

**Chapter 04**  
Proposed  
Scheme  
Description

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## 4. Proposed Scheme Description

### 4.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the Kimmage to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

Article 5(1)(a) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (hereafter collectively referred to as the Environmental Impact Assessment (EIA) Directive)) requires that the EIAR contains:

*'a description of the project comprising information on the site, design, size and other relevant features of the project....'*

Section 50(2)(b)(i) of Number 14 of 1993 - Roads Act, 1993 (as amended) states that that the EIAR shall contain the following information:

*'a description of the proposed road development comprising information on the site, design, size and other relevant features of the development.....'*

The layout of this Chapter begins with the Proposed Scheme Overview (Section 4.2). This is followed by sections describing the design iteration process (Section 4.3) and the overall design principles applied to the Proposed Scheme (Section 4.4). Following this, there is a detailed description of the Proposed Scheme (Section 4.5) and a section describing the key infrastructure elements associated with the Proposed Scheme (Section 4.6). These sections should be read in their entirety in order to gain a full understanding of the Proposed Scheme and its associated key infrastructure elements.

### 4.2 Proposed Scheme Overview

The Proposed Scheme will be approximately 3.7km in length and will commence on R817 Kimmage Road Lower at the junction with the R818 on Terenure Road West and Kimmage Road West, and R817 Fortfield Road. The Proposed Scheme will continue along R817 Kimmage Road Lower towards the City Centre, via the R137 on Harold's Cross Road, Clanbrassil Street Upper and Lower and New Street South. Priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both directions, where feasible, with alternative measures proposed at particularly constrained locations such as much of R817 Kimmage Road Lower, Harold's Cross Park West and short sections of R137 Clanbrassil Street Upper and Lower in alternate directions. A complementary cycle route is also proposed to the west of the Proposed Scheme via quiet streets at the southern end of the Proposed Scheme.

Moreover, pedestrian facilities will be upgraded, and additional signalised crossings will be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrian experience. Examples of this include the proposed works at R817 Kimmage Road Lower and Sundrive Road, and at St. Patrick's Court.

Table 4.1 summarises the changes which will be made to the existing corridor as a result of the Proposed Scheme.

**Table 4.1: Summary of Changes as a Result of the Proposed Scheme**

Features	Existing (km)	Proposed Scheme (km)
<b>Bus Lanes</b>		
Inbound	0.9	1.55
Outbound	0.4	1.6
<b>Bus Priority through Traffic Management</b>		
Inbound	0	2.15
Outbound	0	2.1
Total Bus Priority (both directions)	1.3	7.4
<b>Bus Measures</b>		
Proportion of Route with Bus Priority Measures	18%	100%
<b>Cycle Facilities – Segregated (excluding Quiet Street Treatment)</b>		
Inbound	0	1.75
Outbound	0	1.75
<b>Cyclist Facilities – Non-Segregated</b>		
Inbound	2.8	2.25
Outbound	3.2	2.25
<b>Cyclist Facilities – Overall</b>		
Total Cyclist Facilities (both directions)	2.8	4.0
Proportion Segregated (including Quiet Street Treatment)	3.2	4.0
<b>Other Features</b>		
Number of Traffic Signal Controlled Junctions	9	11
Number of Pedestrian Signal Crossings (including at junctions)	35	47
Number of Properties with Land Acquisition	n/a	25

The description of the Proposed Scheme is supported by a series of drawings (listed in Table 4.2), which are contained in Volume 3 of this EIAR, and these should be read in conjunction with this Chapter.

