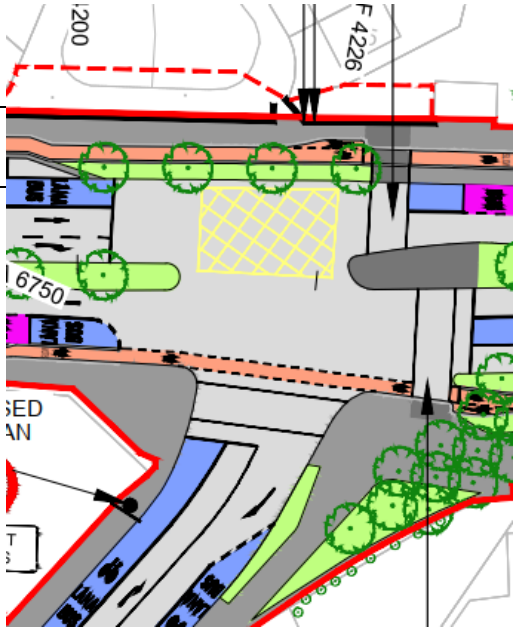
Provide the cycle merge onto the carriageway at locations where there are no vehicle merge requirements.

Problem: 5.2.22

Location(s): Walkinstown Road / Drimnagh Road junction

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0022

Summary: Turning vehicles may cause side impact collisions.



Description:

Northbound buses and vehicles on the Walkinstown Road must turn right onto the Drimnagh Road. Tracking for buses and other large vehicles has not been provided for this turning manoeuvre. There is a proposed Toucan crossing on the northern side of the Drimnagh Road with a central splitter island. It is unclear if large vehicles and buses can undertake this manoeuvre simultaneously.

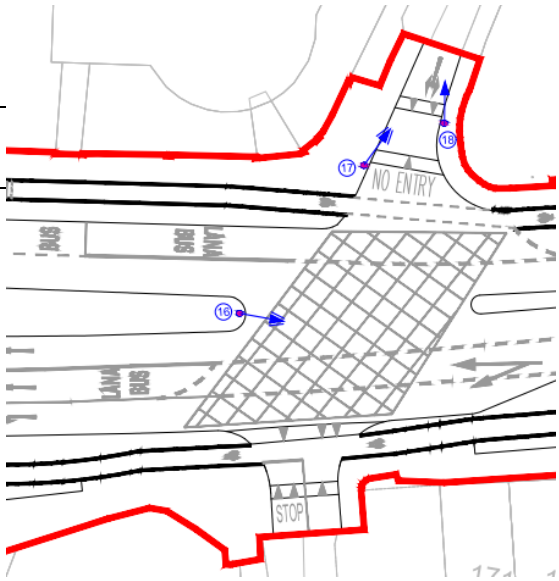
If sufficient turning space is not available this could lead to large vehicles over-running the kerbs of the splitter island or colliding with a bus on the nearside leading to vehicle/pedestrian or vehicle/vehicle collisions.

Recommendation:

Undertake a swept path analysis to ensure that there is sufficient space for buses and large vehicles to turn right simultaneously.

Problem: 5.2.23

Location(s):	Balfe Road / Drimnagh Road junction
Drawing(s):	BCIDA-ACM-TSM_SJ-0809_XX_00-DR-TR-0031
Summary:	Form of vehicle control from Balfe Lane is unclear.



Description:

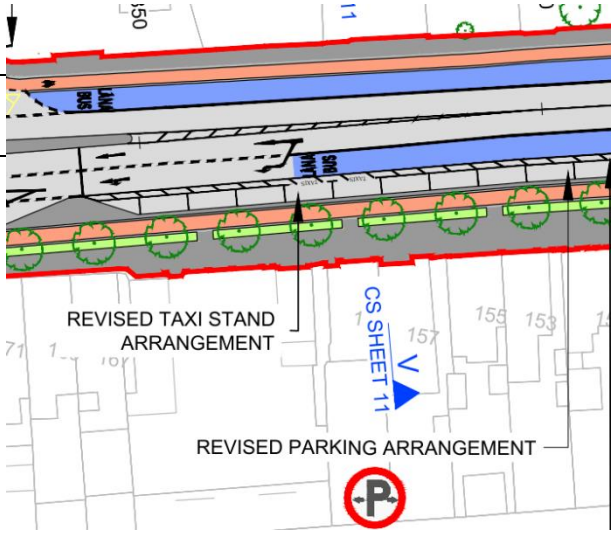
The existing Balfe Road / Drimnagh Road junction is a signal-controlled junction. The proposed traffic signals drawings shows only a signal control for the one-way Slievebloom Road. Vehicles exiting Slievebloom Road and Balfe Road can turn either left or right, with a proposed Right Turn ban during peak hours only. This proposed form of control at this junction may lead to vehicles exiting right from the Balfe Road uncontrolled junction coming into conflict with right turning traffic from Slievebloom Road or with eastbound and westbound traffic on Drimnagh Road, particularly westbound turning vehicles on Drimnagh Road if vehicles exiting Balfe Road are encroaching into the Drimnagh Road to see past the Taxi stand on their right. This could lead to vehicular head on, side impact or rear end shunt collisions.

