

Limerick City & County Council

TUS Moylish to City Active Travel
Scheme

Stage 1 Road Safety Audit

Limerick City & County Council

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Document Ref: P21-103-RSA-PD-RP-001

Rev	Prepared By	Reviewed By	Approved By	Issue Date	Reason for Revision
2.0	AOR	MAH	AOR	29 th July 2022	Final
1.0	AOR/MAH	PJM	AOR	28 th July 2022	Draft Report

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1 Introduction

1.1 General

This report results from a Stage 1 Road Safety Audit on the proposed TUS Moylish to City Active Travel Scheme carried out at the request of Mr. Liam Kennedy of Limerick City & County Council.

The members of the Road Safety Audit Team are independent of the design team, and include: -

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Road Safety Audit Team Leader

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The Road Safety Audit took place between September 2021 and July 2022 and comprised an examination of the documents provided by the designers (see Appendix B). In addition to examining the documents supplied the Road Safety Audit Team visited the site of the proposed measures on the 21st September 2021. Weather conditions during the site visit were dry and the road surface was dry. Traffic volumes during the site visit were high, pedestrian and cyclist volumes were high and traffic speeds were considered to be generally within the posted speed limit.

A supplementary site visit was undertaken by the RSA Team Leader on the 28th February 2022. Weather conditions during this site visit were wet and the road surface was wet. Traffic volumes during the supplementary site visit were high, pedestrian and cyclist volumes were high and traffic speeds were considered to be generally within the posted speed limit.

Where problems are relevant to specific locations these are shown on drawing extracts within the main body of the report and their locations are shown in Appendix D. Where problems are general to the proposals sample drawing extracts are within the main body of the report where considered necessary.

This Stage 1 Road Safety Audit has been carried out in accordance with the requirements of GE-STY-01024 - Road Safety Audit (December 2017), contained on the Transport Infrastructure Ireland (TII) Publications website.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety and considers the perspective of all road users. It has not been examined or verified for compliance with any other standards or criteria. The problems identified in this report are considered to require action in order to improve the safety of the scheme and minimise collision occurrence.

If any of the recommendations within this road safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observations are intended to be for information only. Written responses to Observations are not required.

1.2 Items Not Submitted for Auditing

Details of the following items were not submitted for audit; therefore no specific problems have been identified at this stage relating to these design elements, however where the absence of this information has given rise to a safety concern it has been commented upon in Section 3: -

- Landscaping
- Vehicle swept paths
- Drainage
- Public Lighting
- Visibility splays

2 Project Description

2.1 General

Limerick City & County Council propose to improve the R445 Regional Road (Cratloe Road) and Local Roads at Belfield Court and Bellefield Gardens. The improvement scheme is located in an urban area approximately 2km from Limerick City Centre, with the Local Roads running through adjacent residential areas. The Scheme extends from the Moylish Roundabout, at its western extents, to the junction of Bellefield Gardens and Ennis Road, at its southern extents.



FIGURE 2-1: LOCATION PLAN (SOURCE WWW.OPENSTREETMAP.ORG)

Throughout the Scheme, Cratloe Road is currently a two-way single carriageway approximately 8.3m wide, with a posted speed limit of 50kph and with public lighting and footpaths on both sides of the road. There are currently no bus or cycle lanes on Cratloe Road, however on-street parking is available along sections of the road within the extents of the Scheme.

Belfield Court and Bellefield Gardens are both local roads running in a north south direction and connect the Cratloe Road to the R57 Regional Road (Ennis Road) which links the N18 National Road to Limerick City Centre. These are two-way single carriageway roads with posted speed limits of 50kph and carriageway widths of approximately 5.5m. Footpaths are provided on both sides of these roads and public lighting is available along at least one side of these roads.

The proposed scheme would include the following changes to the existing road layout: -

- The addition of an eastbound bus lane on Cratloe Road between the Moylish Roundabout and the signalised crossroads junction with the R464 Regional Road (Shelbourne Road (South) & Kileely Road (North)).
- Removal of on-street parking along some sections of Cratloe Road.
- The addition of a protected cycle track on both sides of Cratloe Road.
- Traffic calming measures, including raised tables and speed humps.
- The addition of a Zebra crossing on the LIT Access Road at Moylish Roundabout and amendments to the existing Zebra crossing on Cratloe Road at the roundabout.
- The upgrade of existing uncontrolled pedestrian crossings to toucan crossings.
- The upgrading of existing bus stops to 'floating island' bus stops.
- Provision of raised tables at priority-controlled side road junctions.
- The upgrading of the existing signalised junctions at Cratloe Road/Kileely Road/Shelbourne Road and at Cratloe Road/Cross Road.
- The upgrading of the existing priority-controlled junction between Cratloe Road and Bellefield Court to a signalised junction.
- Provision of protected cycle lanes at all signalised junctions, both existing and proposed.

2.2 Collision History

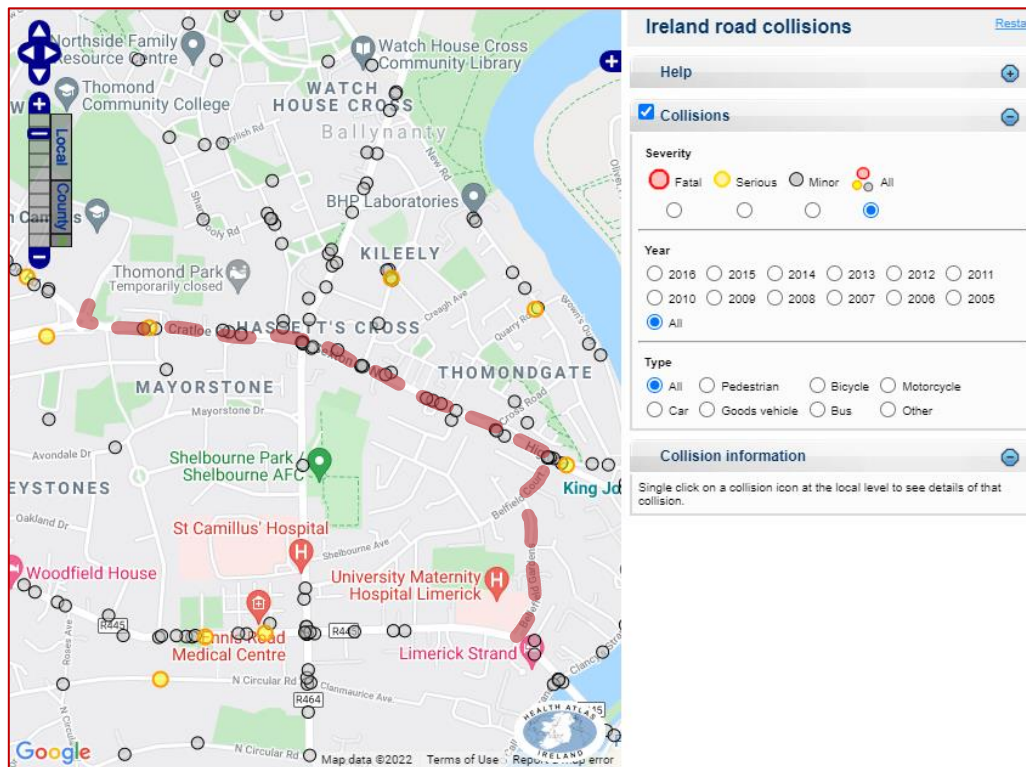


FIGURE 2-2: HISTORICAL COLLISIONS IN THE VICINITY OF THE SCHEME (SOURCE WWW.RSA.IE)

The Road Safety Authority website (www.rsa.ie) was consulted to identify historical collisions in the vicinity of the proposed scheme. The website includes summary information on recorded collision occurrence for the period 2005 to 2016 (see Figure 2-2).