**Table 4.2: List of Drawings**

Drawing Series Number	Description
BCIDD-ROT-SPW_ZZ-0011_XX_00-DR-CR-9001	Site Location Plan
BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-9001	General Arrangement
BCIDD-ROT-GEO_HV-0011_ML_00-DR-CR-9001	Mainline Plan and Profile
BCIDD-ROT-GEO_CS-0011_XX_00-DR-CR-9001	Typical Cross Sections
BCIDD-ROT-ENV_LA-0011_ML_00-DR-LL-9001	Landscaping General Arrangement
BCIDD-ROT-PAV_PV-0011_XX_00-DR-CR-9001	Pavement Treatment Plans
BCIDD-ROT-SPW_BW-0011_XX_00-DR-CR-9001	Fencing and Boundary Treatment
BCIDD-ROT-TSM_GA-0011_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDD-ROT-LHT_RL-0011_XX_00-DR-EO-9001	Public Lighting
BCIDD-ROT-TSM_SJ-0011_XX_00-DR-TR-9001	Junction System Design
BCIDD-ROT-STR_ZZ-0011_XX_00-DR-SS-9001	Structures
BCIDD-ROT-DNG_ZZ-0011_XX_00-DR-CD-9001	Proposed Surface Water Drainage Works
BCIDD-ROT-UTL_UD-0011_XX_00-DR-CU-9001	IW Foul Sewer Asset Alterations
BCIDD-ROT-UTL_UE-0011_XX_00-DR-CU-9001	ESB Asset Alterations
BCIDD-ROT-UTL_UG-0011_XX_00-DR-CU-9001	GNI Asset Alterations
BCIDD-ROT-UTL_UW-0011_XX_00-DR-CU-9001	IW Water Asset Alterations
BCIDD-ROT-UTL_UL-0011_XX_00-DR-CU-9001	Telecommunications Asset Alterations
BCIDD-ROT-UTL_UC-0011_XX_00-DR-CU-9001	Combined Existing Utility Records

### 4.3 Design Iteration

The design of the Proposed Scheme has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme, described in Chapter 1 (Introduction), undertaken throughout the option selection and design development process has been incorporated, where appropriate.

Examples of how the design evolved are as follows:

- Road widening into numerous properties along Kimmage Road Lower was removed from the proposals through the introduction of Bus Gates as an alternative method for provision of bus priority over a length of 2km;
- A proposed cycleway through the grounds of Our Lady's Hospice and along Greenmount Lane was removed from the Proposed Scheme, and instead Harold's Cross Road will be widened into 18 properties to enable the provision of segregated cycle tracks alongside the bus lanes;
- Additional footbridges are proposed on both sides of Robert Emmet Bridge at the Grand Canal to enable continuous segregated cycle tracks and bus lanes along Clanbrassil Street Upper;
- On Clanbrassil Street Lower and New Street South, the existing trees in the median will be retained and instead the segregated cycle tracks will be introduced through narrowing of both the traffic lanes and the wide footpaths; and
- An additional quiet street cycle route was included generally following the route of the River Poddle parallel to the bus corridor on the western side, with a proposed boardwalk at the Stone Boat to provide a connection from Sundrive Road to Mount Argus.

### 4.4 Design Principles

The design of the Proposed Scheme was developed with reference to the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors (PDGB) (NTA 2021) (refer to Appendix A4.1 in Volume 4 of this EIAR). This guidance document was prepared to ensure that a consistent design approach for the Core Bus Corridor Infrastructure Works (hereafter referred to as the CBC Infrastructure Works) was adopted based on the objectives of the Proposed Scheme. The scheme objectives are described in full in Chapter 2 (Need for the Proposed Scheme).

The purpose of the PDGB is to complement existing guidance documents / design standards relating to the design of urban streets, bus facilities, cycle facilities and urban realm, which include the following:

- The Design Manual for Urban Roads and Streets (DMURS) (Government of Ireland 2013);
- The National Transport Authority (NTA) National Cycle Manual (NCM) (NTA 2011);
- Transport Infrastructure Ireland (TII) National Road Design Standards;
- The Department of Transport (DoT) The Traffic Signs Manual (TSM) (DoT 2019);
- The UK Department for Transport (UK DfT) Guidance on the Use of Tactile Paving Surfaces (UK DfT 2007);
- The National Disability Authority (NDA) Building for Everyone: A Universal Design Approach (NDA 2020); and
- Greater Dublin Strategic Drainage Study (GDSDS) (Irish Water 2005).

Accessibility for mobility impaired users is a core element of the Proposed Scheme design and it has been informed by the principles of DMURS, Building for Everyone: A Universal Design Approach, How Walkable is Your Town (NDA 2015), Shared Space, Shared Surfaces and Home Zones from a Universal Design Approach for the Urban Environment in Ireland (NDA 2012), Best Practice Guidelines, Designing Accessible Environments (Irish Wheelchair Association 2020), Inclusive Mobility (UK DfT 2005), Guidance on the Use of Tactile Paving Surfaces, and the British Standards Institution (BSI) BS8300-1:2018 Design of an accessible and inclusive built environment - External environment – Code of practice (BSI 2018). Accessibility is also addressed in Chapter 12 of the PGDB. Further detail on accessibility for mobility impaired users is given in Section 4.6.5.