Recommendation:

Provide traffic signals for all arms of this junction to ensure vehicles on all arms are aware of the priority movements.

Problem: 5.2.24

Location(s):	Drimnagh Road
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0022
Summary:	Risk of pedestrian collisions at Taxi rank.



Description:

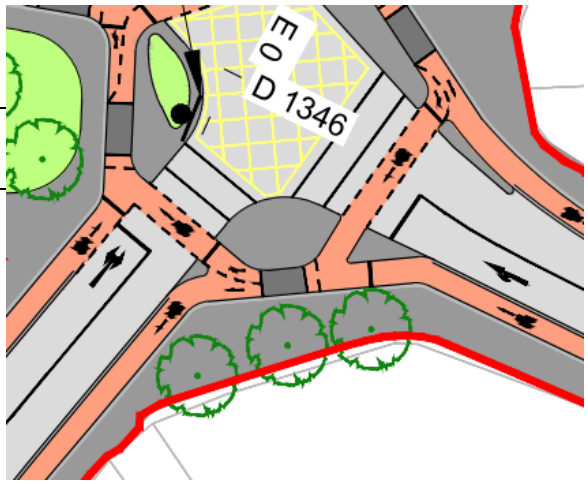
On the southern side of the Drimnagh Road, east of the Balfe Road, a revised taxi stand and parking layout are proposed. The parking is proposed to be fully parallel bays along the Drimnagh Road. The cycle lane is proposed adjacent to these parking bays, with a small separation distance between them. If taxis are picking up or delivering customers to this location, or cars are using these spaces there is nowhere for pedestrians to stand close to these vehicles. If the cycle lane remains adjacent to the vehicle parking with minimal separation to these bays this could lead to collisions between cyclists and drivers/passengers of the vehicles using these parking bays.

Recommendation:

Relocate the cycle lane further away from the parking bays to provide standing/waiting area for pedestrians using these bays or provide a shared use area, with appropriate tactiles and signage, along this section.

Problem: 5.2.25

Location(s):	Kildare Road / St Mary's Road junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0024
Summary:	Turning vehicles may have insufficient space.



Description:

The left slip lane from Kildare Road to St Mary's Road has been replaced. It is unclear if HGVs or other large vehicles can safely turn left from Kildare Road into St Mary's Road. Tracking for large vehicles has not been provided for this turning manoeuvre.

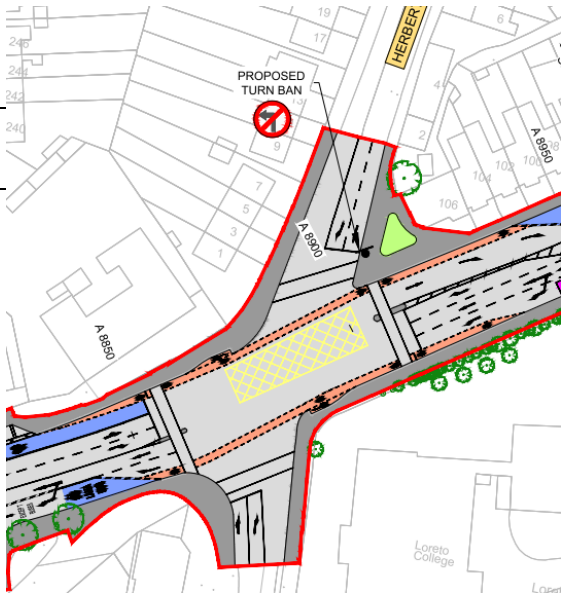
If sufficient turning space is not available this could lead to large vehicles over-running the kerbs adjacent to the pedestrian crossing, which could lead to collisions with pedestrians waiting to cross.

