

# Old Bawn to Ballyboden Active Travel Scheme

## Informal Public Consultation Technical Note

FINAL | April 2023









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# 1. Introduction

The Old Bawn to Active Travel Scheme (hereafter referred to as the active travel scheme) is a project to be delivered by South Dublin County Council (SDCC), funded by the National Transport Authority (NTA). Arup was appointed as a multi-disciplinary technical consultant to progress the design of the active travel scheme. This report was prepared by Arup and forms part of the informal public consultation which runs during April and May 2023. Additional information on the active travel scheme is available on the SDCC consultation portal: [website](#). This report should be read in conjunction with the general arrangement Drawings along with any other material available of the consultation portal.

The purpose of this report is to provide an overview of the active travel scheme and outline the objectives, core design features and work done to date.

## 1.1 Background

The active travel scheme will be delivered in two phases. This report is concerned with Phase 1 which comprises sections of Old Bawn Road, Firhouse Road, Ballycullen Road, Castlefield Avenue and Knocklyon Road along with several secondary links connecting the main corridor to schools, community centres, employment hubs, and residential areas. The location and extent of the project is outlined in section 1.2 of this report.

## 1.2 Location

Phase 1 of the active travel scheme is outlined in red below, while the green represents sections that will be delivered under Phase 2 of the project.



Figure 1: Extents and phasing of the active travel scheme.

## 1.3 Need for scheme

The study area is currently served by generally low-quality walking and cycling infrastructure. Signalised junctions do not have segregation for cyclists from motor vehicles and side roads comprise of large corner radii with no speed mitigation measures or pedestrian or cyclist priority. There are currently no cycling facilities along Old Bawn Road and Knocklyon Road. Firhouse Road and Ballycullen Road have some cycling facilities, however, they are not continuous, with particular deficiencies at junctions and pinch points, creating an environment where cyclists must share space with pedestrians at bus stops or cede priority to motorists at junctions.

There are nine educational facilities along, or within proximity of, the route of the active travel scheme, along with several leisure centres and retail areas. The proposed active travel scheme will provide continuous segregated walking and cycling infrastructure suitable for all ages and abilities along the full extent of the scheme. At uncontrolled junctions, pedestrian and cyclist priority will be provided; at signalised junctions kerb protected cycle segregation will be added along with improved pedestrian and cyclist crossings on each arm. The active travel scheme will also connect with other existing and planned walking and cycle routes, creating a “network effect”, with the intention of promoting modal shift to healthier and more sustainable methods of transport in the area.

## 1.4 Objectives of the scheme

The purpose of the proposed scheme, as set out by SDCC, is to link residential communities in Tallaght, Old Bawn, Ballycullen, Firhouse, Knocklyon and Ballyboden to trip generators such as schools and educational centres, recreation zones, employment and business hubs, and “third spaces”. There will also be links to the wider active travel network in the county by enhancing walking and cycling facilities. Upgrades will be made to existing junctions along the main route and secondary links, providing segregated cycling facilities through the junctions in addition to enhanced pedestrian crossings. When the project is delivered, it will enhance the streetscape of the area, provide continuous walking and cycling infrastructure, and improve safety for all road users. The provision of safe, continuous, legible, active travel infrastructure will be a catalyst for an increased number of journeys being made by walking, cycling, and public transport by:

- Encouraging modal shift to walking and cycling as a safe and convenient means of making local trips (work, school, college, recreation trips etc.) and to create a network of high-quality walking and cycling facilities.
- Developing secondary links in the vicinity of the main scheme that will look to increase the usability of the main route through increasing access and destination options.
- Improving the landscape along the route to improve biodiversity and create a more pleasant environment to walk and cycle.
- Installing safe school treatments outside schools which will create safe and welcoming environments that will encourage walking and cycling to school and promote positive social interaction at the school gate
- Ensuring the delivery of high-quality linkages between residential areas and key trip attractors (e.g. schools, colleges, sports clubs, shopping centres) as well as other planned and existing cycle and walking routes.
- Reprioritising crossings of sides roads, by tightening corner radii and providing raised entry treatments that allow for pedestrian and cycle priority through the junctions and encourage slower vehicle speeds.

- Developing signalised junctions that cater for all pedestrian and cyclist movements, providing segregated and kerb protected cycle facilities along with single-movement pedestrian crossings on each junction arm.
- Upgrading bus stops to remove conflict between pedestrian and cyclists and between cyclists and stopping buses by deflecting cyclists around the bus stop and by providing permeability between bus stops and destinations
- Significantly improving safety for pedestrians and cyclists in accordance with the National Cycle Manual (NCM) and the Design Manual for Urban Roads and Streets (DMURS).

## 2. Scheme overview

The Old Bawn to Ballyboden Active Travel Scheme is an active travel improvement project that aims to provide high-quality walking and cycling facilities in the Tallaght, Firhouse and Knocklyon area. Phase 1 includes about 5.3 km of upgrades along the main route and improvements across an additional 2 km of secondary links. The scheme commences on Old Bawn Road, south of the junction with the N81, running to north of the junction with Firhouse Road West. Phase 1 of the active travel scheme continues along Firhouse Road from east of the Killinniny Road junction to east of the Knocklyon Road junction, with a upgrade on Ballycullen Road and Castlefield Avenue linking Firhouse Road and Knocklyon Road via the existing M50 pedestrian and cyclist bridge. On Knocklyon Road, the Phase 1 of the active travel scheme runs from the Firhouse Road junction to the western entrance to Dargle Wood Park.

The scheme will utilize existing infrastructure where possible, particularly along Firhouse Road where the walking and cycling infrastructure is generally of good quality. New walking and cycling infrastructure will be provided where there are no existing provisions or where they are deemed unsafe or of poor quality e.g. at junctions and bus stops. The scheme adopts the principles outlined in DMURS to encourage more sustainable travel patterns and safer streets, following a hierarchy (see Figure 2) that prioritises pedestrians, followed by cyclists, public transport, and lastly, private motor vehicles. While the scheme adopts the hierarchy, it also recognises that private car trips will remain an essential part of daily life, and therefore, the impacts on private car journeys will be minimised as far as practicable.

While the provision of high-quality infrastructure will require significant construction of new elements of the streetscape, where existing infrastructure meets the design standards of the proposed scheme and meets quality and longevity requirements, these elements will be retained.

The sections below provide a high-level description of the changes and improvements to infrastructure along each road segment. Additional detail can be found in the general arrangement drawings.

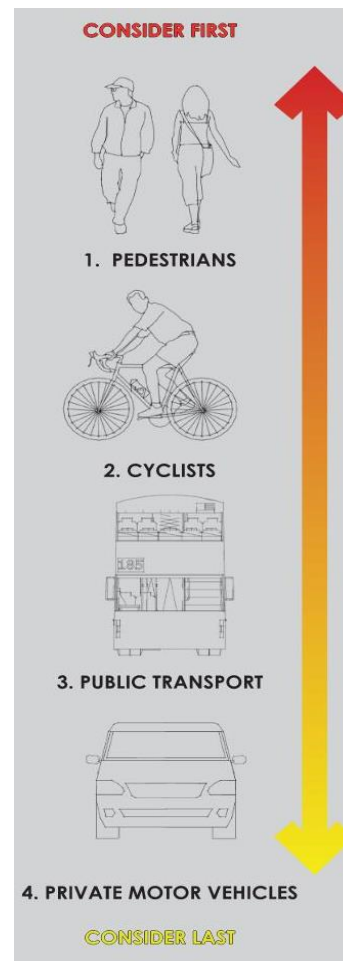


Figure 2: User Hierarchy (DMURS, section 2.2.2)

## Old Bawn Road



For the most part, there are footpaths on both sides of Old Bawn Road. However, there are minimal existing cycling facilities, no walking or cycling priority, pedestrians must cross side roads with long crossing distances at road level, side road entries consist of large corner radii encouraging high vehicle speeds, and there is limited use of tactile paving to guide visually impaired persons through junctions.

Under the active travel scheme, the pedestrian experience will be improved through the provision of continuous high-quality footpaths with removal of dished entrances to side roads and private accesses. The design will infer pedestrian priority in line with the hierarchy shown in Figure 2. Tactile treatments will be improved and installed in line with best practice.