An example of the application of the design principles for the Proposed Scheme can be seen at the major Kimmage Cross-Roads (KCR) Junction where the pedestrian crossings have been simplified and shortened through the removal of left-slip lanes, road narrowing, and straight crossings without staggers in median islands that require further waiting by pedestrians. At some existing junctions, pedestrian crossings are not currently available on all arms which requires pedestrians to go around the long way and to cross the junction in stages. In the Proposed Scheme, additional pedestrian crossings will be provided at all arms for more convenience and directness. Between junctions, additional pedestrian signal crossings will be provided in numerous locations for increased accessibility across the main roads.

The Proposed Scheme, which has been developed after the consideration of reasonable alternatives and which achieves the aims and objectives for the Proposed Scheme, is described in detail in Section 4.5. Further detail on the key infrastructure elements that comprise the Proposed Scheme is provided in Section 4.6.

## **4.5 Description of the Proposed Scheme by Section**

For the purposes of describing the Proposed Scheme it, has been split into the following three sections:

- Section 1 - Lower Kimmage Road from Kimmage Cross Roads to the Junction with Harold's Cross Road;
- Section 2 - Harold's Cross Road from Harold's Cross Park to Grand Canal; and
- Section 3 - Clanbrassil Street Upper and Lower and New Street from the Grand Canal to the Patrick Street Junction.

### **4.5.1 Section 1 – Lower Kimmage Road from Kimmage Cross Roads to Junction with Harold's Cross Road**

#### **4.5.1.1 General Overview of Section 1 of the Proposed Scheme**

This section of the Proposed Scheme will be approximately 2.2km long and will commence on R817 Kimmage Road Lower at the KCR Junction with R818 Kimmage Road West, R817 Fortfield Road and R818 Terenure Road West. The Proposed Scheme will proceed along R817 Kimmage Road Lower in a north-eastern direction generally and will conclude at the junction with R137 Harold's Cross Road at the northern end of Harold's Cross Park.

Priority for buses will be provided along the entire length of this section of the Proposed Scheme, with dedicated bus lanes in either direction over a length of 260m northbound, and 200m southbound from the KCR Junction to where a southern Bus Gate is proposed just north of the R817 Kimmage Road Lower and Ravensdale Park Junction. This Bus Gate will operate in tandem with a northern Bus Gate at Harold's Cross Park to preclude through-traffic over the intervening 2km length of this section, to R137 Harold's Cross Road at Harold's Cross Park. The Bus Gates will operate at peak times to secure bus priority by deflecting through-traffic off this route, while ensuring enhanced amenity for local residents with the development of a quieter street (with existing parking arrangements unchanged) than currently exists. Local traffic access will be diverted via Sundrive Road on the western side or Larkfield Avenue on the eastern side.

The provision of the southern Bus Gate at the Ravensdale Park Junction will be complemented by a number of traffic management measures on adjoining residential streets to prevent through-traffic or 'rat-running' as follows:

- Near the southern Bus Gate, Poddle Park to the west will be closed to through-traffic, except for cyclists, at the junction with Ravensdale Park;
- To the east of the southern Bus Gate, Derravaragh Road will be closed to through-traffic, except for cyclists, at the southern side of the junction with Corrib Road; and
- For southbound traffic diverted by the proposed southern Bus Gate, improvements will be made to the junction of R137 Harold's Cross Road and Kenilworth Park by way of the provision of a southbound right-turn to facilitate local access to R817 Kimmage Road Lower from the north. This will require adjustment to the junction for efficient traffic operation, and a westbound Bus Gate from Kenilworth Square will simplify the signal staging.

Segregated cycle tracks will be provided in either direction along the southern sub-section of the Proposed Scheme that precedes the Bus Gate at the Ravensdale Park Junction. After this point, the existing advisory cycle lanes will be retained and not altered, as the road conditions will be much enhanced as a result of the reduced general traffic restricted by the Bus Gate.