Within the extents of the proposed scheme, a total of 34 collisions were recorded which are summarised in Table 2-1 below. One of the collisions, involving a cyclist, resulted in a Serious Injury and the remaining 33 collisions resulted in a Minor Injury.

TABLE 2-1: DETAILS OF RECORDED COLLISIONS IN THE VICINITY OF THE SCHEME BETWEEN 2005 AND 2016

Year	Vehicle	Circumstances	Day	Time	Speed limit [kph]	Location	Severity
2015	Bicycle	Other	Tuesday	10am – 4pm	50	Cratloe Rd	Serious
2016	Car	Rear end, straight	Friday	10am – 4pm	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2016	Car	Rear end, straight	Wednesday	7pm – 11pm	50	Sexton St N / O'Callaghan Ave Junction	Minor
2016	Car	Rear end, straight	Friday	10am – 4pm	50	Sexton St N (Service Stn.)	Minor
2016	Car	Pedestrian	Friday	7pm – 11pm	50	High Rd / Belfield Court	Minor
2016	Bicycle	Other	Wednesday	4pm – 7pm	50	High Rd / Thomondgate Junction	Minor
2015	Goods Vehicle	Rear end, straight	Wednesday	10am – 4pm	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2014	Car	Rear end, straight	Friday	10am – 4pm	50	Cratloe Rd / Mayorstone Ave Junction	Minor
2014	Bicycle	Angle, both straight	Monday	10am – 4pm	50	Sexton St N (Service Stn.)	Minor
2014	Car	Pedestrian	Saturday	7pm – 11pm	50	Sexton St N / Stenson Park Junction	Minor
2014	Car	Rear end, straight	Saturday	7pm – 11pm	50	High Rd / Cross Rd Junction	Minor
2014	Car	Rear end, straight	Friday	10am – 4pm	50	High Rd / Cross Rd Junction	Minor
2013	Car	Pedestrian	Saturday	10am – 4pm	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2013	Car	Pedestrian	Saturday	10am – 4pm	50	Sexton St N / O'Callaghan Ave Junction	Minor
2013	Car	Pedestrian	Saturday	7pm – 11pm	50	Sexton St N (Service Stn.)	Minor
2013	Car	Pedestrian	Thursday	10am – 4pm	50	High Rd / Belfield Court	Minor
2012	Car	Rear end, straight	Friday	10am – 4pm	50	Cratloe Rd	Minor
2011	Car	Pedestrian	Saturday	4pm – 7pm	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2009	Car	Rear end, straight	Thursday	10am – 4pm	50	Cratloe Rd	Minor
2009	Motorcycle	Other	Wednesday	4pm – 7pm	50	Cratloe Rd / Mayorstone Upper Junction	Minor
2009	Car	Other	Wednesday	4pm – 7pm	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2009	Car	Rear end, straight	Tuesday	10am – 4pm	50	Sexton St N	Minor
2009	Car	Single vehicle only	Monday	11pm – 3am	50	Sexton St N	Minor
2008	Motorcycle	Pedestrian	Wednesday	7am – 10am	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2008	Car	Rear end, straight	Friday	10am – 4pm	50	Sexton St N / O'Callaghan Ave Junction	Minor
2008	Motorcycle	Other	Wednesday	10am – 4pm	50	Sexton St N	Minor
2008	Car	Rear end, straight	Monday	10am – 4pm	50	Sexton St N	Minor
2007	Car	Head-on right turn	Thursday	7pm – 11pm	50	Cratloe Rd / Mayorstone Ave Junction	Minor
2007	Car	Rear end, straight	Thursday	10am – 4pm	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2007	Car	Rear end, right turn	Sunday	10am – 4pm	50	Sexton St N / O'Callaghan Ave Junction	Minor
2006	Car	Rear end, straight	Monday	7pm – 11pm	50	Sexton St N / Stenson Park Junction	Minor
2005	Car	Pedestrian	Friday	10am – 4pm	50	Sexton St N / Shelbourne Rd / Kileely Rd Junction	Minor
2005	Motorcycle	Head-on conflict	Thursday	7pm – 11pm	50	High Rd / Belfield Court	Minor
2005	Bus	Rear end, straight	Sunday	11pm – 3am	50	High Rd / Belfield Court	Minor

3 Main Report

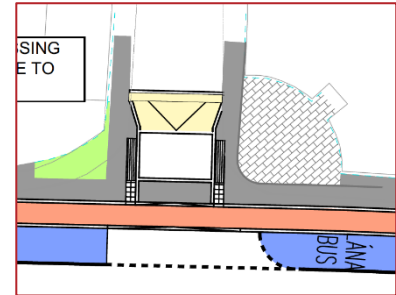
3.1 Problem

Location: General – Raised Table at Side Roads

Summary: Hazard tactile paving has been indicated at the edge of the footpath at raised table junctions which may lead to confusion for visually impaired pedestrians.

A raised table has been indicated at the majority of side road junctions within the proposed Scheme with the footpath indicated continuing across the top of the table and a ramp rising from the side road carriageway to tie into the raised table.

Corduroy hazard tactile paving has been indicated at the edge of the footpath on both sides of the side road adjacent the ramp. The Audit Team are concerned that the use of this type of paving in this location could mislead visually impaired pedestrians, into mistaking the raised table for a series of steps, resulting in unsafe entry to the side road carriageway and an increased risk of being struck by a vehicle.



Recommendation

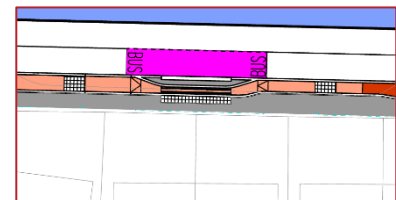
The corduroy hazard tactile paving should be omitted.

3.2 Problem

Location: General – Crossings of cycle track at island bus stops

Summary: The proposed layout at the crossings of the cycle tracks at a number of bus stops within the Scheme may lead to an increased risk in collisions involving cyclists and pedestrians.

