Appendix C
Stage 1 Road Safety Audit &
Road User Audit

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1. Introduction

1.1 Report Context

This report describes the findings of a Stage 1 Road Safety Audit & Road User Audit associated with Bus Connects Galway: Dublin Road.

The Audit has been completed by Traffico Ltd. on behalf of Barry Transportation.

1.2 Details of Site Inspection

Date	Daylight / Darkness	Weather & Road Conditions
Tuesday 30th January 2023	Daylight	Sunny with dry roads.

Table 1.1 – Site Inspection Details

1.3 The Road Safety Audit Team

The members of the Road Safety Audit Team have been listed following:

Status	Name / Qualifications	TII Auditor Reference No:
Audit Team Leader (ATL)	**Martin Deegan** BEng(Hons) MSc CEng MIEI	MD101312
Audit Team Member (ATM)	**Jason Walsh** BEng (Hons) PCert (RSA) CEng MIEI	JW3362499

Table 1.2 – Audit Team Details

1.4 Drawings & Documents Examined as Part of the Audit Process

The following drawings were examined as part of the Audit process:

Drawing No./ Document Ref	Drawing / Document Title	Revision
BCGDR-BTL-GEO_GA-XX-DR-CR-00001	General Arrangement Sheet 1 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00002	General Arrangement Sheet 2 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00003	General Arrangement Sheet 3 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00004	General Arrangement Sheet 4 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00005	General Arrangement Sheet 5 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00006	General Arrangement Sheet 6 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00007	General Arrangement Sheet 7 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00008	General Arrangement Sheet 8 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00009	General Arrangement Sheet 9 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00010	General Arrangement Sheet 10 of 12	P02

Drawing No./ Document Ref	Drawing / Document Title	Revision
BCGDR-BTL-GEO_GA-XX-DR-CR-00011	General Arrangement Sheet 11 of 12	P02
BCGDR-BTL-GEO_GA-XX-DR-CR-00012	General Arrangement Sheet 12 of 12	P02

Table 1.3 – Designers Drawing & Document List

1.5 Stage 1 Road Safety Audit & Road User Audit Content & Compliance

Procedure and Scope for Stage 1 Road Safety Audit & Road User Audit

This Stage 1 Road Safety Audit & Road User Audit has been undertaken in accordance with Section 5.4.2 of the Design Manual for Urban Roads and Streets. The UK Department for Transport Traffic Advisory Leaflet (TAL) 5/11 has also been referred to for guidance.

This Stage 1 Road Safety Audit & Road User Audit consists of the following audit sections:

- Walking, Cycling and Access Audit – focusing on accessibility requirements of vulnerable road users (and in particular, those with visual or mobility impairments), and on the movement and place function requirements of pedestrians and cyclists
- Road Safety Audit – focusing on issues relating directly to road safety

Procedure and Scope Specific to the Road Safety Audit

The Road Safety Audit has been carried out in accordance with the procedures and scope set out in TII publication number GE-STY-01024 - Road Safety Audit.

As part of the road safety audit process, the Audit Team have examined only those issues within the design which relate directly to road safety.

Compliance with Design Standards

The road safety audit process is not a design check, therefore verification or compliance with design standards has not formed part of the audit process.

Minimizing Risk of Collision Occurrence

All problems described in this report are considered by the Audit Team to require action in order to improve the safety of the scheme and minimise the risk of collision occurrence.

2. Walking, Cycling and Access Audit

2.1 Best Practice Guidance

This Stage 1 Road Safety Audit & Road User Audit has been carried out in accordance with general best practice guidance set out within the following documents:

- The Disability Act 2005
- Building Regulations 2000, Technical Guidance Document M – Access for People with Disabilities (Department of the Environment, Heritage and Local Government)
- Buildings for Everyone Access and use for all citizens (National Disability Authority)
- Access Auditing of the Built Environment Guidelines (National Disability Authority)
- Traffic Management Guidelines (Irish Government Publications 2003)
- Guidance on the use of Tactile Paving Surfaces: UK Department for Transport

2.2 Objectives of the Walking, Cycling and Access Audit

The objectives of this Walking, Cycling and Access Audit are as follows:

- To ensure a high level of accessibility to the development site for all vulnerable road users and, for visually and mobility impaired users
- To ensure that the current and future access needs within the scheme are recognised and developed
- To ensure that advantage is afforded to walkers and cyclists at every opportunity

2.3 General Accessibility Recommendations

Following delivery of the Walking, Cycling and Access Audit, the design team should consider all issues raised herein for inclusion into the final design. It is less costly to make the changes now, pre-construction, than later after the scheme has been commissioned.