Recommendation:

Undertake a swept path analysis to ensure that there is sufficient space large vehicles to safely turn left without overrunning the proposed kerblines.

Problem: 5.2.26

Location(s):	Crumlin Road / Sundrive Road / Herberton Road junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0027
Summary:	Unclear cycle lane crossings.



Description:

Cycle lanes are provided in the eastbound and westbound directions on Crumlin Road. It is unclear though how cyclists access Sundrive Road and Herberton Road, and how cyclists on these roads access the cycle track on Crumlin Road. There are pedestrian crossing facilities provided at the junction but is unclear if Toucan crossings are provided at these crossing locations too.

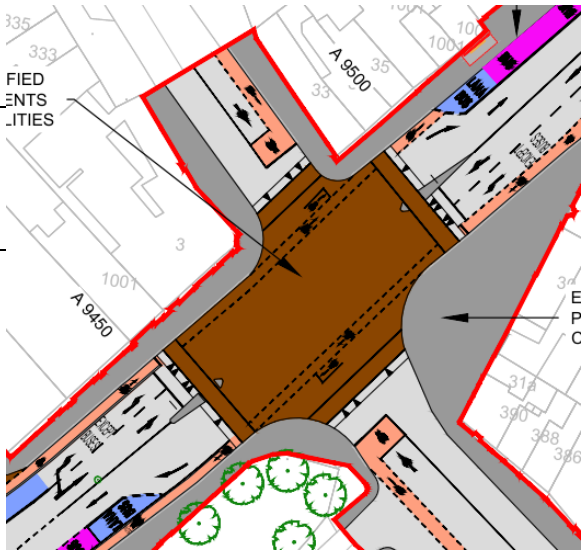
If inadequate direct cycle routes and signage are not adequately provided, it result in cyclists entering onto the carriageway where it is not safe to do so, which could lead to cyclist/vehicular collisions.

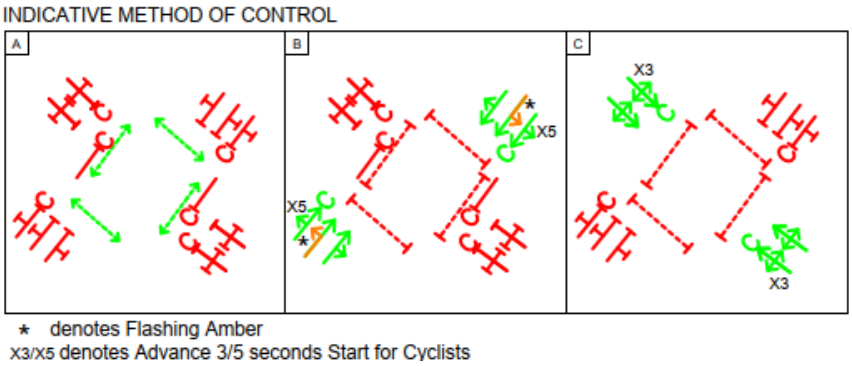
Recommendation:

Provide clear and direct access for all cycle routes to and from the cycle lanes.

Problem: 5.2.27

Location(s):	Dolphins Barn / South Circular Road junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0029 & BCIDA-ACM-TSM_SJ-0809_XX_00-DR-TR-0048
Summary:	Cycle signal control from South Circular Road places cyclists in conflict with vehicles.





Description:

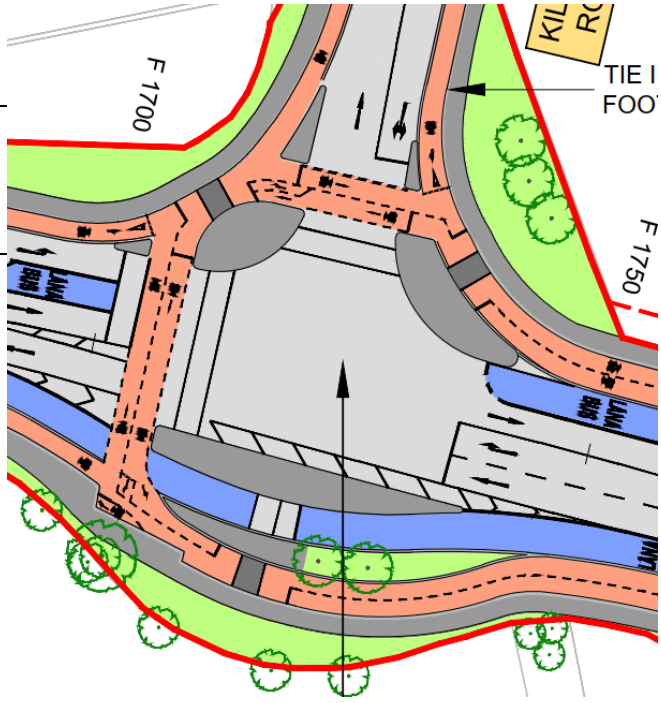
Right turning cycle pockets are provided for cyclists on the South Circular Road. These are located behind the cycle lane and in advance of the advanced stop lines (ASLs) on South Circular Road. The proposed traffic signals drawing shows this junction with 3-stage signals. Therefore, cyclists in the right turning cycle pockets or cyclists in the advanced cycle storage areas that are turning right into Dolphins Barn may conflict with opposing vehicles through this junction. This can result in cycle/vehicle collisions resulting in injury to cyclists.

Recommendation:

Provide a safe system of control movements for cyclists through all arms of this junction.

Problem: **5.2.28**

Location(s):	Nangor Road / Killeen Road junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0050 & BCIDA-ACM-TSM_SJ-0809_XX_00-DR-TR-0064
Summary:	Length of pedestrian crossing is too long for a single-phase crossing.



Description:

The length of the pedestrian crossing across Nangor Road is very long. The crossing traverses four lanes of traffic plus a hatched section to meet the first splitter island on the southern side, which separates the mainline traffic from the westbound bus lane.

A second separation island is proposed between the westbound bus and cycle tracks and provides a pedestrian crossing to the southern footpath. This southern section of the pedestrian crossing is staggered from the crossing across Nangor Road.

For pedestrians to cross safety in a single stage would require long red times, which would result in the formation of large queues and traffic congestion at the junction. In addition, the distance of the crossing is

likely to be excessive for mobility impaired pedestrians to negotiate safely (prior to the green signal for traffic).

Recommendation:

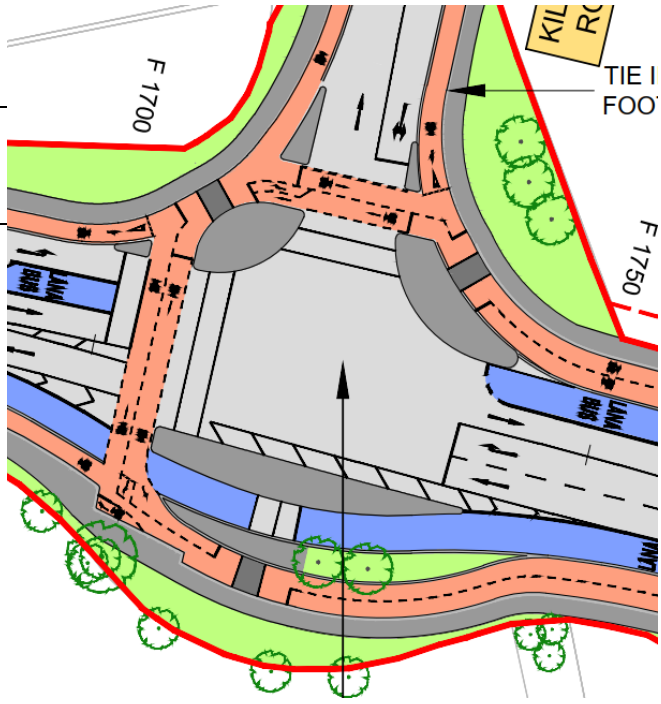
The design should ensure that sufficient green time is provided for pedestrians to cross in a single movement. Flashing amber phases should not be included as this may encourage motorists to move forward while pedestrians are still on the carriageway.

Problem: 5.2.29

Location(s): Nangor Road / Killeen Road junction

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0050

Summary: Segregation island may not be wide enough to accommodate all NMUs.