Island bus stops have been indicated on Cratloe Road throughout the proposed Scheme. A pedestrian crossing of the cycle track has also been indicated at these locations for pedestrians to travel between the footpath and floating island bus stops. The proposed layout at the bus stops may lead to an increased risk of pedestrian-cyclist collisions, or loss of control collisions for cyclists, due to the following: -



- The width of the island is relatively narrow and it may not accommodate the volume of pedestrians waiting at the bus stop which may lead to waiting pedestrians encroaching into the cycle track, and blocking the path of a cyclist.
- The cycle track through the bus stop is relatively narrow through the crossing and, in some locations, includes sharp changes in direction, and tight radii, within the horizontal alignment upstream and downstream of the crossing.
- The tactile paving suggests that these will be uncontrolled pedestrian crossings. Visually impaired pedestrians would be unable to safely, and independently, navigate these type of crossings and would therefore be unable to travel between the floating island and footpath.
- No tactile paving indicated within the bus stop islands to advise visually impaired passengers who disembark at the stop of the cycle lane/track.

Recommendation

At all island bus stop locations, a continuous footpath connection should be provided between the footpath and the bus stop island. The island should be of adequate width (e.g. the National Cycle Manual recommends a minimum island width of 3m) to accommodate the expected volumes of waiting passengers.

Upstream of the link between the footpath and island, the cycle track should be terminated with cyclists required to give way to pedestrians on the footpath connection, with the cycle track commencing again downstream. Ladder & tramline tactile paving will be required at this crossing point. Alternatively, the National Cycle Manual In-line Bus-stop Option 3 could be used instead.

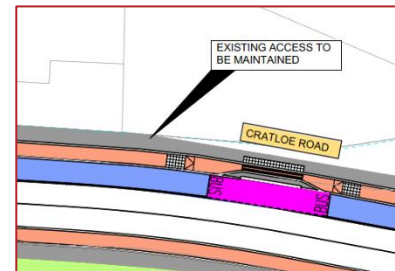
The horizontal alignment of the cycle track should not include any sharp changes in direction or tight radii.

3.3 Problem

Location: General – Vehicular Accesses

Summary: The layout at vehicular accesses within the Scheme, where drivers are required to cross the footpath and cycle track, has not been indicated.

There are a number of existing vehicular accesses on both sides of Cratloe Road, for example at residential properties and at the Thomond Park Stadium, with some residential properties located in close proximity to each other, which would require drivers to cross the footpath and cycle track when entering/exiting these accesses. The proposed layout of these accesses has not been indicated and it is unclear how drivers will cross the raised cycle track, and subsequently the footpath, at these locations which may lead to material damage as vehicles travel over the raised kerbs.



Also, if it is required to lower and raise the footpath/cycle track, at residential properties there is a risk of discomfort for cyclists.

This is a particular concern for drivers of powered two-wheelers who may experience greater difficulty in traversing raised kerbs increasing the risk of loss of control collisions.

Recommendation

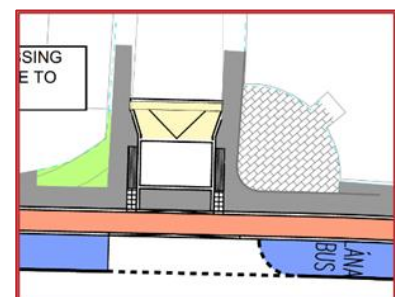
As the design progresses, a layout, which is safe for all road users, should be provided at vehicular accesses which require drivers to cross the footpath and cycle track.

3.4 Problem

Location: General – Uncontrolled crossings at side roads

Summary: The tactile paving at uncontrolled pedestrian crossings at side road junctions is not of the required depth for this type of crossing.

Uncontrolled pedestrian crossings have been indicated across side roads at the majority of priority-controlled side road junctions within the Scheme. The depth of the tactile paving indicated at these crossings is not sufficient for an in-line crossing. This could lead to a visually impaired pedestrian inadvertently stepping over the tactile paving and entering the area shared with motorised vehicles where there is an increased risk of being struck by a vehicle.



Recommendation

Tactile paving at in-line pedestrian crossings should be a minimum of 1.2m (three rows of tactile paving) deep.

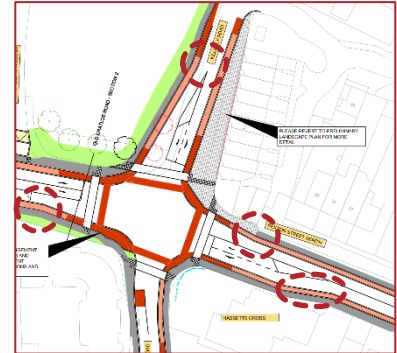
3.5 Problem

Location: General – Throughout the Scheme

Summary: The amended alignment of roads within the proposed Scheme result in a number of sudden changes in the kerb line which may lead to an increased risk of kerb strikes.

The provision of segregated cycle tracks on Cratloe Road and adjoining side roads within the Scheme results in amendments to the existing, and the provision of new, kerb lines.

The amended alignment of the roads within the Scheme, due to the new kerb lines, results in a number of locations where there are sudden, sharp, changes in direction of the kerb, which may lead to an increased risk of kerb strikes and material damage or loss of control type incidents and secondary collisions with other road users or items of roadside furniture.



Recommendation

The new, and revised, kerb line alignment should include smooth transitions at changes of direction in the horizontal alignment such that drivers are gradually guided through any change in direction, thus mitigating the potential for kerb strikes.

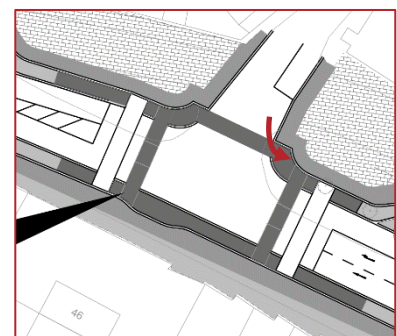
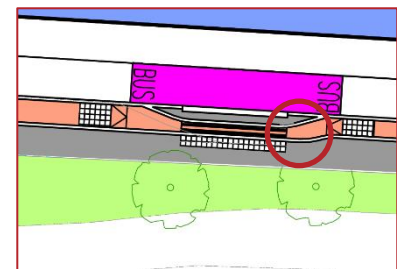
3.6 Problem

Location: General – Cycle track throughout the Scheme

Summary: Sharp changes in the cycle track alignment, combined with tight radius curves, may lead to an increased risk of loss of control type incidents.

There are some locations within the proposed cycle tracks throughout the Scheme that include sudden changes in the horizontal alignment, combined with short radius curves, including locations where cyclists turn left onto the cycle track at signalised junctions from side roads which do not provide segregated facilities, as this manoeuvre is likely to require cyclists to turn through 90°.

The combination of short radius curves and changes in direction could lead to cyclists, who are likely to approach these locations at higher speeds from relatively straight sections upstream, losing control of, and falling from their bicycle, resulting in personal injuries.