The client should consider setting up a dedicated access team for the project, responsible for the long-term management of universal access throughout the development.

This process should be facilitated by an Access Plan, which is a strategy for improving accessibility developed from the Audit and can ensure that access is an on-going concern and help identify opportunities for change.

The access plan should incorporate planned maintenance programmes, a schedule of works that has been devised to take into account the information in the Audit, processes to allow regular updating of the Audit information and links to maintenance and management procedures.

It should also set out procedures to ensure that when opportunities for access improvement arise, they are recognised.

2.4 Specific Walking, Cycling and Accessibility Recommendations

A summary of the design features, together with recommended actions to be taken during the relevant stage of the design or operation of the scheme have been detailed in the following table.

Table 2.1 - Walking, Cycling and Access Audit Summary Table

I.D.	Location	Feature	Action	When
Recommendations to Encourage Walking				
W1	Footpaths within Bus Connects Galway: Dublin Road	Pedestrian provision & universal access	Ensure pedestrian environments are logical, continuous, easy to understand and consistent throughout the development.	Design Stage
W2	Pedestrian linkage to external Public Roads serving Bus Connects Galway: Dublin Road	Pedestrian provision – connections to Bus Stops	Provide seamless connections onto the external public roads to connect with the Bus Stops and encourage uptake for bus travel.	Design Stage
W3	Footpaths serving Bus Connects Galway: Dublin Road	Street furniture positioning	Ensure street furniture is carefully positioned to avoid obstruction in footways and to maximise the effective width.	Design & Operational Stages
W4	Footpaths serving Bus Connects Galway: Dublin Road	Footpaths and crossing points	Ensure footpaths and crossing points are located on all significant desire lines, where they are safe and convenient to use for all vulnerable road users.	Design Stage
W5	Pedestrian linkage to Bus Connects Galway: Dublin Road	Linkage to public roads and footpaths	Access points onto the project road which connect with private development sites with public thoroughfares should link seamlessly to accommodate universal access and pedestrian progression between the scheme and all key employment sites, educational campuses, commercial sites and housing development sites.	Design & Operational Stages
W6	Side roads and significant private accesses Bus Connects Galway: Dublin Road	Courtesy pedestrian crossings.	Priority should be afforded to the crossing of pedestrians at all side road and private access. Stop lines should be set back in advance of pedestrian crossings to direct drivers to give way to pedestrians first, before advancing to consider joining the mainline carriageway.	Design Stage

I.D.	Location	Feature	Action	When
Recommendations to Encourage Cycling				
C1	Side roads connecting to Bus Connects Galway: Dublin Road	Streets where car and cycling use is integrated	Upon entering the side roads, drivers should immediately recognise that they are in a shared space where their behaviour should be adjusted to suit the environment. To achieve this, appropriate measures should be prescribed which might make it abundantly clear to drivers that the movement of cyclists takes precedence over vehicles. This might be achieved with gateway treatment, lane narrowing, surface materials or lane cycle logos.	Design Stage
C2	Shared cycling and walking areas within Bus Connects Galway: Dublin Road	Pedestrian & cyclist facilities.	Conflicts can arise where different modes of transport share the same space. Ensure cycle environments are logical, continuous, and legible throughout the development. Where cyclists are encouraged to share with pedestrians, ensure that sufficient width and end user information are provided.	Design Stage
C3	Formal Road Crossings within Bus Connects Galway: Dublin Road	Continuity and crossing.	Ensure continuity for cyclists and pedestrians are provided at key crossing points, and that crossing points are located with good forward stopping sight distance for approaching vehicles (these should not be obscured with landscaping).	Design Stage
C4	All dedicated cycling provisions within Bus Connects Galway: Dublin Road	Street furniture positioning.	Ensure street furniture is carefully positioned to avoid obstruction in cycle paths and to maximise the effective width available to cyclists.	Design & Operational Stages
C5	Dedicated cycle tracks within Bus Connects Galway: Dublin Road	Commencements and terminations	Where cycle tracks commence, measures to allow ease of access for cyclists should be included. Where cycle tracks terminate, then termination points should be carefully designed to optimise cycle safety.	Design Stage
C6	Cycle Parking Areas within Bus Connects Galway: Dublin Road	Cycle Parking	Ensure appropriate cycle parking is provided within the project road to encourage uptake for cycling. Ensure it is comfortable and safe for cyclists to access the parking.	Design Stage