A secondary cycle route will also be designated, in parallel to R817 Kimmage Road Lower, along Poddle Park, Bangor Road, and Blarney Park to Sundrive Road. From Sundrive Road, cyclists will be able to proceed via a new connection to Mount Argus Way and Mount Argus View where a proposed steel boardwalk structure will be provided beside the River Poddle at the Stone Boat feature (as outlined in Section 4.6.8 and in Chapter 15 (Archaeological & Cultural Heritage)).

At Harold's Cross Park south, it will be necessary to remove the existing footpath on the northern side of the street adjoining the park over a length of 50m so as to accommodate road widening for two-way traffic on the access route between the proposed Bus Gates to Mount Jerome Cemetery and Mount Argus Road. Most pedestrians walk through the park when it is open during the day. At other times there is the alternative footpath along the southern side of the street. The alternative to this proposal would be to remove the five on-street parking spaces in front of houses for which there is no other parking available nearby.

#### 4.5.1.2 Deviations from Standard Cross Sections in Section 1

The width of the cross-sectional elements, as outlined in Section 4.6.1, have been fully adhered to in Section 1 of the Proposed Scheme. However, within the Bus Gates section along R817 Kimmage Road Lower, the existing advisory cycle lanes will be retained, which is a deviation from the design guide that proposes segregated cycle tracks to be provided generally. In this context, the traffic volumes will be very low due to the Bus Gate and a 30 km/h (kilometres per hour) speed limit will apply, which will provide a context in which advisory cycle lanes are appropriate.

#### 4.5.1.3 Bus Lane Provision in Section 1

An overview of the bus lane provision as part of the Proposed Scheme is set out in in Section 4.6.4. Full bus priority through the use of dedicated bus lanes and Bus Gates will be provided along the length of Section 1. Bus lanes will be provided in both directions at the southern end of Section 1 between the KCR Junction and the Ravensdale Park Junction. The northbound bus lane will be 220m long (excluding the lengths through the junctions), and the southbound bus lane will be slightly shorter at 160m long as it will commence 60m south of the junction at Ravensdale Park, where the road widens sufficiently to accommodate four traffic lanes and two cycle tracks. The slightly shorter southbound bus lane will not diminish bus movements as the buses will have priority over general traffic when passing through the nearby Bus Gate a short distance further north. The bus lane will be long enough to allow buses to bypass any traffic queue that extends back from the KCR Junction.

**Table 4.3: Proposed Signal Controlled Priority Junctions in Section 1**

Junction Location	Priority Type	Note
KCR Junction	Southbound bus Signal Controlled Priority	Southbound buses will be released in advance of general traffic by a dedicated bus lane signal. This will enable some bus services to turn right into R818 Kimmage Road West from the bus lane on the left side of the traffic lane. These buses will not need to weave right across general traffic to reach the right-turn lane as they must do in the existing junction arrangement. General southbound traffic will move in a separate signal stage after the bus stage has finished, and all traffic will occupy a single lane for left-turns, straight-ahead and right-turns. There will be no sharing of the bus lane by left-turning general traffic.
R817 Kimmage Road Lower / R137 Harold's Cross Road	Southbound bus Signal Controlled Priority	At the northern end of this section at Harold's Cross Park, there will be a bus priority signal to enable southbound buses to turn right from R137 Harold's Cross Road onto R817 Kimmage Road Lower. The bus signal stage will operate separately from the general traffic stage, and it will also enable southbound cyclists to turn right at the same time.

#### 4.5.1.4 Bus Stops in Section 1

The different types of bus stops (Island, Shared Landing, Inline and Layby) are described in Section 4.6.4. The bus stop locations are outlined in Table 4.4 and shown in the General Arrangement series of drawings (BCIDD-ROT-GEO\_GA-0011\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR. Further details of bus stop design is included in the PDGB (NTA 2021) in Appendix A4.1 in Volume 4 of this EIAR.