Recommendation

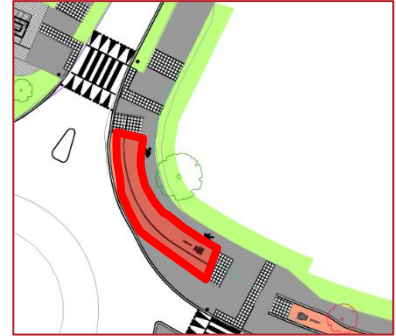
A more forgiving horizontal alignment should be provided within the cycle track with no sharp changes in direction or tight horizontal radii, ensuring cyclists can safely travel through horizontal curves within the cycle track alignment and can safely access/transition to the cycle track/lanes from adjacent side roads.

3.7 Problem

Location: Drawing 19-003-LCCC-CR-S2-0001 (Rev. P0.15)

Summary: Short section of segregated pedestrian and cycle facilities in the north-eastern quadrant of the Moylish Roundabout may increase the risk of a visually impaired pedestrian being struck by a cyclist when transitioning between the different surfaces.

Zebra crossings have been indicated on the northern and eastern arms of the Moylish Roundabout at the western extents of the Scheme. A shared surface is indicated at both crossings with the segregated pedestrian and cycle facilities terminating upstream of, and then recommencing downstream of, the crossing. This however results in a relatively short section of segregated footpath and cycle track in the north-eastern quadrant of the roundabout between the two crossings.



This will require visually impaired pedestrians to transition between shared and segregated facilities four times over a relatively short distance which may lead to confusion for visually impaired pedestrians and an increased risk of collisions with cyclists as they transition between the different surfaces.

Recommendation

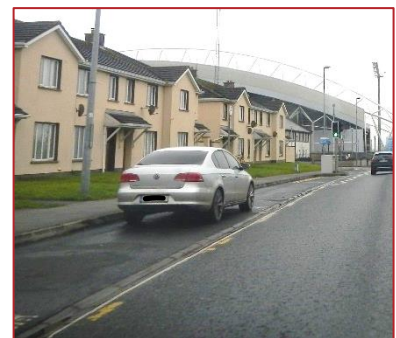
A shared surface should be provided, in lieu of the segregated facilities indicated, between the Zebra crossings on the northern and eastern arms of the Moylish Roundabout commencing upstream of the crossing on the northern arm at the transition with the existing footpath and terminating downstream of the crossing on Cratloe Road at the transition with the proposed segregated footpath and cycle track.

3.8 Problem

Location: Drawing 19-003-LCCC-CR-S2-0001 (Rev. P0.15)

Summary: On-street parking adjacent the residential properties at Mayorstone Court have been removed and it is unclear if alternative facilities will be provided which may lead to residents parking within the footpath or cycle track.

During the Site Visit, the Audit Team noted on-street parking on Cratloe Road in front of the residential properties at Mayorstone Court. This parking is proposed to be removed as part of the Scheme to facilitate the proposed eastbound cycle track. It is unclear if the existing parking is public parking or exclusively for residents of the adjacent properties and, if residential, if alternative parking facilities will be provided for residents. A failure to provide alternative parking facilities for residents, close to their properties, could lead to residents parking within the cycle track or footpath resulting in obstacles for non-motorised road users, particularly the visually impaired and wheelchair users, resulting in the risk of pedestrians/cyclists entering the adjacent cycle track/carrageaway where there is an increased risk of pedestrian-cyclist, or vehicle-cyclist, collisions.



Recommendation

If parking is required for residents at this location, ensure alternative parking facilities are provided nearby.

Parking deterrent measures may also be required within the footpath/cycle track at this location to prevent unauthorised parking.

3.9 Problem

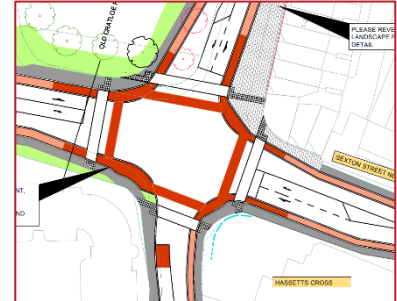
Location: Drawings 19-003-LCCC-CR-S2-0002 (Rev. P0.07) & 19-003-LCCC-CR-S2-0004 (Rev. P0.13)

Summary: The junction corner radii at signalised junctions is relatively large and may encourage high entry and exit speeds.

Amendments to the kerb lines within signalised junctions on Cratloe Road are proposed to facilitate the provision of cycle facilities within the junction. The junction corner radii at the signalised junctions appears to be relatively large and this may encourage high entry/exit speeds resulting in an increased risk of loss of control type incidents.

Recommendation

Tighter junction corner radii should be provided in accordance with the Design Manual for Urban Roads & Streets (DMURS) depending on the volume of large vehicles travelling through the junction.



3.10 Problem

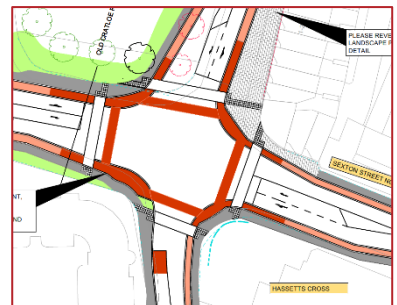
Location: Drawings 19-003-LCCC-CR-S2-0002 (Rev. P0.07) & 19-003-LCCC-CR-S2-0004 (Rev. P0.13)

Summary: The width of the pedestrian crossings at signalised junctions may be too narrow to accommodate the expected volumes of pedestrians.

The widths of the proposed pedestrian crossings at signalised junctions within the Scheme appear to be quite narrow and may not sufficiently accommodate the volume of pedestrians at this location.

Recommendation

The width of the pedestrian crossings at signalised junctions within the Scheme should be increased in accordance with the DMURS which recommends a minimum width of 4m for pedestrian crossings in busy urban areas.

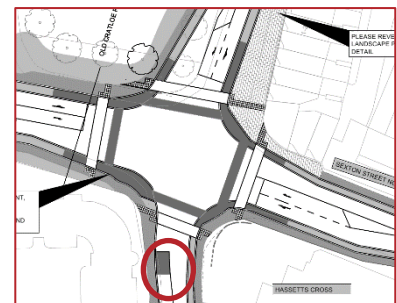


3.11 Problem

Location: Drawings 19-003-LCCC-CR-S2-0002 (Rev. P0.07) & 19-003-LCCC-CR-S2-0004 (Rev. P0.13)

Summary: It is unclear if cyclists will be permitted to proceed with motorised vehicles when exiting side roads at signalised junctions that do not contain segregated facilities and, if not, this may put stationary cyclists in the carriageway at risk of being struck by a vehicle.

Segregated cycle facilities have been indicated on the majority of arms at signalised junctions within the Scheme with the exception of Shelbourne Road and Cross Road where an advance stop line and no facilities have been indicated respectively. Protected cycle lanes, via the provision of kerbs within the corner radii, are proposed at the signalised junctions.