Along the entire length of Old Bawn Road covered by Phase 1, cycle tracks, generally 2.0 m wide, with localised narrowing to 1.5 m where necessary, will be provided. The cycle tracks will be vertically separated from the road and footpaths.

The improvements will begin at the entrance to St. Maelruain's Park/Watergate, where a new shared path will provide access to Sean Walsh Memorial Park from Old Bawn Road. On the western side of Old Bawn Road, a short section of two-way cycle track will connect the shared path to an upgraded toucan crossing.

To facilitate this two-way cycle track, existing bus stop 2616 will be relocated approximately 70 m to the south. The existing stepped connection to St. Maelruain's Park will be upgraded to an accessible access point improving connectivity to the stop and new shelter.

Along the entire length of Old Bawn Road covered by Phase 1 of the active travel scheme, kerb protected cycle tracks, separated from the road and footpath, will be provided on both sides of the road. The cycle tracks will be, generally, 2.0 m wide with localised narrowing to 1.5 m where necessary.

A link to St. Dominic's National School will be added along Mountain Park. Improvements along this section will include upgrades to existing footpaths, provision of raised entry treatments and tightening of corner radii of side roads and provision of a safe school treatment (See section 3.1).

In addition, links to Scoil Maelruain Senior and Junior National Schools will be included in the works. Improvements to safety and active travel comfort will be made on Old Bawn Way, Old Bawn Park, and Old Bawn Avenue, as well as on Parkwood Road, Parkwood Avenue, and Parkwood Grove. These improvements include raised entry treatments along with tightening of corner radii, raised junctions and provision of safe school treatments outside Scoil Maelruain Senior and Junior National Schools. A school street with time-plated access restrictions is proposed for the cul-de-sac section of Old Bawn Way. It is also proposed to calm and improve the streetscape on Parkwood Grove near the eastern pedestrian entrance to the schools.

The Old Bawn Road junction with Seskin View Road will be upgraded to include improved pedestrian facilities including a single-phase crossing of each arm, tighter corner radii, signal-controlled movements for cyclists, along with physical kerb buildouts to protect cyclists through the junction. See section 3.4.3 for additional detail on the proposals at this junction.

Along the entire length of Old Bawn Road covered by Phase 1 of the active travel scheme, junction corner radii will be tightened and raised entry treatments will be provided to reprioritize the junctions in favour of active travel (see section 3.4.2). This arrangement provides pedestrians and cyclists with priority through the junction while vastly improving safety for all road users. At locations where there is sufficient space, the cycle track is offset from the edge of carriageway to provide improved visibility between cyclists crossing the junction and turning traffic.

Bus stops along the length of Old Bawn Road will be upgraded. These upgrades will lead to all stops becoming inline stops with either shared landing arrangements or island bus stop designs (see section 3.5). To improve bus service reliability and headway, two northbound bus stops will be removed: stops 2534 and 2536. The spacing between the northbound stops will more closely align with best practice from a bus movement and customer catchment point of view.

Where there are currently shelters at existing bus stops, the shelters will be retained and upgraded. Relocated stop 2616 will retain a shelter which will be upgraded. To offset the loss of the shelter from stop 2534 which is to be removed, stop 2533 will be upgraded and will include a new bus shelter.

Phase 1 of the active travel scheme on Old Bawn Road will terminate just north of the junction with Firhouse Road West where the scheme will tie into the existing infrastructure at that location. South of the tie-in point, upgrade works will be continued under Phase 2.



Figure 3: Existing and proposed infrastructure at Old Bawn Road

## Firhouse Road



Upgrades on Firhouse Road will run from east of the Killininy Road junction to east of the Knocklyon Road junction. The “missing link” between the western end of the Firhouse Road section and the southern end of the Old Bawn section will be upgraded under Phase 2 of the Old Bawn to Ballyboden Active Travel Scheme.

The walking and cycling infrastructure along Firhouse Road between the Western end of Phase 1 and the Ballycullen Road junction is generally of good quality and will be retained for the most part. The most common cycling provision along Firhouse Road consists of 1.5 m cycle tracks adjacent to, and level with, the footpaths. While long stretches along Firhouse Road are of acceptable quality, there are issues relating to safety and priority at side roads, signalised junctions, and bus stops. At these locations, the separation between cyclists and pedestrians is often terminated, the active travel route is often away from the desire line, or those walking, and cycling must give way to private cars. These “weak points”, create conflict, dangerous situations, and an unattractive active travel environment as pedestrians and cyclists are forced to share space and yield to private cars.

There are three signalised junctions along this section of Firhouse Road west of the M50: Ballycullen Drive, Ballycullen Avenue, and Ballycullen Road. Upgrades of these junctions will consist of improved pedestrian facilities including single-phase crossings of each arm, tighter corner radii, signal-controlled movements for cyclists, along with physical kerb buildouts to protect pedestrians and cyclists through the junctions. See section 3.4.3 for additional detail on the junction upgrade proposals.

Firhouse Road junctions with Ballycullen Drive and Ballycullen Avenue are designed to connect into the D24 Neighbourhood Cycle Network Scheme (link to scheme overview: [YouTube](#))

Along the length of Firhouse Road covered by Phase 1 of the active travel scheme, side road junction corner radii will be tightened and raised entry treatment provided (See section 3.4.2). This arrangement provides pedestrians and cyclists with priority through the junction while vastly improving safety for all road users. At locations where there is sufficient space, the footpath and cycle track will be offset from the edge of carriageway to provide improved visibility between cyclists crossing the junction and turning traffic.

Safe school treatment will be provided outside Scoil Carmel J.N.S and Firhouse Community College (See section 3.1). Safe school treatment upgrades will include installing pencil bollards, coloured street art, high friction

surfacing, road markings, and street signs. These measures aim to not only enhance the safety and comfort of cyclists, but also to highlight to drivers that they are entering a school zone and should exercise extra caution. The combination of visual cues and physical changes to the road design will help create a safer and more welcoming environment for pedestrians and cyclists in the area.

At Scoil Carmel, to facilitate the continuation of a segregated cycle track, improvements will require the removal of seven set-down parking spaces from the northern side of the road. Twenty-eight set down spaces will be retained. Additionally, “park and stride” drop off to school will be facilitated by providing improved links between the Dodder Valley Car Park and the school. These improvements will consist of a potential new pedestrian entrance from Firhouse Road at the eastern end of the car park, and an upgraded path from the Dodder Greenway to the existing pedestrian entrance to the northern side of the school (by agreement with Scoil Carmel).

Upgrades at bus stops will include converting existing layby style bus stops to inline bus stops with either shared landing or bus stop island (See section 3.5). Bus stop shelters have been retained in the proposed design anywhere there is an existing bus stop shelter. All bus stop locations will be retained in their current location.



Figure 4: Existing and proposed infrastructure at Firhouse Road

## Firhouse Road – M50 Bridge



This section focuses on Firhouse Road between Ballycullen Road to east of Knocklyon Road, including the existing M50 bridge. There are existing footpaths on both sides of the road. The existing cycling infrastructure includes an east-bound cycle track adjacent to, and level with, the footpath along the entire section. Westbound, cycling provisions include on-road mandatory cycle lane which terminate at the approach to the bridge where cyclists are intended to share space with buses.

To provide continuous cycle tracks along this section in both directions, the road will be realigned (pending agreement with TII), and lane width will be reduced to reallocate space from general traffic to pedestrians and cyclists. The minimum width of 1.5 m for the cycle track and 1.8 m for the footpath will be provided along this section of Firhouse Road. The current road configuration will be retained; one general eastbound traffic lane, one general westbound traffic lane, and a westbound bus lane.

New eastbound and westbound bus stops are proposed to the east of the Firhouse Road/Knocklyon Road junction, with the intention of reducing the distance between the schools and communities on the western end of Knocklyon Road and bus routes along Firhouse Road.

Figure 5 represent the typical cross-section at the Firhouse Road M50 bridge, refer to the general arrangement drawings for additional detail.