I.D.	Location	Feature	Action	When
C7	Cycle Parking Areas within Bus Connects Galway: Dublin Road	Cycle Parking & security	To encourage use and safeguard security, position cycle parking away from isolated areas and close to building entrances which are well lit and have natural passive surveillance. Consider providing cover over the cycle parking to protect cyclists from the elements where possible.	Design Stage
Recommendations to Provide for Universal Access & Accessibility				
A1	Footpaths serving Bus Connects Galway: Dublin Road	Dropped kerbs & tactile paving	Ensure appropriate dropped kerbs and tactile paving are provided at all key crossing points.	Design Stage
A2	Footpaths serving Bus Connects Galway: Dublin Road	Universal Access – footpath types and finishes	Ensure consistency in the types of footpath surface utilised and ensure that the surface provides appropriate contrast with the adjacent road pavement.	Design Stage
A3	Footpaths serving Bus Connects Galway: Dublin Road	Universal Access – material contrast	Ensure contrasting colours/materials are used to define areas which are meant for sole use by vulnerable road users.	Design Stage
A4	Footpaths serving Bus Connects Galway: Dublin Road	Universal Access – footpaths	Ensure that measures are taken to actively maintain and police errant car parking on footpaths which might impact negatively upon pedestrian progression.	Design Stage & Operational Stage
A5	Footpaths serving Bus Connects Galway: Dublin Road	Definition of footpath edges & terminations	Footpath edges should be clearly defined with contrasting finishes and appropriate termination details should be provided where footpaths end.	Design Stage
A6	Footpaths serving Bus Connects Galway: Dublin Road	Steps - legibility	Ensure steps are legible and easy to define by providing step nosings with contrasting colours.	Design Stage
A7	Footpaths serving Bus Connects Galway: Dublin Road	Street Lighting	Ensure public lighting is located where pedestrian movement decisions are required (i.e. at crossing points, entrances and in shared street areas).	Design Stage
A10	External Landscaped areas serving Bus Connects Galway: Dublin Road	Drainage gaps	Ensure any break in surface or gap (such as a drainage gulley) is no greater than 10mm and is perpendicular to line of travel. Locate drainage features both away from (and up gradient from) crossing points.	Design Stage

I.D.	Location	Feature	Action	When
A11	External Landscaped areas serving Bus Connects Galway: Dublin Road	Drainage / pavement gradients	Ensure access routes are constructed with even and gentle falls to allow proper drainage and prevent the formation of puddles. The cross-fall gradient to any access route should not exceed 1 in 50, except when associated with a dropped-kerb.	Design Stage
A12	External Landscaped areas serving Bus Connects Galway: Dublin Road	Obstructions from Street Furniture or landscaping	Ensure street furniture / landscaping do not encroach on the clear width of pathways.	Design Stage
A13	External Landscaped areas Bus Connects Galway: Dublin Road	Street Furniture – visually impaired	Ensure street furniture contrasts in colour with the surrounding pavement surfaces.	Design Stage

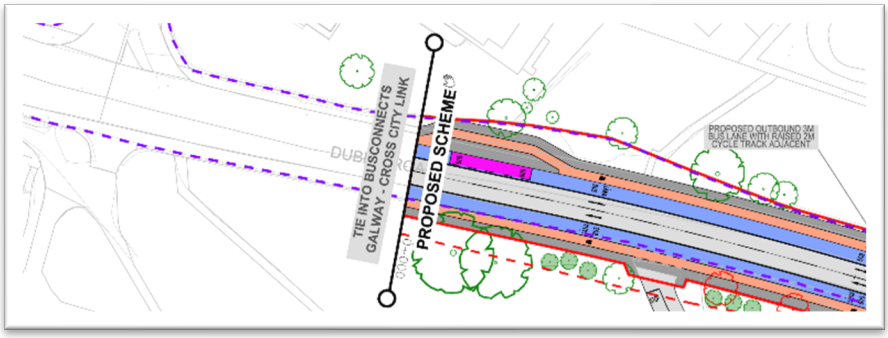
3. Stage 1 Road Safety Audit Problems

3.1 Problem: Connection to Galway Cross City Link

Dwg. | Location: 00001 | Interface with Galway Cross City Link

The Galway Cross City Link is likely to be delivered in a different time frame. This could lead to abrupt terminations or commencements on the cycle track and footpath, resulting in progression issues for vulnerable road users.