At this early stage in the design, information regarding the proposed signal phasing at the junctions has not been provided and it is therefore unclear if cyclists will receive separate cyclist phases within the signal cycle. If separate phases are to be provided for cyclists, it is unclear if cyclists on Shelbourne Road and Cross Road will be permitted to proceed with vehicular traffic should their corresponding cycle signal head be red during vehicular phases on these arms. If not, stationary cyclists in the advance stop line, or within the carriageway on Cross Road, will be at risk of being struck by a vehicle.

Similarly, should cyclists be permitted to proceed, but their dedicated signal head not given a green signal, they may be insufficiently aware that the vehicular signal head is also intended for them resulting in them failing to proceed and being at an increased risk of being struck by a vehicle.

Recommendation

During the design of the traffic signal phases ensure cyclists are included within the proposed signal cycle and that they can traverse the junction safely from all arms, particularly those which do not include segregated cycle facilities.

3.12 Problem

Location: Drawing 19-003-LCCC-CR-S2-0002 (Rev. P0.07)

Summary: The straight-ahead eastbound traffic lane on Cratloe Road becomes the right-turn only lane immediately upstream of the junction with Shelbourne Road & Kileely Road and drivers may be insufficiently aware of need to change lane to continue eastbound.

The eastbound traffic lane on Cratloe Road develops into the right-turn lane at its junction with Shelbourne Road & Kileely Road with the bus lane terminating upstream of the junction to allow straight-ahead and left-turn movements from the nearside lane. Drivers in the eastbound lane, wishing to continue straight through the junction, may be insufficiently aware of the need to change lane on approach to the junction leading to sudden lane changing manoeuvres upstream of the junction resulting in side swipe collisions.



Recommendation

The Audit Team acknowledge that further design is required regarding turning lanes at signalised junctions following traffic modelling however, should the lane configuration indicated be retained, drivers should be clearly advised of the correct lane to enter for their intended destination in good advance of the junction such that they have time to take in the information and undertake safe lane changing manoeuvres upstream of the stop line.

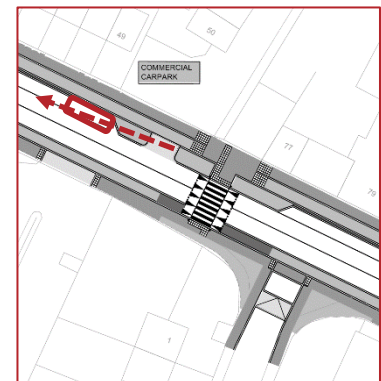
3.13 Problem

Location: Drawing 19-003-LCCC-CR-S2-0003 (Rev. P0.13)

Summary: Visibility to the west for drivers exiting the Commercial Carpark may be restricted by vehicles parked in the on-street parking spaces adjacent the access.

On-street parking has been indicated at some locations on Cratloe Road, including to the west of the access/egress at the Commercial Carpark opposite the Thomondgate Service Station.

Should the on-street parking spaces at this location be occupied there is a risk that a parked vehicle may be located within the visibility splay of a driver exiting the Commercial Carpark. This could lead to an exiting driver's visibility to the west being restricted leading to them exiting onto Cratloe Road when it is unsafe to do so resulting in side-on collisions.



Recommendation

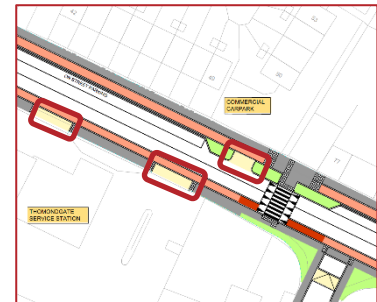
Ensure parked vehicles at this location do not restrict a driver's visibility to the west when exiting the Commercial Carpark. If the parking is determined to be within an exiting driver's visibility splay the section of parking within the visibility splay should be omitted.

3.14 Problem

Location: Drawing 19-003-LCCC-CR-S2-0003 (Rev. P0.13)

Summary: Raised tables have been indicated at the accesses to the Commercial Carpark and Thomondgate Service Station however no ramp has been indicated on the drawing at these locations and it is therefore unclear how the carriageway will transition to the raised table and if all vehicles will be able to safely traverse the level difference.

Raised tables have been indicated at the accesses to the Commercial Carpark and the Thomondgate Service Station on the northern and southern sides of Cratloe Road respectively to the west of the side road junction with Stenson Park. Ramps have not been indicated at any of these accesses and it is therefore unclear how the carriageway on Cratloe Road, and the internal carriageway within the carpark and service station will tie-into the proposed ramps. If the transition between the ramps and carriageway on either side of the ramps is too sudden there is a risk of drivers having to traverse a steep gradient/level difference which may lead to difficulties particularly for drivers of powered two wheelers.



Additionally, the footpath across all accesses is indicated as discontinuous with priority afforded to vehicles entering/exiting the accesses which is inconsistent with the layout at other side road junctions within the Scheme.

Recommendation

Ensure the gradient, or level difference, between the ramp and carriageway at the accesses can be traversed without difficulty by all road users.

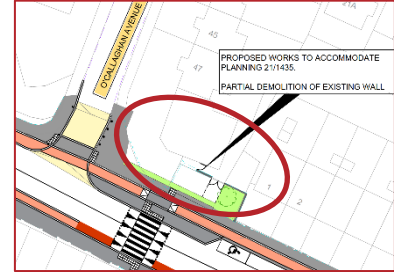
Also, the footpath across the accesses should be continuous with drivers required to give way to pedestrians and cyclists on the footpath and cycle track.

3.15 Problem

Location: Drawing 19-003-LCCC-CR-S2-0003 (Rev. P0.13)

Summary: It is unclear if there will be sufficient space within the site of the existing shop to accommodate the swept path of a delivery vehicle when entering, turning within, and exiting the site.

The existing loading bay on the northern side of Sexton Street North, which is associated with an existing shop premises on the corner of the junction with O'Callaghan Avenue, has been indicated as being removed as part of the proposed Scheme. The Audit Team have been advised that alternative arrangements have been agreed with the shop owner regarding deliveries to the shop, which is proposed to be extended as part of a current planning application. The arrangement will involve delivery vehicles now entering the shop site from the existing vehicular access on O'Callaghan Avenue and unloading items within the extended section of the site, proposed as part of the planning application.



Information regarding the swept path of vehicles using the access (delivery vehicles, refuse vehicles etc.), turning within the site and exiting the access has not been provided, and it is unclear if these vehicles will have sufficient space within the site to turn around, possibly leading to lengthy reversing manoeuvres which can present a hazard to other road users.