Description:

Separation islands are proposed between the mainline traffic from the westbound bus lane and between the westbound bus and cycle tracks which accommodate a pedestrian crossing to the southern footpath. The traffic island separating the westbound mainline and bus carriageways may be of insufficient width to accommodate pedestrians at this location. The current separation island has several items of street furniture including signals, signage and street lighting columns.

This could result in disabled NMUs unable to access either pedestrian crossing from this island.

Recommendation:

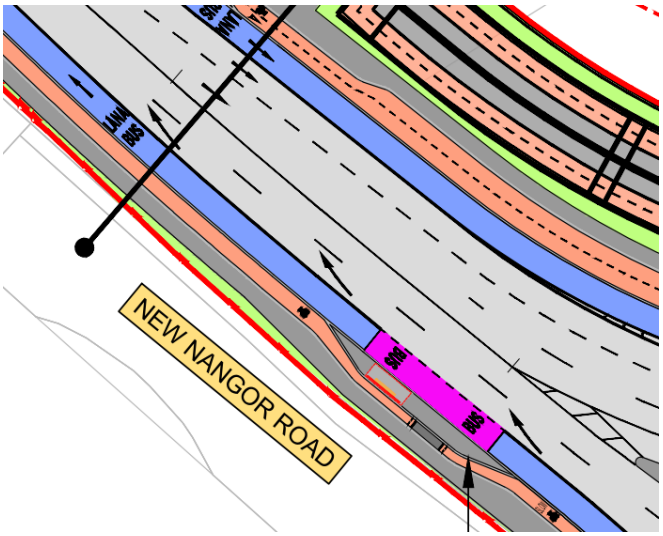
Ensure that this separation island is of sufficient width to accommodate a clear route of sufficient width for all NMUs and the required street furniture.

Problem: 5.2.30

Location(s): Westbound Nangor Rd at Naas Road junction

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0051

Summary: Merge arrows are proposed incorrectly.
Layout of merge arrows may lead to side impact collisions.



Description:

As northwest bound traffic on Nangor Road depart the Naas Road junction, the number of lanes reduces from two down to one. Merge arrow markings are proposed to direct vehicles into one lane. The proposed markings direct vehicles from Lane 1 into Lane 2. This requires vehicles in Lane 1 to merge into Lane 2. As slower vehicles tend to use Lane 1, this may result in hesitant drivers in Lane 1 braking as they are unclear of the merge manoeuvre or not giving way to Lane 2 vehicles, which may result in rear end or side impact vehicle collisions.

Recommendation:

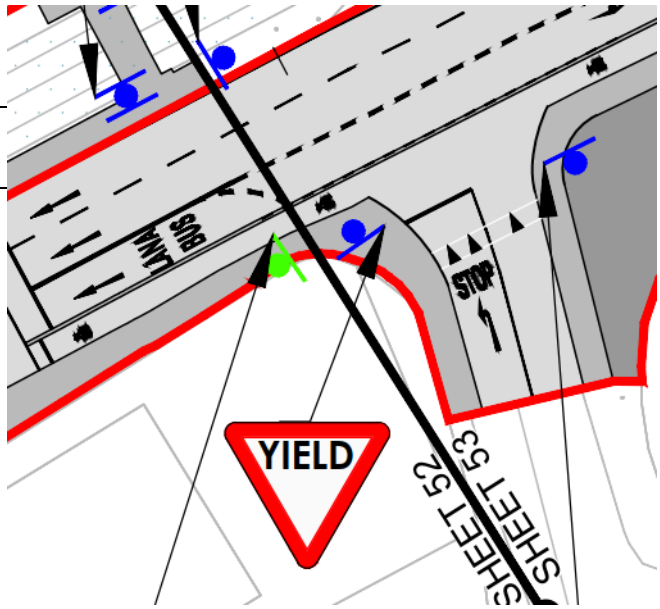
Ensure the merge markings are indicted to require Lane 2 vehicles to merge into Lane 1 at this location and provide adequate advance warning to motorists as they approach this location.

Problem: **5.2.31**

Location(s): Robinhood Road / Naas Road junction

Drawing(s): BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0053

Summary: Different road marking and signage at junction.