Figure 3.1 – Interim Tie-In Pending Delivery of Galway Cross City Link



Recommendation

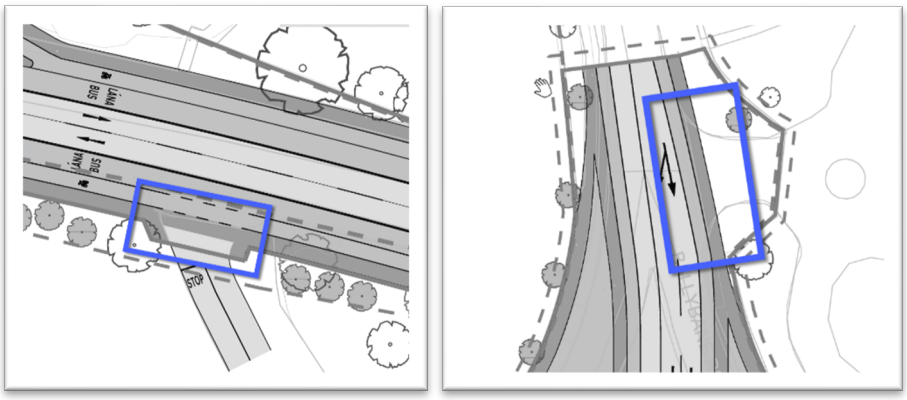
An interim tie-in solution which places an emphasis on progression and safety for vulnerable road users should be devised at the interface with the Galway Cross City Link.

3.2 Problem: Facilities for Mobility Impaired Road Users

Dwg. | Location: 00001 & 0005 | All Side Roads & Significant Development Accesses

Failing to provide facilities for vulnerable road users (including pedestrians and mobility impaired people) to cross side roads and significant development accesses could lead to slips trips and conflicts with general traffic.

Figure 3.2 – Example Significant Accesses on The Gables & Derelict Hotel Site (Sheets 1 & 5)



Recommendation

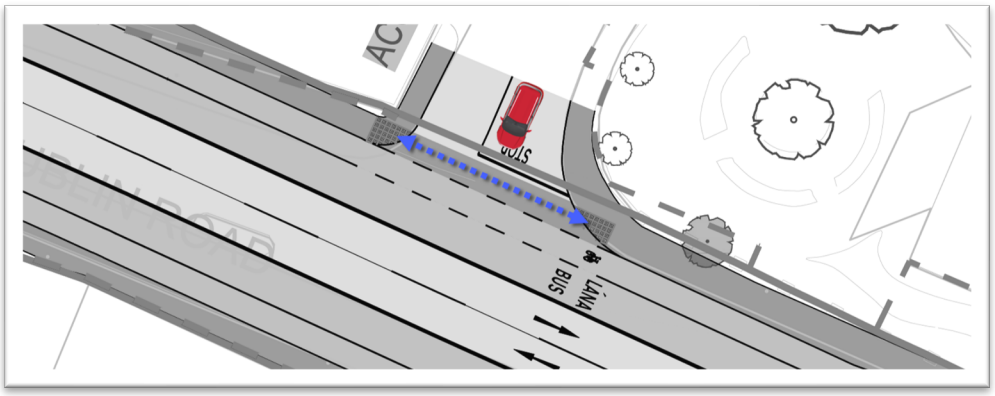
Appropriate (and consistent) measures should be provided to both guide and afford priority to vulnerable road users attempting to cross side roads and significant development accesses.

3.3 Problem: Extended Crossing Distance for Pedestrians

Dwg. | Location: 00002 | Access to The Connacht

The unusually wide junction bellmouth will encourage higher vehicle speeds whilst imposing longer crossing distances on pedestrians. This is likely to increase both the severity and the likelihood of a collision occurring between a vehicle and a vulnerable road user at this location.