**Table 4.4: Proposed Bus Stop Locations within Section 1**

Direction	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Shelter	Note
Inbound	Kimmage Cross Roads	2438	To be removed			Bus stop to be replaced by new stop 100m further north.
Inbound	New Bus Stop – KCR	2438	A-210	Narrow Island	Yes	Replaces two existing bus stops that are just 150m apart.
Inbound	Ravensdale Park	2439	To be removed			Bus stop to be replaced by new stop 50m further south.
Inbound	Aideen Avenue	2440	A-655	Inline	Yes	Inside Bus Gate section – existing retained
Inbound	Kimmage Grove	2441	A-1040	Inline	Yes	Inside Bus Gate section – existing retained
Inbound	Mount Argus Church	2442	A-1400	Inline	Yes	Inside Bus Gate section – existing retained
Inbound	Brookfield	2443	A-1650	Inline	Yes	Inside Bus Gate section – existing retained
Inbound	Mount Argus Road	2444	A-2033	Inline	Yes	Inside Bus Gate section – existing retained
Inbound	Harold's Cross Park	1292	B-10320	Inline	Yes	Existing retained
Outbound	Podde Park	2394	A-145	Narrow Island	Yes	Moved 100m south closer to the KCR Junction where there is space for an island separation from the cycle track
Outbound	Corrib Road	2393	A-500	Inline	Yes	Inside Bus Gate section – existing retained
Outbound	Kimmage Grove	2392	A-1010	Inline	Yes	Inside Bus Gate section – existing retained
Outbound	Mount Argus Church	2391	A-1365	Inline	Yes	Inside Bus Gate section – existing retained
Outbound	Mount Argus Park	2390	A-1575	Inline	Yes	Inside Bus Gate section – existing retained
Outbound	St. Clare's Avenue	2389	A-2125	Inline	Yes	Inside Bus Gate section. Stop moved 85m south closer to the pedestrian crossing, with wider footpath.
Orbital Westbound	Sundrive Park, Sundrive Road	2485	n/a	Narrow Island	Yes	Existing retained
Orbital Eastbound	Sundrive Park, Sundrive Road	2497	n/a	Narrow Island	Yes	Moved 70m closer to the junction with R817 Kimmage Road Lower.

#### 4.5.1.5 Cycling Provision in Section 1

The specific proposals for cycling facilities in Section 1 of the Proposed Scheme are described below. Provisions for cyclists at the signal-controlled junctions are described in Section 4.6.3.5.

At the southern end of this section, new cycle tracks will be provided along R817 Kimmage Road Lower over a length of 260m from the KCR Junction, northwards to the junction of Ravensdale Park where the cycle tracks will



extend through the southern Bus Gate. Cycle tracks will be provided over typically 40m lengths on the western, southern and eastern approaches to the KCR Junction (these cycle tracks will be extended in future as part of the Greater Dublin Area Cycle Network Plan 2013 / 2022 Greater Dublin Area Cycle Network (NTA 2013; 2022)). At Ravensdale Park, cycle tracks will extend westwards for 60m from R817 Kimmage Road Lower to the junction at Poddle Park for the connection to the 'Poddle Way' cycle route along quiet residential streets.

Generally, along the 2km length of R817 Kimmage Road Lower, from Ravensdale Park to the junction with R137 Harold's Cross Road, the existing part-time advisory cycle lanes will be retained, apart from a short length of 160m on the southern approach to the junction with Sundrive Road where new on-street parking will be provided. At that location, cyclists will share the traffic lane with low traffic flows in a low-speed 30km/h speed limit zone.

On Sundrive Road, segregated cycle tracks will be provided as part of the 'Poddle Way' cycle route from Blarney Park eastwards over a length of 200m to the junction at R817 Kimmage Road Lower. These cycle tracks will extend through the junction and continue for a short distance eastwards along Larkfield Avenue (these cycle tracks will be extended in future as part of the Greater Dublin Area Cycle Network Plan 2013 / 2022 Greater Dublin Area Cycle Network).

At Mount Argus View, 200m north of Sundrive Cross, the 'Poddle Way' cycle route will re-join R817 Kimmage Road Lower and will follow that street for the remaining 1km to R137 Harold's Cross Road.

#### 4.5.1.6 Junction Information for Section 1

An overview of the approach to junction review and design is provided within Section 4.6.7, with the specific junctions within Section 1 of the Proposed Scheme outlined in Table 4.5.