Description:

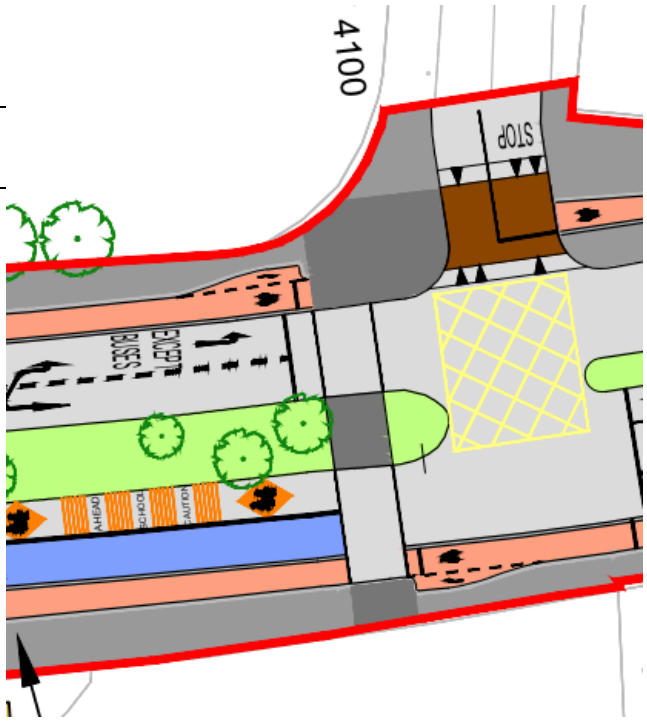
There is YIELD road sign and a STOP road marking provided at the junction between Naas Road and Robinhood Road in advance of the cycle track on Naas Road. This signage is conflicting to motorists. Failure to provide clear consistent warning signage for traffic departing Robinhood Road may cause confusion at the junction and may result in collisions between motorists and cyclists.

Recommendation:

Provide consistent signage on the minor arm of the Robinhood Road / Naas Road junction.

Problem: **5.2.32**

Location(s):	Long Mile Road/Slievebloom Park junction
Drawing(s):	BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0058
Summary:	Cycle track accesses footpath may cause pedestrian/cyclist conflicts



Description:

The eastbound cycle track on Long Mile Road accesses the pedestrian footpath at Slievebloom Park onto a shared space. There are no road markings, tactiles or any degree of advance warning indicating this shared space area. This can lead to confusion on the shared area which can result in collisions between pedestrians and cyclists.

Recommendation:

Appropriate tactile paving should be provided to inform cyclists and the visually impaired users that they are entering into a shared area and road markings and appropriate signage warning cyclists of the footpath ahead should be installed. Priority should be given to pedestrians at these locations.

6. Audit Team Statement

We certify that the site was visited and that this audit has been carried out in accordance with the Transport Infrastructure Ireland Road Safety Audit Guidelines GE-STY-01027-01 (HA 19/15) and Standard GE-STY-01024-07 (HD 19/17).

The Road Safety Audit has been carried out with the sole purpose of identifying any features of the design that could be removed or modified in order to improve the safety of the scheme.

No one on the audit team has been involved with the scheme design.

AUDIT TEAM LEADER: SENIOR ROAD SAFETY AUDITOR

Rowan Lyons Signed

BEng CEng, MIEI MCIHT MSoRSA (Certificate of Competency in Road Safety Audit)

Principal Engineer

AECOM Date 24 Oct 2022

9th Floor, 2 Clarence Street West

Belfast

BT2 7GP

ROAD SAFETY AUDIT TEAM MEMBER:

Brian McMahon Signed

BE MSc CEng MIEI (Certificate of Competency)

Associate Director

AECOM Date 19 Dec 2022

4th Floor, Adelphi Plaza

Georges Street Upper

Dun Laoghaire

Co. Dublin A96 T927

OTHERS INVOLVED:

There were no other persons involved in this Audit than previously stated above.

Appendix A Documents Submitted to the Audit Team

The following documents were obtained from the Design Team.