Figure 3.3 – Extended Pedestrian Crossing Distances at The Connacht Access



Recommendation

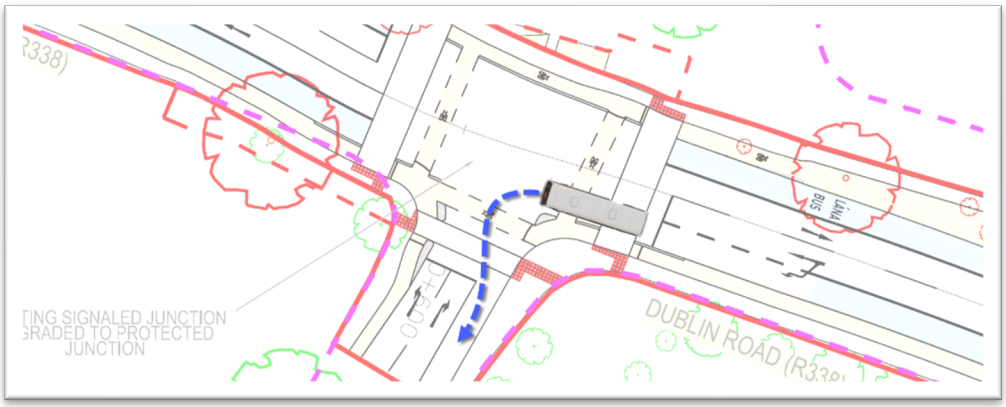
Appropriate measures should be designed which might improve safety for pedestrians crossing the access. Such measures might include a reduction in crossing distance, or a raised crossing table to slow vehicle speeds.

3.4 Problem: Bus Tracking for Left Turn into Renmore Road

Dwg. | Location: 00002 | Left Turn into Renmore Road

The road space available for buses and larger vehicles to turn left here appears limited. This could lead to kerb strikes, opposition type vehicle conflicts and delays during peak commuting times.

Figure 3.4 – Left Turn into Renmore Road Appears Challenging for Buses



Recommendation

The vehicle swept path for (larger) left turning vehicles should be checked, with the geometry and junction layout adjusted appropriately, if required.

3.5 Problem: Bus Tracking for Left Turn into Balluloughnane Road

Dwg. | Location: 00004 | Left Turn into Ballyloughnane Road

The road space available for buses and larger vehicles to turn left here appears limited. This could lead to kerb strikes, opposition type vehicle conflicts and delays during peak commuting times.

Figure 3.5 – Left Turn into Ballyloughnane Road Appears Challenging for Buses

Recommendation

The vehicle swept path for (larger) left turning vehicles should be checked, with the geometry adjusted appropriately, if required.

3.6 Problem: Vehicle Conflicts on Cycle Track & Footpath

Dwg. | Location: 00005 | Fast food Outlet & Petrol Station Opposite Hospital Access

Frequent vehicle access to the fast food outlet and petrol station could place pedestrians and cyclists at an increased risk of conflict at this location.

Figure 3.6 – Vehicle Access Across Cycle Track & Footpath to Clustered Retail Site

Recommendation

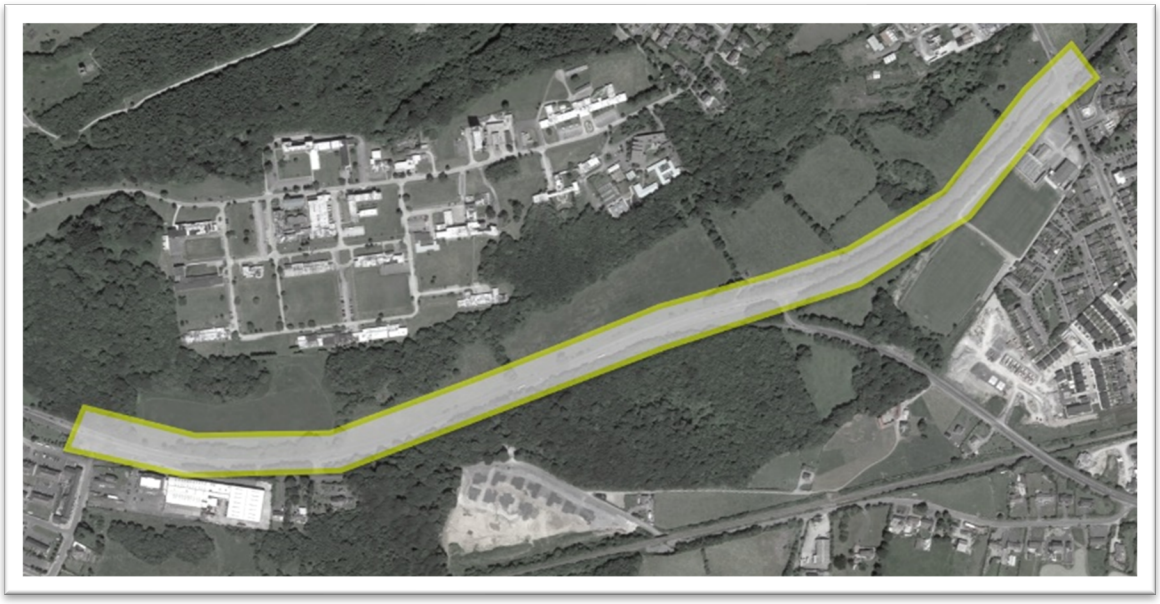
The Designer should investigate interventions which might aggressively slow the vehicle speeds of drivers attempting to cross the cycle track and footpath at this location. This should be supplemented with measures to guide vehicles towards specific access points at each premises.