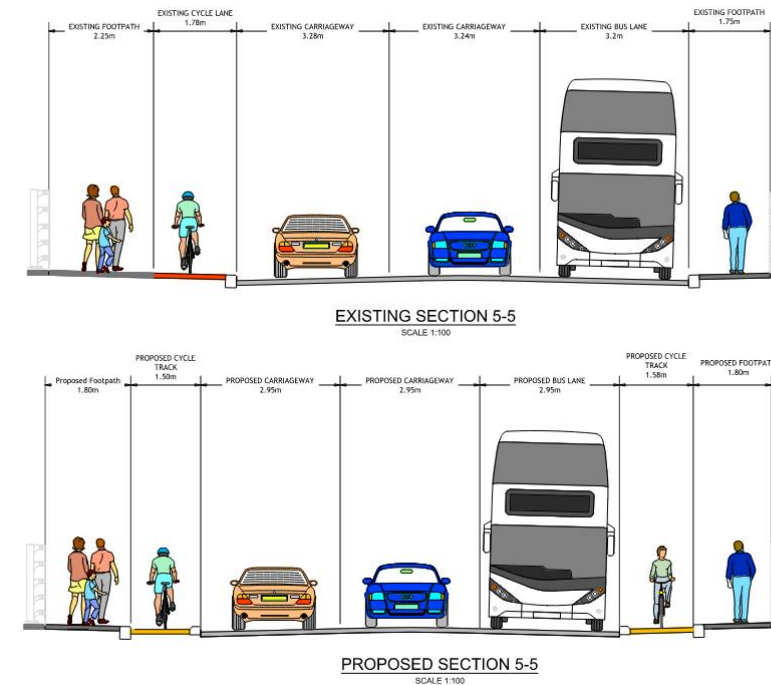


Figure 5: Firhouse Road, M50 bridge typical cross-section

## Ballycullen Road / Castlefield Avenue



The northern end of Ballycullen Road includes on-road mandatory cycle lanes along the entire length covered by Phase 1 of the active travel scheme. The cycle lanes are covered in red high friction surface and are of good material quality, however there is no physical separation between the cycle lanes and the road.

Upgrades to Ballycullen Road will consist of replacing the on-road cycle lanes with 2m wide segregated cycling facilities (See section 3.2).

There are two bus stops along this section, 4749 and 4760. The current arrangement consists of inline stops at which cyclists must stop behind a pulled-in bus. Upgrades of the bus stops will include converting the existing bus stops to shared landing zone arrangements (see section 3.5). The northbound bus shelter will be retained.



Along this section, priority junction corner radii will be tightened and raised entry treatment provided (see section 3.3.2). This arrangement provides pedestrians and cyclists with priority through the junction while vastly improving safety for all road users. At locations where there is sufficient space, the cycle track is offset from the edge of carriageway to provide improved visibility between cyclists crossing the junction and turning traffic.

The active travel scheme will tie into the existing raised kerb protected cycle tracks, south of the junction with Monalea/Castlefield Avenue, and will continue east towards Knocklyon via Castlefield Avenue and the existing M50 pedestrian bridge. Quiet street treatments will be provided on Castlefield Avenue that will include traffic speed mitigation features such as raised platforms and reduction of corner radii, as well as road marking and signage to indicate the shared nature of the road. Refer to the general arrangement drawings for addition detail.

## Knocklyon Road



This section of the active travel scheme commences at the Knocklyon Road junction with Firhouse Road, continues south along Knocklyon Road and terminates at the western entrance to Dargle Wood Park. There are footpaths on both sides of the road for the length of Knocklyon Road covered by Phase 1.

There are no existing cycling facilities between the junction with Firhouse Road and Knocklyon Shopping Centre. Upgrades to the road layout on Knocklyon Road between Scholarstown Road and Idrone Avenue were carried out in the last decade and include sections of shared path. The proposed active travel scheme will tie into these shared paths.

Segregated cycling facilities (See section 3.2) will be provided in each direction along the entire length of Knocklyon Road. The cycle track width will be 2 m where possible, however in constrained areas, widths will be reduced to a minimum of 1.5 m. This is necessary in order to ensure a desirable minimum footpath width is achieved or to minimise tree felling.



**Figure 6: Existing and proposed infrastructure outside Gaelscoil Chnoc Liamhna, Knocklyon Road**

The signalised junction between Knocklyon Road and Firhouse Road will be upgraded to include improved pedestrian facilities including single-phase crossings of each arm, tighter corner radii and segregated, kerb protected cycle facilities with signal-control for all movements through the junction. Refer to section 3.4.3 for additional detail at this junction.

Valuable road space on Knocklyon Road outside Gaelscoil Chnoc Liamhna has been devoted to a car set-down area. This has a number of negative effects on vulnerable road users and the streetscape in general. While the set-down area can be seen as a convenient means for drivers to park directly outside the school, it is at the cost of reduced safety and attractiveness for parents and children wishing to using active travel means to access the school. The remaining footpath adjacent to the set down area is below the desirable minimum. As there will be significant numbers of parents and children entering through the main gate, a generous footpath would be more suitable. Additionally, drivers entering and exiting the set down area will present a risk to parents and children arriving to the school by bike and also to cycle commuters moving north along Knocklyon Road.

Outside school hours, the excessive width of the roadway and set-down area has been noted to encourage high speeds along this section of Knocklyon Road, including incidents where drivers have avoided the ramp on the road by veering into the set down area itself.

It is proposed, as part of the upgrade works, that the set-down area will be removed to allow for a segregated northbound cycle track and wide shared space adjacent to the school wall. This shared space will allow parents and children coming from north of the school to use the upgraded toucan crossing at Delaford Avenue and proceed southward to the school gate or to and from the school warden to the south of the entrance. Owing to the width of the shared space, there will be opportunities to include school themed street art and representations which will help to create a pleasant environment for children, parents, and staff at the school entrance.

To offset the loss of the set-down area, it is proposed to provide parallel parking bays on the western side of Knocklyon Road north of Delaford Avenue. These parallel parking spaces will be interspersed with landscaped buildouts. A parking protected cycle track will be provided adjacent to the footpath and separated from the parking bays by a door-zone buffer. These parallel parking spaces will also be available for matchday parking for the adjoining Knocklyon United football pitch.

The provision of the new bus stops on Firhouse Road to the east of the Knocklyon Road junction will bring a public transport connection closer to the school and pitches.

The existing informal parking on the green space at the northern end of Knockfield Manor is to be formalised under the scheme. 11 spaces will be provided. This will curtail the impact on the green area and will allow the existing mature trees at the location to be enhanced with additional landscaping features.

Along the entire length of Knocklyon Road covered by Phase 1 of the active travel scheme, side road junction corner radii will be tightened and raised entry treatment provided (see section 3.4.2). This arrangement provides pedestrians and cyclists with priority through the junction while vastly improving safety for all road users. At locations where there is sufficient space, the footpath and cycle track will be offset from the edge of carriageway to provide improved visibility between cyclists crossing the junction and turning traffic.

A link to St. Colmcille's Senior and Junior National Schools will be added along Idrone Avenue. Improvements will include upgrades to footpaths, provision of raised entry treatment and tightening of corner radii of side roads, including the entrance to Knocklyon Shopping Centre and provision of a safe school treatments (refer to section 3.1). Additionally, a new link will be provided between Knocklyon Grove and Idrone Avenue through the northern section of the field opposite Colmcille's Senior and Junior National Schools.

The existing shared path which passes through the grounds of Knocklyon Shopping Centre will be upgraded to a 3.0 m wide shared surface which will improve access to this key trip generator and provide an east-west connection while allowing the mature trees on Knocklyon Road to be maintained. The existing pedestrian crossing adjacent to the western entrance to the park will be converted to a toucan crossing (4.0 m wide crossing that facilitates both pedestrians and cyclist).

## 3. Core Design Features

### 3.1 Safe School Treatments

Providing safe active travel links to schools is a key objective of this scheme and the wider Cycle South Dublin program. There are six schools (including two senior and junior national schools on shared campuses) in the vicinity of Phase 1 and some degree of safe school treatments will be provided at each. The six schools are:

- St. Dominic's National School
- Scoil Maelruain Senior and National Schools
- Firhouse Community College
- Scoil Carmel J.N.S
- Gaelscoil Chnoc Liamhna
- St. Colmcille's Senior and Junior National Schools

Additionally, two of the schools, namely St. Dominic's National School and Scoil Maelruain Junior National School will be part of the 2023 Safe Routes to Schools programme (SRTS). The SRTS programme was developed in partnership with the NTA and Green-Schools in 2020 as a response to the need to support schools to increase walking and cycling to school.