Document No.	Rev.	Description	Date
Subtitle	-	Description of scheme and routes. Including collision data and traffic surveys.	
BCIDA-ACM-GEO_IX-0809_XX_00-DR-CR-0001	L03	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. GENERAL ARRANGEMENT. COVER SHEET	23/05/22
BCIDA-ACM-GEO_KP-0809_XX_00-DR-CR-0002	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. GENERAL ARRANGEMENT. KEY PLAN	23/05/22
BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001 to 0056	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. GENERAL ARRANGEMENT	23/05/22
BCIDA-ACM-TSM_IX-0809_XX_00-DR-CR-0001	L03	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. TRAFFIC SIGNS AND ROAD MARKINGS. COVER SHEET	10/06/22
BCIDA-ACM-TSM_KP-0809_XX_00-DR-CR-0001	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. TRAFFIC SIGNS AND ROAD MARKINGS. KEY PLAN	10/06/22
BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-0001 to 0056	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. TRAFFIC SIGNS AND ROAD MARKINGS	10/06/22
BCIDA-ACM-TSM_IX-0809_XX_00-DR-TR-0001	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. COVER SHEET	20/06/22
BCIDA-ACM-TSM_IX-0809_XX_00-DR-TR-0002	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. COVER SHEET	20/06/22
BCIDA-ACM-TSM_KP-0809_XX_00-DR-TR-0001	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. KEY PLAN	20/06/22
BCIDA-ACM-TSM_SJ-0809_XX_00-DR-TR-0001 to 0071	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. TRAFFIC SIGNS AND ROAD MARKINGS. JUNCTION SYSTEMS DESIGN	20/06/22

BCIDA-ACM-GEO_IX-0809_XX_00-DR-CR-0002	L03	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. TYPICAL CROSS SECTIONS. COVER SHEET	27/05/22
BCIDA-ACM-GEO_CS-0809_XX_00-DR-CR-0001 to 0028	L01	TALLAGHT/CLONDALKIN TO CITY CENTRE CORE BUS CORRIDOR SCHEME. TYPICAL CROSS SECTIONS.	27/05/22

Appendix B Road Safety Audit Feedback Form

	Scheme: Greenhills to City Centre Core Bus Corridor **Audit Stage: Stage 1** **Date Audit Completed: 30.10.2022**				
Paragraph No. in Safety Audit Report	**To Be Completed by Designer**				**To Be Completed by Audit Team Leader**
	Problem Accepted (yes/no)	**Recomm-ended measure accepted (yes/no)**	**Describe alternative measure(s). Give reasons for not accepting recommended measure.**	**Designers Comments**	**Alternative measures or reasons accepted by auditors (yes/no)**
4.2.1	yes	yes		Preliminary design checked for swept paths	
4.2.2	yes	yes		Detailed design requirement	
4.2.3	yes	yes		Preliminary design tie-ins in to existing throughout	
4.2.5	no	no	At Woodford Walk the outbound bus stop moved to east of junction to allow outbound buses turning left to use it. New controlled crossing provided on the east side of the junction.	Bus Stops generally spaced 400m apart to facilitate efficient bus progress. The proposed design line to the proposed crossing points has been considered throughout, not existing crossing points.	Yes
4.2.6	yes	yes		Footpath continues across all accesses, which are ramped	
4.3.4	yes	no	Design layout changed since RSA review, current layout shows newly constructed junction under TUD scope.		Yes

4.3.13	yes	yes		On-street parking enforcement measures may be required.	
4.3.14	yes	no	Cycle lane Yield marking provided and roundabout design revised to provide single traffic lanes on exits. Cyclists also have protection entering carriageway during raised crossing red light activation for general traffic.		Yes
4.3.15	yes	yes		Raised table treatment at entry and exit to this link road is provided	Yes
4.3.25	yes	yes		The lane allocation has been amended so that the bus lane stops where the left turn to Back Lane is. The weaving movement described is facilitated by a longer yellow box.	
4.3.2	yes	yes		Yield markings have been added	
4.3.10	yes	yes		Enforcement measures may be required.	
4.3.11	yes	yes		Enforcement measures may be required.	
4.3.14	yes	yes		Layout amended	
4.3.16	no	no	While at grade crossing route may be shorter in distance, it would be longer time wise because of the sequencing of the signals. This is covered in the MCA in the PRO. Raised pedestrian and cyclist bridge with both stairs and ramps on all arms provides safe junction crossing routes for		Yes