3.7 Problem: Managing Vehicle Speeds Along Bus Route

Dwg. | Location: 00006 - 00011| Galway Crystal to Doughiska Road

The (less frequent) junction spacing and absence of development activity on this rural section of the scheme are likely to result in higher vehicle speeds. This could increase both the frequency and the severity of collision outcomes here.

Figure 3.7 – More Rural Section of Scheme Prone to Higher Vehicle Speeds



Recommendation

Appropriate speed management measures should be set in place along this section of the scheme.

4. Audit Team Statement

4.1 Certification & Purpose

We certify that we have examined the drawing listed in Chapter 1 of this Report.

Sole Purpose of the Road Safety Audit

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

4.2 Implementation of RSA Recommendations

The problems identified herein have been noted in the Report together with their associated recommendations for road safety improvements.

We (the Audit Team) propose that these recommendations should be studied with a view to implementation.

Audit Team's Independence to the Design Process

No member of the Audit Team has been otherwise involved with the design of the measures audited.

4.3 Road Safety Audit Team Sign-Off

Martin Deegan
Audit Team Leader
Road Safety Engineering Team
traffico

Signed: 

Date: 9th February 2024

Jason Walsh
Audit Team Member
Road Safety Engineering Team
traffico

Signed: 

Date: 9th February 2024

5. Responding to the Road Safety Audit

5.1 How the Designer Should Respond to the Road Safety Audit

The Designer should prepare an Audit Response for each of the recommendations using the Road Safety Audit Feedback Form attached in Appendix A.

When completed, this form should be signed by the Designer and returned to the Audit Team for consideration. See flow-chart following for further description.

Figure 5.1 – Road Safety Audit Sign-Off and Completion Process

5.2 Returning the Completed Feedback Form

The Designer should return the completed Road Safety Audit Feedback Form attached in Appendix A of this report to the following email address:

- Email address: martin@traffico.ie

The Audit Team will consider the Designer's response and reply indicating acceptance or otherwise of the Designers response to each recommendation.

Triggering the Need for an Exception Report

Where the Designer and the Audit Team cannot agree on an appropriate means of addressing an underlying safety issue identified as part of the audit process, an Exception Report must be prepared by the Designer on each disputed item listed in the audit report.

Appendix A

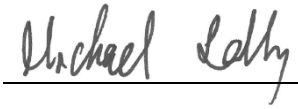
A.1 Road Safety Audit Feedback Form

Road Safety Audit Feedback Form

Scheme: Bus Connects Galway: Dublin Road	
Audit Stage: Stage 1 Road Safety Audit	**Audit Date:** 9th February 2024

Problem Reference (Section 3)	Designer Response Section			Audit Team Response Section
	Problem Accepted (yes / no)	Recommended Measure Accepted (yes / no)	Alternative Measures or Comments	Alternative Measures Accepted (yes / no)
3.1	yes	yes		
3.2	yes	yes		
3.3	yes	yes		
3.4	yes	yes		
3.5	yes	yes		
3.6	yes	yes		
3.7	yes	yes		

**The Designer should complete the Designer Response Section above, then fill out the designer details below and return the completed form to the Road Safety Audit Team for consideration and signing.*

Designer's Name:	Tristan Dunne	Designer's Signature:		Date:	10.10.24
Employer's Name:	Michael Lally (GCC)	Employer's Signature:		Date:	01.11.24
Audit Team's Name:	Martin Deegan	Audit Team's Signature:		Date:	05 / 11 / 2024