The principles of the SRTS programme will be used to determine the most appropriate safe school treatment for each of the schools in vicinity of Phase 1 of the scheme.

### Aims of the program:

- Improve safety at the school gate by providing 'front of school' treatments to alleviate congestion and improve access;
- Improve access routes to school by improving walking and cycling infrastructure; and
- Increase the number of students who cycle to school by expanding the amount of cycle parking.

### What does a SRTS approach look like?

- Space for pedestrians: footpaths outside the school should be wider than the recommended 1.8 m due to the peak loading. Combine seating, landscape street lighting to reduce footprint
- Safe spaces to cross: side Road Junction tightening with raised crossings, reduced crossing distance and provision of crossing on all arms of junctions. Guardrails should be removed/not provided (as per DMURS).
- Reduced traffic speed: reducing carriageway width and corner radii and the use of traffic management measures such as horizontal and vertical deflections. Use of vertical elements, such as trees to narrow perceived width of road.
- Surface colour/texture changes: use of road and footpath surface colours that stand out from the rest of the carriageway can positively impact traffic speed.
- Space for cyclists: relocating road space to create protected lanes, consider making the street one-way or restricting vehicular traffic during school opening and closing times.
- Improvement to permeability: create shortcuts to the school through attractive traffic free areas and provide 4.0 m wide paths for walking and cycling with good lighting.
- Landscape and public realm improvements: planting of street trees and rain gardens. Integration of sustainable urban drainage systems (SUDs) into the design.



Figure 7: Example of SRTS Quick-Build Design, Dublin City Council



**Design Elements could include:**

- 1 Carriageway narrowing where possible (build-outs using inexpensive materials could be used for Quick-Build Schemes).
- 2 Vertical/horizontal deflection at start of zone.
- 3 Surface colour/texture change.
- 4 Visible pedestrian crossing with good lighting.
- 5 Distinctive signage (minimise use of warning signs).
- 6 Planting and trees (use planters for Quick-Build Schemes).
- 7 Seating.
- 8 Potential art elements.
- 9 Protected cycle lanes connecting to wider cycle network.

Figure 8: SRTS streetscape design elements

### 3.2 Cycle Facility Segregation (Horizontal and Vertical)

One of the core objectives of the active travel scheme is to provide segregated cycling facilities along the entire route. Physical segregation ensures that cyclists are protected from motorised traffic as well as independent of vehicular congestion, thus improving cyclist safety and reliability of journey times for cyclists. Physical segregation will be provided in the form of vertical segregation, (e.g., raised kerbs), horizontal segregation, (e.g., parking/verge protected cycle tracks), or both. Additionally, the use of shared space has been minimised as combining pedestrians and cyclists results in a reduced quality of services for both. Particular attention has been paid to providing segregation at junctions and ensuring that interfaces between pedestrians, cyclists, and vehicles have been minimised, are consistent, and are legible.

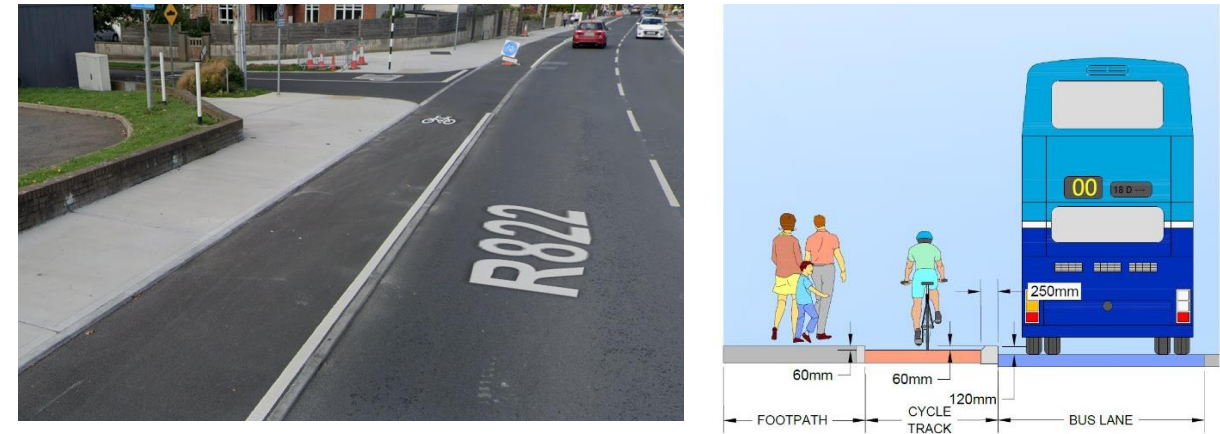


Figure 9: Example of segregated cycle facility and typical kerb cross-section arrangement

### 3.3 Residential Access

Residential access will be retained along the entire length of the active travel scheme. Where footpaths and cycle tracks cross residential accesses, chamfered kerbs will be provided between the footpath and cycle track and cycle track and road, as shown in figure 10. This arrangement will avoid the changes in level for pedestrian or cyclist while maintaining a convenient access for residents to their property. The priority at these crossings is also rebalanced in line with the priority hierarchy in figure 2.

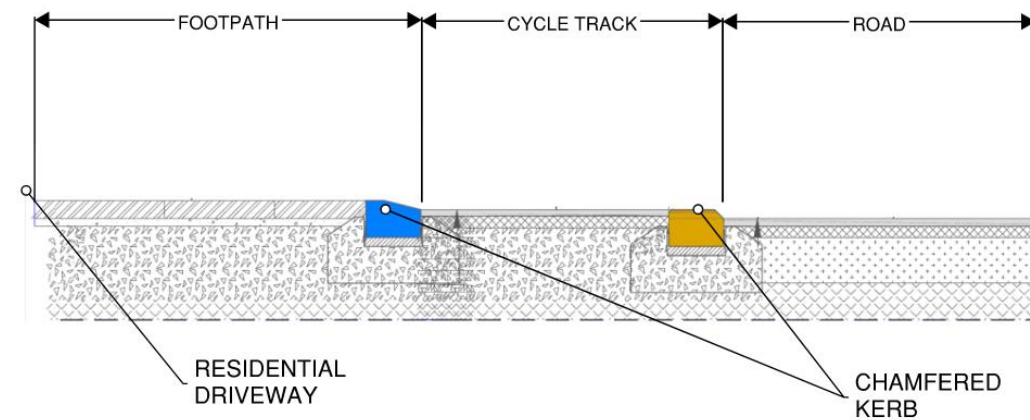


Figure 10: Typical arrangement at access to residential properties

### 3.4 Junctions

Junctions along the active travel scheme have been designed in accordance the principles outlined in DMURS, the NCM and the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors. Traffic modelling was carried out for significant junctions along the route. The design process and principles used to assess junctions is summarised below.

### 3.5 Junction Modelling

Two industry standard modelling software packages were used in the modelling of signalised junction along the proposed scheme: PTV VISSIM (VISSIM) and LinSig. VISSIM is a microscopic multi-modal traffic flow simulation software package that was used in the modelling process. LinSig is a software which allows traffic engineers to model traffic signals and their effect on traffic capacities and queuing.

LinSig was used in parallel to the geometrical design process of junctions along Phase 1 of the active travel scheme. The results of the analysis assisted with decision making and guided the design process. The analysis informed the design through the identification of potential risks related to traffic capacity and queuing arising from alterations to existing junction layouts in order to provide active travel improvements. The design team primarily focused on the level of segregation provided for pedestrians and cyclists, while also taking into account the impact on traffic capacity at the junction.

The junctions were modelled under two scenarios ‘do-nothing’ and ‘do-something’. The results were evaluated by looking at the junctions practical reserve capacity (PRC) (%) and delay through the junction. The ‘do-nothing’ scenario analysed the junction with the current traffic flows and junction layout while the ‘do-something’ scenario analysed the junction using current traffic flows with an updated design that provided segregated pedestrian and cyclists facilities on all arms of the junction.

Following this analysis, a design for each junction which provided the most “gain” for least “pain” was selected.