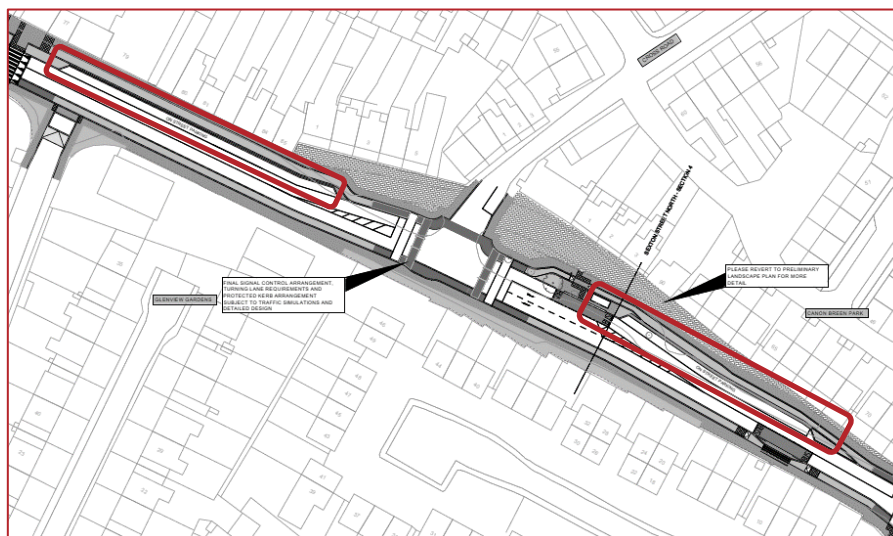
Recommendation

The proposed delivery arrangements at the shop, including turning manoeuvres, should be accommodated safely within the proposed new delivery layout.

3.16 Problem

Location: Drawing 19-003-LCCC-CR-S2-0004 (Rev. P0.13)

Summary: It is unclear if there will be a sufficient buffer between the on-street parking on the northern side of Cratloe Road and the adjacent eastbound cycle track.



On-street parking has been indicated at some locations on both sides of Cratloe Road within the proposed Scheme. While a kerbed buffer zone has been indicated at some locations between the on-street parking and the adjacent cycle track it is unclear from the drawing provided if a buffer zone is proposed between the parking and cycle track on the northern side of Cratloe Road to the east and west of its junction with Cross Road. If a sufficient buffer zone is not provided between the parking and adjacent cycle track there is a risk of a vehicle door being opened into the path of a cyclist resulting in collisions.

Recommendation

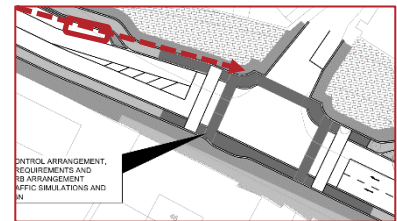
Ensure a sufficient buffer zone is provided between on-street parking and the adjacent cycle track at all locations where on-street parking is proposed within the Scheme.

3.17 Problem

Location: Drawing 19-003-LCCC-CR-S2-0004 (Rev. P0.13)

Summary: The combination of the horizontal alignment and on-street parking on Cratloe Road on the eastbound approach to its junction with Cross Road may lead to restricted visibility for a driver towards the traffic signal head(s) at the junction.

There is a change in direction in the horizontal alignment on Cratloe Road upstream of its junction with Cross Road. On-street parking has also been indicated on the northern side of Cratloe Road at this location. Although the location of traffic signal heads at signalised crossings has not been indicated at this early stage in the design, there is a risk that an eastbound driver's forward visibility to the expected location of the primary traffic signal head may be restricted by a combination of the horizontal alignment and the potential for a high-sided vehicle to be parked in the parking space. This could lead to drivers being insufficiently aware of a red signal on approach to the signalised junction resulting in them failing to stop at the stop line and overshooting into the junction where there is a risk of side-on collisions.



Recommendation

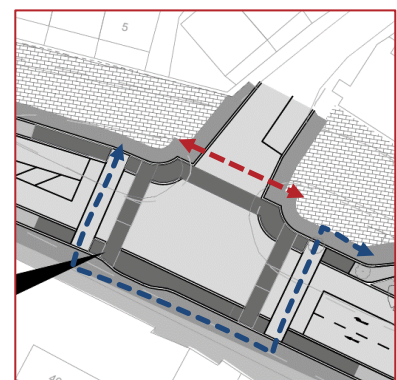
Ensure an eastbound driver's forward visibility to the signal heads at the Cratloe Road/Cross Road signalised junction is not restricted. A section of the on-street parking provision upstream of the junction should be omitted if it is found that a parked vehicle may potentially block a driver's forward visibility or cantilever signal supports may be required.

3.18 Problem

Location: Drawing 19-003-LCCC-CR-S2-0004 (Rev. P0.13)

Summary: A pedestrian crossing has not been indicated across Cross Road at its signalised junction with Cratloe Road.

A pedestrian crossing has not been indicated across Cross Road at the signalised junction with Cratloe Road. It is unlikely that pedestrians on the northern side of Cratloe Road will take the lengthy route via the crossings indicated to continue east on Cratloe Road and instead take the shortest route across Cross Road. This could lead to pedestrians crossing the carriageway during red pedestrian phases at the junction when drivers may be less attentive to them resulting in an increased risk of vehicle-pedestrian collisions.



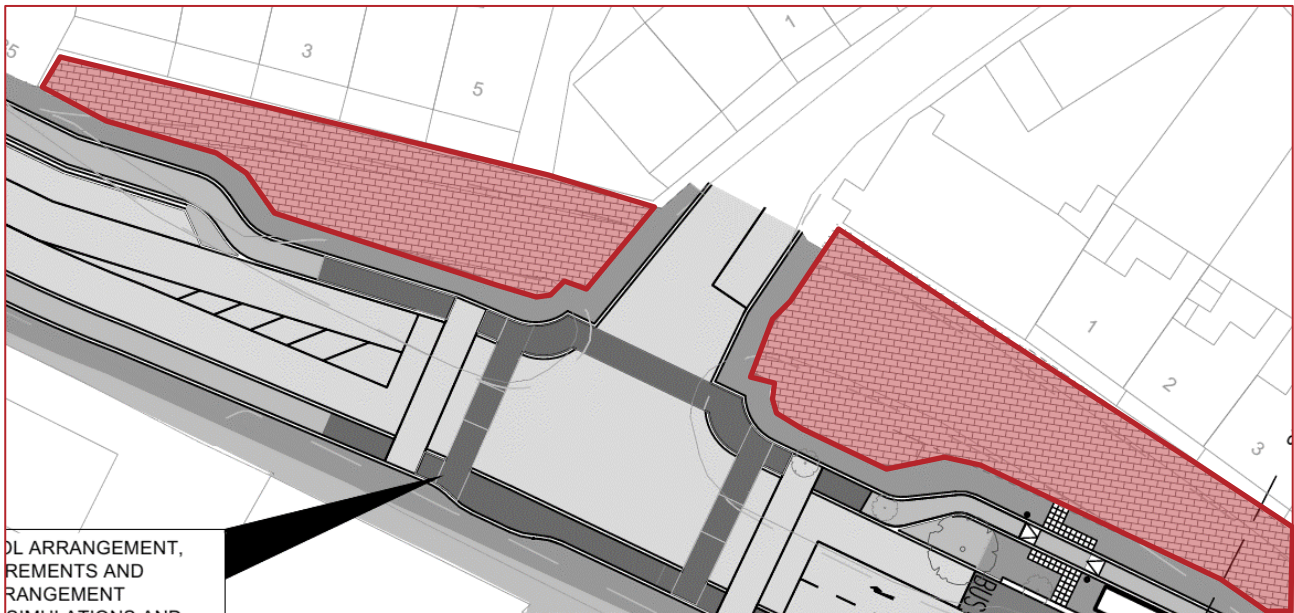
Recommendation

A pedestrian crossing should be provided across Cross Road and incorporated into the signal cycle at the junction.