			pedestrians and cyclists.		
4.3.18	yes	yes		Design revised with bus lane and cycle track kerb upstand now provided across access.	
4.3.20	no	no	Kerb vertical separation is provided between bus lane and cycle track		Yes
4.3.22	yes	yes		On-street parking enforcement measures may be required.	
4.3.26	yes	yes		Crossing relocated	
4.3.28	yes	yes		Footpath continues across all accesses, which are ramped	
4.3.30	yes	yes		This will be addressed at detailed design/construction	
4.3.36	yes	yes		On-street parking enforcement measures may be required.	
4.3.38	yes	yes		Footpath continues across all accesses, which are ramped	
4.3.39	yes	yes		Enforcement measures may be required.	
4.3.40	yes	yes		On-street parking enforcement measures may be required.	
4.3.45	no	no	Efficient bus operation, ie consistent frequency, will not result in congested bus stops.	Bus lane west of this bus stop can accommodate additional bus if necessary	Yes
5.1.1	yes	yes		This will be addressed at detailed design stage	
5.1.2	yes	yes		Cycle stacking of the appropriate distance for the anticipated demand has been provided as far as practicable	

5.1.3	yes	yes		This will be addressed at detailed design stage	
5.1.4	yes	yes		GAs show the turn bans only. Signs drawings show all the signs. Consistency has been checked	
5.1.5	yes	yes		Marking not shown on GAs but markings as per PDGB will be provided	
5.1.6	yes	yes		Shared bus stop landing areas have been revised and widened to a minimum of 1m where practicable as per PDGB.	
5.1.7	yes	yes		Layouts as per PDGB have been checked for appropriate swept path	
5.1.8	no	no		Raised table arrangements provide different layouts depending on location and presence of adjacent bus lane where BusConnects detail is used.	Yes
5.2.1	yes	yes		This will be addressed at detailed design stage	
5.2.2	yes	yes		Layout amended to include ASL	
5.2.3	yes	yes		Yellow box extended	
5.2.4	yes	yes		Straight through ped crossing now provided	
5.2.5	yes	yes		This will be addressed at detailed design stage	
5.2.6	no	no	“EXCEPT BUSES” road marking with right-turn arrow is standard road marking in accordance with TSM.		Yes
5.2.7	yes	yes		Splitter island extended	
5.2.8	yes	yes		Yellow box extended	

5.2.9	yes	yes		Swept path considered adequate – detailed design to review	
5.2.10	yes	yes		This will be addressed at detailed design stage	
5.2.11	yes	yes		Junction reconfigured	
5.2.12	yes	yes		Junction reconfigured	
5.2.13	no	no	Main cycle route is on Ballymount Avenue, there is a “No Right-Turn” restriction from Greenhills Road onto Ballymount Avenue, cyclists wishing to turn right onto Ballymount Avenue will need to dismount and use raised table crossing.	Dropped kerbs at this location will allow cyclists to dismount to use the raised crossing.	
5.2.14	yes	yes		Bus lane extended	
5.2.15	yes	yes		Cycle tracks added to Calmount Avenue and roundabout redesigned as per NCM. Cycle lanes on Greenhills Road retained	
5.2.16	yes	yes		Cycle track provided for outbound cyclists; ramp provided to relocated Toucan crossing for inbound cyclists	
5.2.17	no	no	Single lane exit on St Peters Road now proposed		Yes
5.2.18	yes	yes		Layout amended	
5.2.19	yes	yes		Single lane exit provided on all arms	
5.2.20	yes	yes		Layout amended	
5.2.21	yes	yes		Layout amended	
5.2.22	yes	no		Swept path ok for right turn	
5.2.23	yes	yes		All arms are signalised	
5.2.24	yes	yes		Shared use area added	

5.2.25	yes	no		Stop line on St. Mary's Road has been altered to accommodate left turn movements from Kildare Road. Layout provided as per DMURS for Quiet Street to Quiet Street junction	
5.2.26	yes	yes		Layout amended	
5.2.27	yes	yes		RT jug pockets removed. Layout as per DCC proposals	
5.2.28	yes	yes		Junction redesigned	
5.2.29	yes	yes		Junction redesigned	
5.2.30	yes	yes		Markings amended	
5.2.31	yes	yes		Signs drawings amended to show STOP sign	
5.2.32	yes	yes		This will be addressed at detailed design stage	

Signed:  Designer: Alan Duggan Date: 28/03/2023

Signed:  Audit Team Leader: Rowan Lyons Date: 30/03/2023

Signed: _____ Employer: _____ Date: _____