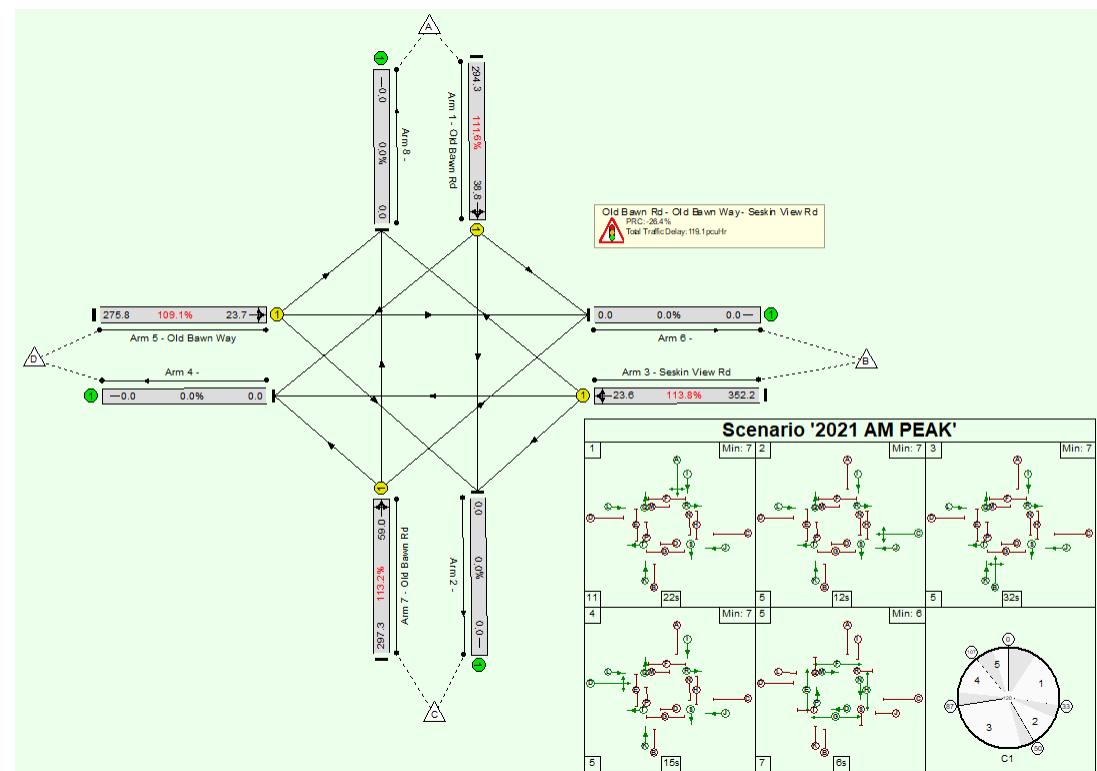


Figure 11: Extract from LinSig junction modelling software

#### 3.5.1 Priority Junctions

As a measure to reduce traffic speed entering and exiting a side road, junction corner radii will be tightened in accordance with the guidance outlined in section 4.3.3 of DMURS. Minimum corner radii are determined by evaluation the radii required for a vehicle which is expected to use the junction. Tightening of corner radii also reduces the crossing length through the junction for pedestrians and cyclists, further contributing to safety.

The identification of an appropriate design vehicle type for each junction is a critical step. If a large proportion of vehicles using a particular side road are known to be HGVs, the geometry of the junction would need to account for this. While catering for the larger vehicle, a wider entrance with a larger corner radius would be designed. However, such a design would mean that cars and LGVs would be able to enter or exit the side road at higher speeds than at a junction designed primarily for cars and LGVs.

Even where the predominant vehicle type using a side road is car or LGV, access for HGVs, even if infrequent e.g., emergency vehicles or waste disposal trucks, must be considered. However, in situations like this, requiring drivers of larger vehicles to proceed with increased caution and for the large vehicle to cross the white line

in order to enter or exit the side road, would be considered to have an overall preferable outcome from a safety point of view across time.

The preferred priority junction arrangement consists of a continuous footpath, i.e., no change of level or material through the junction, and a single direction, with-flow, cycle track continuing with priority across the front of the side road on a raised entry treatment. The consistency of material and level on both the footpath and cycle track infers priority to the pedestrian and the cyclist.

Where sufficient space is available, the footpath and cycle track can be offset to provide for improved visibility between cyclists and turning vehicles. Where enough space is available, the design can allow for a regular size car to wait between the pedestrian and cyclist crossing points on the side road and the main road.

Splayed kerbs allow for a transition the road and cycle track, and cycle track and footpath. Refer to Figure 13 for a visual representation of the typical side road arrangement.

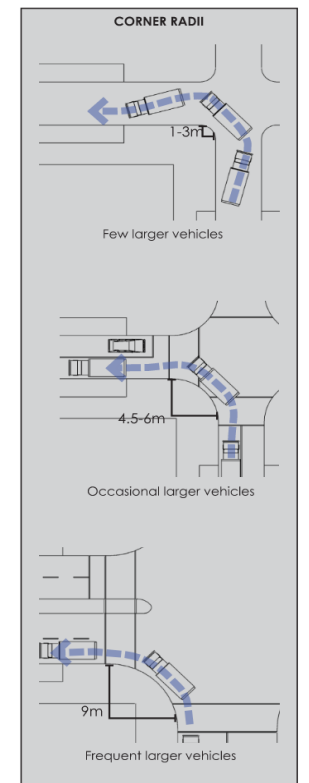


Figure 12: Corner Radii (DMURS, Section 4.3.3)

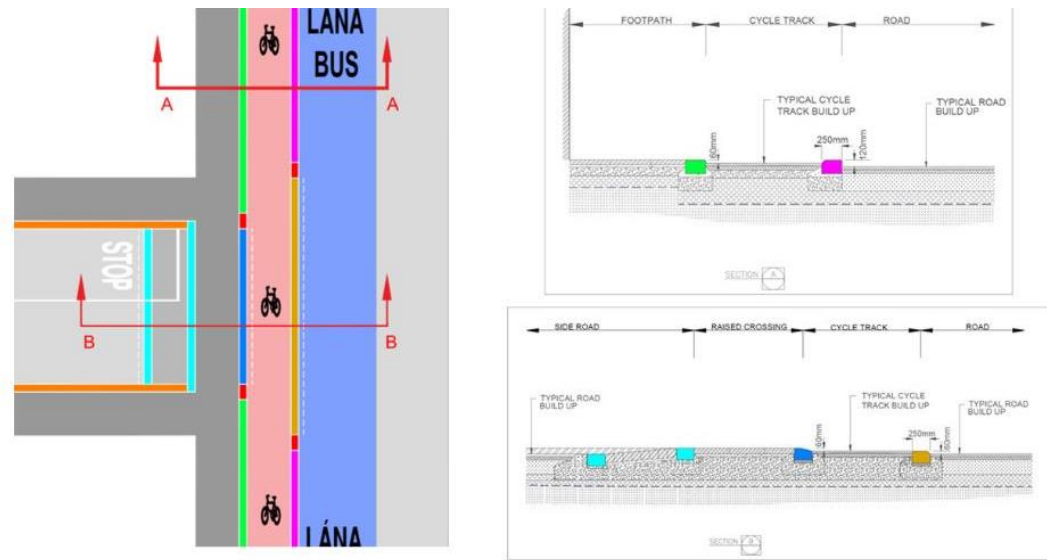


Figure 13: Typical priority junction arrangement with no set-back

### 3.5.2 Signalised Junctions

Signalised junctions have been designed in accordance with the principles outlined in the DMURS, the NCM, and the BusConnects Design Guideline Booklet for BusConnects Core Bus Corridor. The design rationale for signalised junctions along the active travel scheme is to provide single-phase pedestrian crossings on all arms and segregated and signal-controlled cycle facilities allowing for all movements. Table 1 includes a summary of the proposed design at each signalised junction along Phase 1 of the active travel scheme, along with a summary of key considerations.