3.19 Problem

Location: Drawing 19-003-LCCC-CR-S2-0004 (Rev. P0.13)

Summary: There is a risk of collisions between vehicles and visually impaired pedestrians within the paved areas in front of the residential properties on both sides of Cross Road at its signalised junction with Cratloe Road.



The existing side roads at Hibernian Villas and An Bóthar Ard, on either side of Cross Road adjacent its junction with Cratloe Road, are proposed to be closed up and paved with a material different to that of the adjacent footpath. These existing roads currently permit access for vehicles to park at the residential properties at these locations. It is unclear if vehicular access will be maintained from Cross Road to these locations to continue to permit residents to park their vehicles here. It is also unclear if these areas will be at the same level as the adjacent footpaths or if a means of segregation/delineation is proposed. If vehicular access is to be maintained to these areas, and sufficient delineation not provided between the footpath and adjacent shared surfaces, there is a risk of visually impaired pedestrians inadvertently entering the shared surfaces where there is an increased risk of being struck by a vehicle.

Recommendation

If vehicular access is to be maintained from Cross Road at these locations a dropped kerb with a minimum upstand of 25mm should be provided at the edge of the footpaths on Cross Road. Additionally, sufficient measures (i.e. level difference) should also be provided between the footpath and adjacent surfaces on Hibernian Villas and An Bóthar Ard such that visually impaired pedestrians are advised of the different surfaces and potential for motorised vehicles to occupy these areas.

3.20 Problem

Location: Drawing 19-003-LCCC-CR-S2-0005 (Rev. P0.06)

Summary: The islands/kerbs within the carriageway at the give-way layout on Bellefield Gardens may not be sufficiently visible to drivers, particularly during the hours of darkness.

A give-way arrangement has been indicated on Bellefield Gardens which includes narrow islands/kerbs within the carriageway to segregate cyclists and motorised vehicles as they proceed through the reduced cross-section at the chicane.

These kerbs are indicated as having an upstand of 125mm. Drivers approaching the chicane may be insufficiently aware of the kerbs, particularly during the hours of darkness, leading to an increased risk of wheels striking kerbs, or to vehicles with low bodies colliding with the kerbs, resulting in material damage.



Recommendation

Measures should be provided to increase a driver's awareness of the kerbs at the proposed chicane on Bellefield Gardens.

3.21 Problem

Location: Drawing 19-003-LCCC-CR-S2-0005 (Rev. P0.06)

Summary: Pedestrian crossings of side roads on Bellefield Road & Bellefield Gardens have not been indicated.

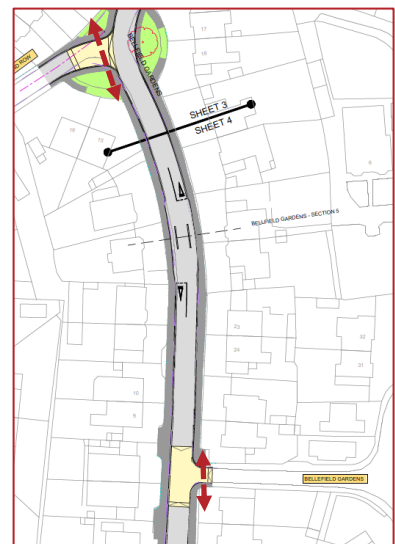
Pedestrian crossings have not been indicated at the side roads on Bellefield Road and Bellefield Gardens. This could lead to pedestrians crossing side road carriageways at locations where drivers may be less attentive to them increasing the risk of vehicle-pedestrian collisions.

Additionally, a failure to provide crossing points with dropped kerbs may lead to difficulties for mobility impaired pedestrians, particularly wheelchair users, when crossing the carriageway resulting in a risk of trips and falls should they have to descend/ascend full height kerbs.

Recommendation

Pedestrian crossings, including dropped kerbs and associated tactile paving, should be provided at the side roads on Bellefield Road and Bellefield Gardens.

Alternatively, the footpaths should be continuous across the side roads at these locations with 'vehicle crossover' arrangements.

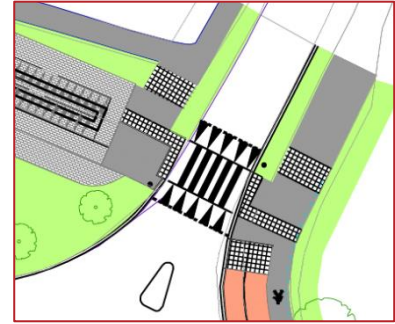


4 Observations

- 4.1 The stem of the tactile paving at controlled crossings throughout the Scheme is not on the correct side of the crossing in all instances.

The tactile paving stem is indicated on the left-hand side of the crossings in some locations. This may lead to visually impaired pedestrians being insufficiently aware of the direction of travel of approaching vehicles or not being guided to the correct location when using the crossing.

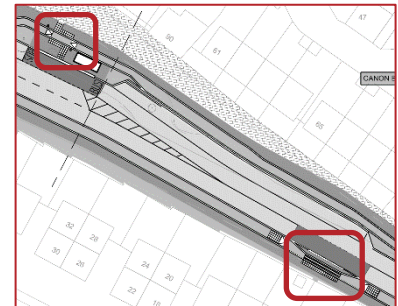
The stem of the tactile paving should be on the right-hand side of controlled crossings throughout the Scheme.



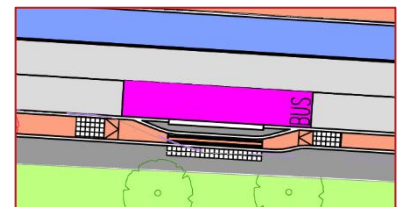
- 4.2 Zebra crossing road markings have not been indicated at crossings of the cycle track where the tactile paving for a controlled crossing has been indicated yet have been indicated at crossings where tactile paving for an uncontrolled crossing is indicated.

This could lead to confusion for visually impaired pedestrians regarding what type of crossing is provided resulting in them being unable to safely and independently navigate the road layout.

Tactile paving at controlled crossings (i.e. Zebra, Pelican, Puffin, Toucan etc.) should be 'L-shaped' and red in colour with the stem located on the right-hand side while tactile paving at uncontrolled pedestrian crossings should be buff in colour and of a sufficient depth for the type of crossing provided (i.e. in-line or inset).



- 4.3 Tactile paving has been indicated within the cycle track upstream, and downstream, of crossings at bus stops throughout the Scheme. The Audit Team are unsure why this is necessary at these locations due to physical delineation between the footpath and cycle track and also given that the segregated cycle track continues past locations.