Table 1: Design summary for signalised junctions

Old Bawn Road/ Seskin View Road	
Existing Layout	
Proposed Design	
<p><b>Summary:</b></p> <ol style="list-style-type: none"> <li>1) Junction is in compliance with the BusConnects Preliminary Design Guidance Booklet with respect to pedestrians and cyclists. The number of traffic lanes will be retained on all arms, the straight-ahead lanes are reduced to 3.0 m and the right turning pockets will be maintained at the existing 2.5 m to facilitate the desirable minimum footpath and cycle track width.</li> <li>2) The design rationale is to provide single-phase pedestrian crossings on all arms and signal controlled segregated cycle crossings for all movements through the junction, and to improve overall pedestrian and cyclists' safety.</li> <li>3) Traffic surveys complete at this junction indicate that the left turning movements from all arms are less than 150 vehicles per hour. This enables the Left-turning vehicles to be staged to run with straight-ahead cyclists to the left of the turning vehicles.</li> <li>4) Right turning cyclists make two-stage turn, behind protected corners.</li> </ol>	

## Firhouse Road/Ballycullen Drive

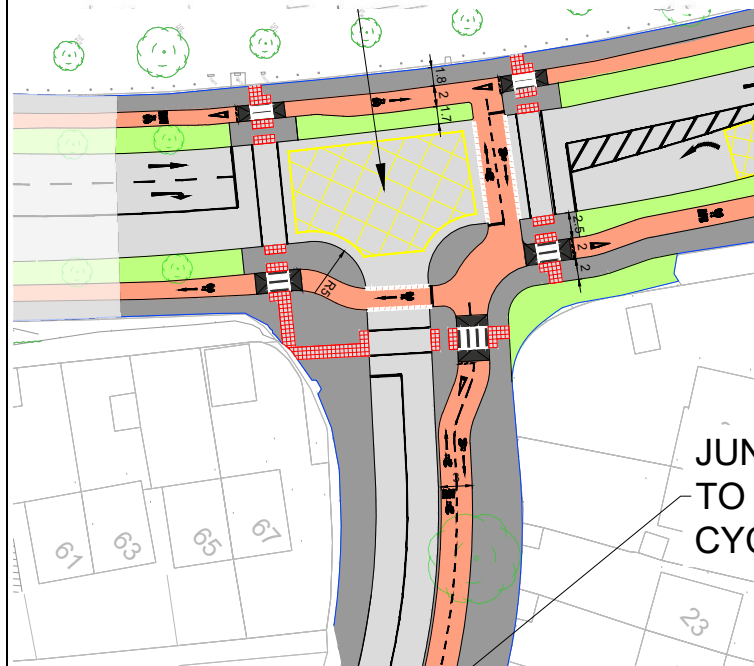
Existing Layout



### Summary

- 1) Junction is in compliance with the NCM with respect to pedestrians and cyclists. The number of traffic lanes will be retained on all arms and the existing kerb lines on Firhouse Road are retained. Road space is reallocated to pedestrians and cyclists by tightening the corner radii and reducing the width of Ballycullen Drive to 6.0 m.
- 2) The design incorporated the D24 Cycle Network Scheme which will include a two-way cycle track on the eastern side of Ballycullen Drive. The design rationale is to provide single-phase pedestrian crossings on all arms and signal controlled segregated cycle crossings for all movements through the junction, and to improve overall pedestrian and cyclists' safety.
- 3) A new pedestrian crossing is added on the western arm .
- 4) Left-turning vehicles are staged to run with straight-ahead cyclists to the left of the turning vehicles. where left turning movements are low (<150 per hour). For higher volumes of left-turners, cyclists will be provided with a dedicated signal stage.
- 5) Pedestrians cross the cycle track on a raised zebra crossing to a pedestrian refuge, prior to crossing the traffic lane. Pedestrians retain priority over cyclists at these crossings.

Proposed Design



## Firhouse Road/Ballycullen Avenue

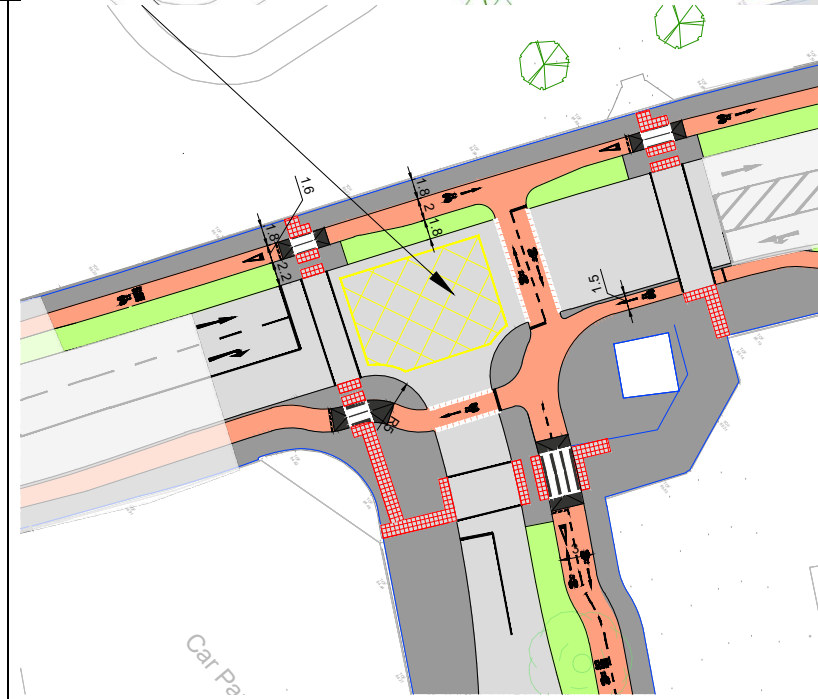
Existing Layout



### Summary:

- 1) Junction is in compliance with the NCM with respect to pedestrians and cyclists. The number of traffic lanes will be retained on all arms and the existing kerb lines on Firhouse Road are retained. Road space is reallocated to pedestrians and cyclists by tightening the corner radii and reducing the width of Ballycullen Avenue to 6.0 m at approach the junction.
- 2) The junction is designed to tie into the proposed D24 Cycle Network Scheme that will include a two-way cycle track on the northern section of Ballycullen Avenue. The design rationale is to provide single-phase pedestrian crossings on all arms and signal controlled segregated cycle crossings for all movements through the junction, and to improve overall pedestrian and cyclists' safety.
- 3) Left-turning vehicles are staged to run with straight-ahead cyclists to the left of the turning vehicles. where left turning movements are low (<150 per hour). For higher volumes of left-turners, cyclists will be provided with a dedicated signal stage. Right turning cyclists make two-stage turn, behind protected corner.
- 4) A new pedestrian crossing will be provided on the southern arm.
- 5) Pedestrians cross the cycle track on a raised zebra crossing to a pedestrian refuge, prior to crossing the traffic lane. Pedestrians retain priority over cyclists at these crossings.
- 6) An appropriate clearance between the cycle track and existing pylon will be retained.

Proposed Design



### Firhouse Road/Ballycullen Road/Mount Carmel Park

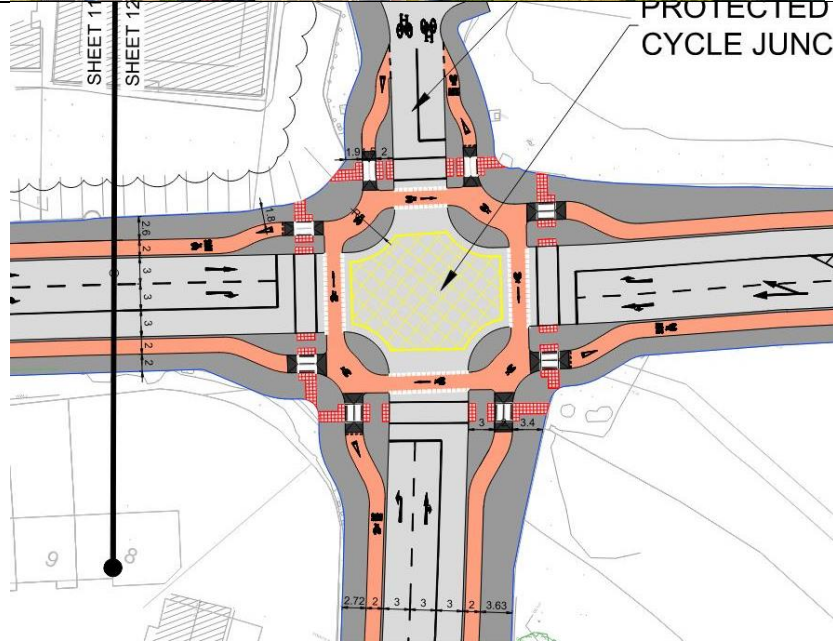
Existing Layout



#### Summary:

- 1) Junction is in compliance with the NCM with respect to pedestrians and cyclists. The number of traffic lanes will be retained on all arms but will be reduced to a width of 3.0 m. Road space is reallocated to pedestrians and cyclists by tightening the corner radii and reducing lane width.
- 2) The design rationale is to provide single-phase pedestrian crossings on all arms and signal controlled segregated cycle crossings for all movements through the junction, and to improve overall pedestrian and cyclists' safety.
- 3) Traffic surveys complete at this junction indicate that the traffic flows for left turning movements are less than 150 vehicles per hour at all arms except the eastern approach. This enables the left turning traffic to be staged with straight ahead cyclists to the left of the turning traffic. At the eastern approach, where the left turning movements exceed 150 vehicles per hour, straight ahead cyclists will be separated from the left turning traffic.
- 4) Pedestrians cross the cycle track on a raised zebra crossing to a pedestrian refuge, prior to crossing the traffic lane. Pedestrians retain priority over cyclists at these crossings.

Proposed Design



### Ballycullen Avenue / Firhouse road

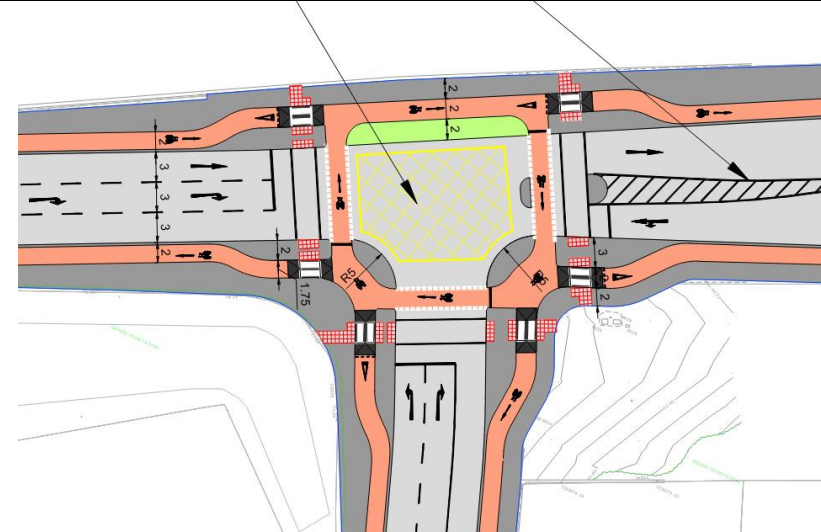
Existing Layout



#### Summary:

- 1) Junction is in compliance with the NCM with respect to pedestrians and cyclists. The number of traffic lanes will be retained on all arms but will be reduced to a width of 3.0 m. Road space is reallocated to pedestrians and cyclists by tightening the corner radii and reducing lane width.
- 3) The design rationale is to provide single-phase pedestrian crossings on all arms and signal controlled segregated cycle crossings for all movements through the junction, and to improve overall pedestrian and cyclists' safety.
- 4) Left-turning vehicles are staged to run with straight-ahead cyclists to the left of the turning vehicles. where leftturning movements are low (<150 per hour). For higher volumes of left-turners, cyclists will be provided with a dedicated signal stage. Right turning cyclists make two-stage turn, behind protected corner.
- 5) Pedestrians cross the cycle track on a raised zebra crossing to a pedestrian refuge, prior to crossing the traffic lane. Pedestrians retain priority over cyclists at these crossings.

Proposed Design



### 3.6 Bus Stops

Bus stops along the active travel scheme have been designed to align with the principles outlined in the BusConnects Design Guideline Booklet for BusConnects Core Bus Corridor. Any existing layby style bus stops will be converted to inline bus stops. Two types of bus stops are proposed along the route: a shared bus stop landing zone and island bus stop. Bus stop proposals at each stop along the route are detailed in Appendix A.

The key design features and considerations relating to the two bus stop types are listed below:

- Conflict between cyclists and stopping busses is removed as cyclists are deflected behind the bus stop.
- A loading/landing zone, out of the line of the cycle track is provided at either stop type.
- To address the pedestrian and cyclist conflict, a pedestrian priority crossing point is provided for pedestrians accessing the bus stop area.
- The cycle track will deflect behind the stop sufficiently to reduce cycling speed for safety though the crossing area so cyclists can give way to pedestrians crossing to the bus stop area.
- Appropriate signage and lighting will be provided at these locations to ensure that all road users are aware of the potential conflicts.

#### Shared Bus Stop Landing Area

Shared Bus Stop landing zone, as shown in Figure 14, are used where there is insufficient space to provide an island bus stop. The cycle lane width is reduced on the approach to slow cyclists, along with a 1m island being provided for users departing the bus. This is to prevent bus users stepping directly into the cycle track. A total of 8 bus stops along Phase 1 of the active travel scheme will be upgraded to inline bus stop with a shared landing zone and 2 new bus stops of the same type will be provided.

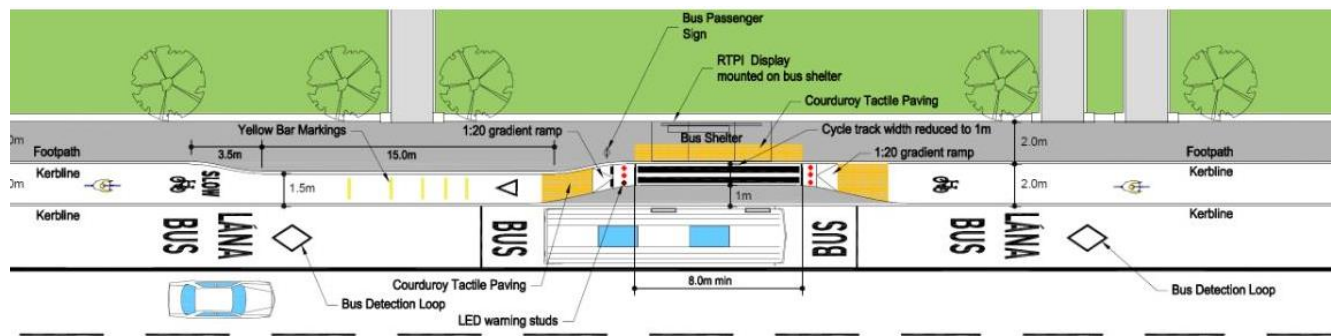


Figure 14: Typical arrangement at shared bus stop landing area

#### Bus Stop Island

Where sufficient space is available, Island Bus Stops, as shown in Figure 15, have been proposed, which help to reduce the conflict between users departing the bus and cyclists. A total of 8 bus stops along Phase 1 of the active travel scheme will be upgraded to inline bus stops with a bus stop island and 2 new bus stops of the same type will be provided.

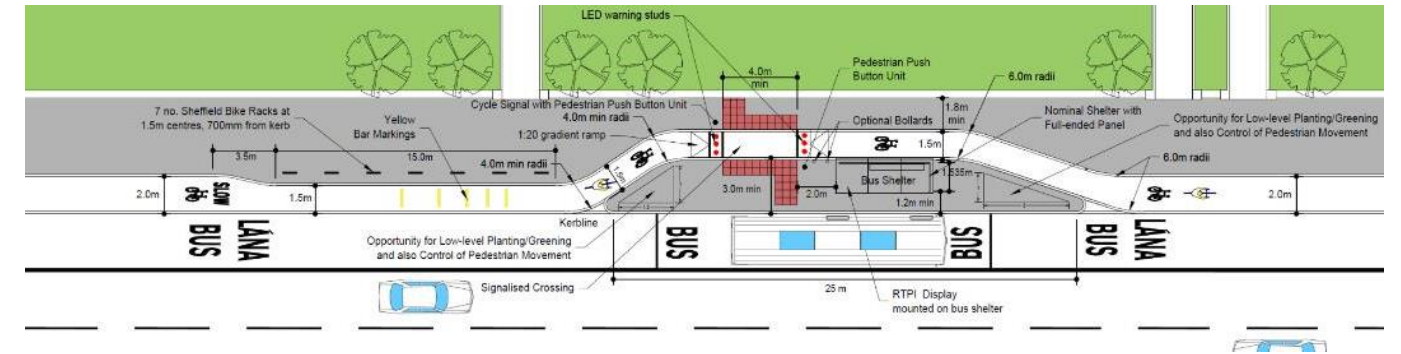


Figure 15: Typical arrangement at Island bus stops



Figure 16: Example of inline bus stop island, Liffey Valley





Figure 17: Example of inline bus stop island, Liffey Valley

## 5. Conclusion

Phase 1 of the Old Bawn to Ballyboden Active Travel scheme will provide 5.3 km of upgrades to walking and cycling infrastructure in Old Bawn, Firhouse, Knocklyon, and the surrounding areas. The facilities are designed to the most recent design standards which focus on providing safe and continuous active travel infrastructure that accommodate people of all ages and abilities. In addition to the improvements along the main route, the scheme will also provide safe school treatments at six schools with the aim of providing a safe and welcoming environment outside schools and encourage a modal shift to active travel.