However, should the level difference between the footpath and cycle track fall below 25mm as the cycle track rises to meet the footpath, tramline tactile paving would be required within the cycle track to advise visually impaired pedestrians of the different facilities however it should be provided at the top of the ramp rather than the bottom.

- 4.4 During the Site Visit, the Audit Team noted that the existing footpaths on Bellefield Road and Bellefield Gardens at some locations were in poor condition.

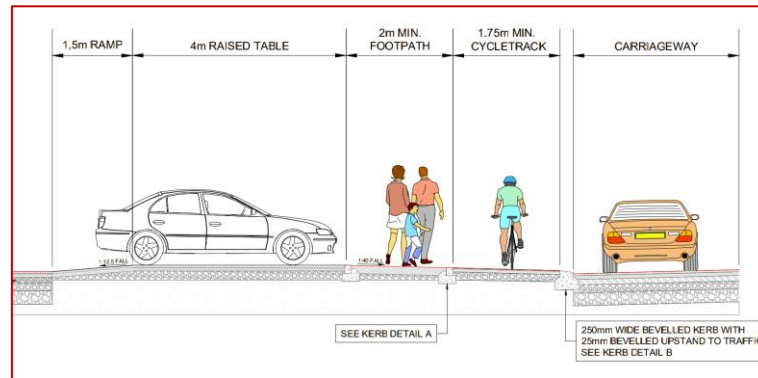
It is assumed that the Scheme will include renewal of the existing footpaths at these locations. A failure to upgrade the footpath at these locations may increase the risk of trips and falls.



4.5 The cross-section of the proposed raised-table arrangement at side roads within the Scheme shows the footpath and cycle track on the same level as the proposed raised-tables.

However, the plan drawings do not indicate any change in level within the cycle tracks on the approach to the raised-table.

While the proposed arrangement is unlikely to give rise to a safety issue, it may be preferable to maintain a level difference between the pedestrian and cyclist areas of the raised-table in order to deter inadvertent straying into the adjacent area by pedestrians and/or cyclists, and to improve a side-road driver's awareness of the crossing.



To this end, a level difference of 25mm minimum could be provided between the footpath and the cycle track and between the footpath and side road carriageway to improve the definition and conspicuity of the footpath across the side road.

5 Road Safety Audit Team Statement

We certify that we have examined the drawings referred to in this report. The examination 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.

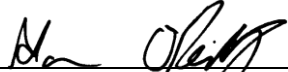
The problems identified have been noted in this report together with associated safety improvement suggestions, which we would recommend should be studied for implementation.

No one on the Road Safety Audit Team has been involved with the design of the scheme.

ROAD SAFETY AUDIT TEAM LEADER

Alan O'Reilly

Signed:



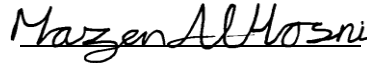
Dated:

29th July 2022

ROAD SAFETY AUDIT TEAM MEMBER

Mazen Al Hosni

Signed:



Dated:

29th July 2022

Appendix A – Road Safety Audit Brief Checklist

Have the following been included in the audit brief?: (if 'No', reasons should be given below)

	Yes	No
1. The Design Brief	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Departures from Standard	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Scheme Drawings	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Scheme Details such as signs schedules, traffic signal staging	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Collision data for existing roads affected by scheme	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Traffic surveys	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Previous Road Safety Audit Reports and Designer's Responses/Feedback Form	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Previous Exception Reports	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Start date for construction and expected opening date	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Any elements to be excluded from audit	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Any other information?

(if 'Yes', describe below)

<input type="checkbox"/>	<input checked="" type="checkbox"/>
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Appendix B – Documents Submitted to the Road Safety Audit Team

DOCUMENT/DRAWING TITLE	DOCUMENT/DRAWING NO.	REVISION
Proposed Layout – Sheet 1	19-003-LCCC-CR-S2-0001	P0.15
Proposed Layout – Sheet 2	19-003-LCCC-CR-S2-0002	P0.07
Proposed Layout – Sheet 3	19-003-LCCC-CR-S2-0003	P0.13
Proposed Layout – Sheet 4	19-003-LCCC-CR-S2-0004	P0.13
Proposed Layout – Sheet 5	19-003-LCCC-CR-S2-0005	P0.06
Side Road Junction_Cross Section Detail		A1

Appendix C – Feedback Form

Road Safety Audit Feedback Form

Scheme: TUS Moylish to City Active Travel Scheme

Route No.: Cratloe Road, Bellefield Road & Bellefield Gardens

Audit Stage: Stage 1 Road Safety Audit **Date Audit Completed:** 12th May 2022

Paragraph No. in Safety Audit Report	To be Completed by Designer			To be Completed by Audit Team Leader
	Problem Accepted (Yes/No)	Recommended Measure(s) Accepted (Yes/No)	Describe Alternative Measure(s). Give reasons for not accepting recommended measure	Alternative Measures or Reasons Accepted by Auditors (Yes/No)
3.1	Yes	Yes		
3.2	Yes	No	Further discussion ongoing with the NTA on the crossing detail of the cycle track to be provided at island bus stops. The layout at these bus stops will be developed further during the detail design stage following these discussions.	Yes
3.3	Yes	Yes		
3.4	Yes	Yes		
3.5	Yes	Yes		
3.6	Yes	Yes		
3.7	Yes	Yes		
3.8	No	No	Parking is not exclusively for residents at this location. Parking is available to the rear of the properties via the vehicular entrances off the laneway running along the northern boundary	Yes
3.9	Yes	Yes		
3.10	Yes	Yes		
3.11	Yes	Yes		
3.12	Yes	Yes		

Road Safety Audit Feedback Form

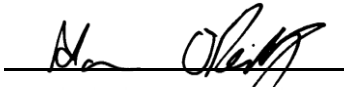
Scheme: TUS Moylish to City Active Travel Scheme

Route No.: Cratloe Road, Bellefield Road & Bellefield Gardens

Audit Stage: Stage 1 Road Safety Audit Date Audit Completed: 12th May 2022

Paragraph No. in Safety Audit Report	To be Completed by Designer			To be Completed by Audit Team Leader
	Problem Accepted (Yes/No)	Recommended Measure(s) Accepted (Yes/No)	Describe Alternative Measure(s). Give reasons for not accepting recommended measure	Alternative Measures or Reasons Accepted by Auditors (Yes/No)
3.13	Yes	Yes		
3.14	Yes	Yes		
3.15	Yes	Yes		
3.16	Yes	Yes		
3.17	Yes	Yes		
3.18	Yes	Yes		
3.19	Yes	Yes		
3.20	Yes	Yes		
3.21	Yes	Yes		

Signed  Designer Date 29/07/2022

Signed:  Audit Team Leader Date 29th July 2022

Signed:  Employer Date 2nd August 2022

Appendix D – Problem Locations

General Problem 3.1 General Problem 3.2 General Problem 3.3 General Problem 3.4 General Problem 3.5 General Problem 3.6