The public consultation process provides an opportunity for anyone interested to review the proposed scheme and express their opinions on the plans. After the consultation period, the design team will evaluate the feedback and make changes that are deemed necessary to the design, based on the comments received. Following the consultation period, the design team will complete the detailed design of the active travel scheme and will subsequently begin the tender process where an appropriate contractor will be appointed to carry out the works.

## 4. Arboricultural Assessment

An Arboricultural Assessment Report will be prepared based on a detailed tree survey along the proposed route and following the requirements of *BS5837:2012 Trees in relation to design demolition and construction – Recommendations*.

The report documents the nature, quality, and condition of existing trees along and adjacent to the route and identifies the likely direct and indirect impact of the proposed development on such trees. It then identifies trees in relative proximity to the proposed works and construction wayleaves that should be protected during construction, with suitable mitigation measures, as appropriate.

The impact of tree removal for the works is anticipated to be negligible, as preserving trees along the scheme was given great importance during the preliminary design stage. As part of the works additional trees and landscape features will be established along the route resulting in a net increase in trees over the route.

# Appendix A: Bus Stop Interventions

Stop Number	Longitude, Latitude	Stop Name	Direction	Proposed changes to bus stop	Bus Shelter	Bus Stop Relocated (Yes/No)	Reason for moving/changing bus stop
2616	53.284621, -6.360608	St Maelruan's Park	North-bound	Upgraded to an inline shared bus stop landing zone	Existing: Yes Proposed: Yes	Yes	1) Bus stop relocated about 50m south to facilitate a two-way cycle track providing access to Sean Walsh Memorial Park. 2) Bus stop layout changed to deflect cyclists around the bus stop and remove conflict between cyclists and stopping buses.
2605	53.284077, -6.359922	St Maelruan's Park	South-bound	Upgraded to an inline shared bus stop landing zone	Existing: Yes Proposed: Yes	No	1) Bus stop layout changed to deflect cyclists around the bus stop and remove conflict between cyclists and stopping buses.
2536	53.282950, -6.359553	Old Bawn Court	North-bound	Bus stop to be removed			1) Bus stop to be removed due to the proximity of relocated bus stop 2616 which is approx. 140m north.
2538	53.281504, -6.358852	The Crescent	South-bound	Upgraded to a shared bus stop landing zone	Existing: Yes Proposed: Yes	No	1) Bus stop layout changed to deflect cyclists around the bus stop and remove conflict between cyclists and stopping buses.
2535	53.280994, -6.358905	Seskin View Road	North-bound	Upgraded to a bus stop island	Existing: Yes Proposed: Yes	No	1) Bus stop layout changed to deflect cyclists around the bus stop and remove conflict between cyclists and stopping buses.

Stop Number	Longitude, Latitude	Stop Name	Direction	Proposed changes to bus stop	Bus Shelter	Bus Stop Relocated (Yes/No)	Reason for moving/changing bus stop
New bus stop	53.279696, -6.358345		South-bound	Proposed inline shared bus stop landing zone	Existing: New Proposed: No		
2534	53.278921, -6.358276	Old Bawn Terrace	North-bound	Bus stop to be removed			1) Bu stop to be removed due to the proximity of bus stop 2533 which is approx. 160m south. 2) Bus stop shelter to be relocated to stop 2533.
2533	53.277433, -6.357598	Parkwood Lawn	North-bound	Existing Layby bus stop upgraded to inline bus stop island	Existing: No Proposed: Yes	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2)Bus stop layout changed to removed pedestrian and cyclist conflict.
2542	53.276789, -6.350139	Firhouse College	East-bound	Existing Layby bus stop upgraded to inline bus stop island	Existing: Yes Proposed: Yes	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2)Bus stop layout changed to removed pedestrian and cyclist conflict.
2523	53.277082, -6.348772	Firhouse College	West-bound	Existing Layby bus stop upgraded to inline bus stop island	Existing: Yes Proposed: Yes	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2)Bus stop layout changed to removed pedestrian and cyclist conflict.

Stop Number	Longitude, Latitude	Stop Name	Direction	Proposed changes to bus stop	Bus Shelter	Bus Stop Relocated (Yes/No)	Reason for moving/changing bus stop
2524	53.278351, -6.346766	Ballycullen Drive	West-bound	Existing Layby bus stop upgraded to inline bus stop island	Existing: Yes Proposed: Yes	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2) Bus stop layout changed to removed pedestrian and cyclist conflict.
7961	53.280496, -6.345144	Outside Church of Scientology & Community Centre	East-bound	Existing Layby bus stop upgraded to inline bus stop island	Existing: Yes Proposed: Yes	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2) Bus stop layout changed to removed pedestrian and cyclist conflict.
2522	53.281445, -6.342319	Firhouse Centre	West-bound	Existing Layby bus stop upgraded to inline bus stop island	Existing: Yes Proposed: Yes	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2) Bus stop layout changed to removed pedestrian and cyclist conflict.
6128	53.283119, -6.340933	Ballycullen Avenue	East-bound	Bus stop retained as existing	Existing: Yes Proposed: Yes	No	1) Bus stop is retained as existing as it provides good segregation between pedestrians and cyclists.
2544	53.284868, -6.335919	Woodlawn	East-bound	Existing Layby bus stop upgraded to shared bus stop landing zone	Existing: No Proposed: No	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2) Bus stop layout changed to removed pedestrian and cyclist conflict.

Stop Number	Longitude, Latitude	Stop Name	Direction	Proposed changes to bus stop	Bus Shelter	Bus Stop Relocated (Yes/No)	Reason for moving/changing bus stop
2521	53.284719, -6.335757	Woodlawn Park	West-bound	Existing Layby bus stop upgraded to inline bus stop island	Existing: Yes Proposed: Yes	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2) Bus stop layout changed to removed pedestrian and cyclist conflict.
2545	53.286241, -6.332722	Monalea Wood	East-bound	Existing Layby bus stop upgraded to inline bus stop island.	Existing: No Proposed: No	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2) Bus stop layout changed to removed pedestrian and cyclist conflict.
2520	53.286086, -6.332678	Ballycullen Road	West-bound	Existing Layby bus stop upgraded to inline shared bus stop landing zone	Existing: No Proposed: No	No	1) Layby removed to provide more space for walking and cycle infrastructure. 2) Bus stop layout changed to removed pedestrian and cyclist conflict.
4749	53.285471, -6.330367	Ballycullen Road	South-bound	Existing inline bus stop upgraded to inline shared bus stop landing zone	Existing: No Proposed: No	No	1) Bus stop layout changed to deflect cyclists around the bus stop and remove conflict between cyclists and stopping buses.
4760	53.285348, -6.330572	Sally Park Close	North-bound	Existing inline bus stop upgraded to inline shared bus stop landing zone	Existing: Yes Proposed: Yes	No	1) Bus stop layout changed to deflect cyclists around the bus stop and remove conflict between cyclists and stopping buses.

<b>Stop Number</b>	<b>Longitude, Latitude</b>	<b>Stop Name</b>	<b>Direction</b>	<b>Proposed changes to bus stop</b>	<b>Bus Shelter</b>	<b>Bus Stop Relocated (Yes/No)</b>	<b>Reason for moving/changing bus stop</b>
New bus stop	53.287771, -6.326703		West-bound	Proposed inline bus stop island	Existing: New Proposed: No		1) New bus stop to facilitate access to schools and community facilities on Knocklyon Road
New bus stop	53.287883, -6.326803		East-bound	Proposed inline shared bus stop landing zone	Existing: New Proposed: No		1) New bus stop to facilitate access to schools and community facilities on Knocklyon Road