**Table 4.5: Junctions within Section 1 of the Proposed Scheme**

Junction Location	Junction Category	Description	Note
KCR	Major	4-arm junction	Modified layout for bus lanes on the southern arm and cycle tracks on all arms with protected corner islands. Slip lanes removed on three corners and pedestrian crossings shortened.
Ravensdale Park on R817 Kimmage Road Lower	Minor	3-arm junction	Northbound bus lane provided on the northern arm with a separate signal stage. Pedestrian crossings provided across all three arms. Cycle tracks provided on all three arms. Northbound cycle signal stage runs with the bus stage separately from left-turn traffic.
Sundrive Road / Larkfield Avenue on R817 Kimmage Road Lower in Kimmage Village centre.	Moderate	4-arm junction	Modified layout for cycle tracks on three arms with protected corner islands. Junction footprint reduced by build-out of the corners and pedestrian crossings shortened.
R817 Kimmage Road Lower / R137 Harold's Cross Road	Moderate	3-arm junction	Modified layout for the proposed Bus Gate. Cycle track crossings with protected corner islands.
R137 Harold's Cross Road / Parkview Avenue (south-east corner of the park)	Minor	4-arm junction	Fully signalised junction upgrade from the existing pedestrian crossing. Southbound right-turn traffic lane provided to replace the existing bus lane. Cycle lanes in the north-south direction.
R137 Harold's Cross Road / Kenilworth Park	Major	5-arm junction	Southbound right-turn traffic lane provided to replace the existing bus lane. Traffic approaches reduced from five no. to four no. with westbound Bus Gate on the Rathmines side. Cycle tracks provided on four of the five arms.

#### 4.5.1.7 Parking and Loading Bays in Section 1

Changes to parking along Section 1 as a result of the Proposed Scheme are shown in Table 4.6. There will be no change to existing loading provision along this section.

**Table 4.6: Section 1: On-Street Parking Spaces Change Impact Summary**

Location	Type of Parking	Existing	Proposed	Change
Kimmage Road Lower / Sundrive Road Junction. Local shops west side	Adjacent	107	104	-3
Sundrive Road	Informal	232	226	-6
Sundrive Road car park (northern side)	Permit	52	52	0
Sundrive Road (northern side)	Informal	17	3	-14
Sundrive to Harold's Cross Park	Pay & Display	24	12	-12
Lower Kimmage Road at Mount Argus Church Entrance	Taxi Rank	2	0	-2
Kimmage Road Lower between Sundrive junction and Harold's Cross Road (north end of Park) - Side Streets	Informal	80	80	0
Kimmage Road Lower at Mount Argus A	Pay & Display	13	13	0
Harold's Cross Road along the east side of the Park	Adjacent	12	10	-2
Sundrive Junction to Harold's Cross Junction	Adjacent	215	215	0
Mount Argus Apartments	Permit	6	6	0
Total	All	760	721	-39 (-5%)

#### 4.5.1.8 Structures in Section 1

##### 4.5.1.8.1 Major Structures

There are no existing major structures within this section of the Proposed Scheme. One new major structure is proposed, as set out in Table 4.7 and shown in Image 4.1.

**Table 4.7: Proposed Structures in Section 1 of the Proposed Scheme**

Identity	Chainage	Description
Kimmage 02 – Stone Boat Boardwalk between Sundrive Road and Mount Argus View	H70050-H70125	4m wide and 42m long steel boardwalk structure for pedestrians and cyclists that will be located over the western bank of the River Poddle and elevated above the river level. It will be supported by 13 piers that will be underpinned by a single bored pile in each case. A steel grid deck will allow rainwater to pass through to the riverbank below.



**Image 4.1: Proposed New Boardwalk Structure**

#### 4.5.1.8.2 Retaining Walls

There are no retaining walls proposed within this section of the Proposed Scheme.

#### 4.5.1.9 Landscape and Urban Realm in Section 1

For an overview of the landscape design principles and approach, reference should be made to Section 4.6.12. The following sections provide a description of specific landscape and urban realm design in Section 1 of the Proposed Scheme.

##### 4.5.1.9.1 Village Improvements at the Junction of R817 Kimmage Road Lower and Sundrive Road

The area surrounding the junction of R817 Kimmage Road Lower and Sundrive Road is considered the village centre for Kimmage and represents a focal point for commercial activity within the local area. Currently, this location has a predominance of car parking and a poor visual setting. The urban realm improvement proposals, as shown in Image 4.2, will mainly focus on the core area around the junction of Sundrive Cross where the road area will be significantly reduced at the corners to create four enlarged areas for high-quality landscape treatment with Type 3 finishes consisting of natural stone materials. The large number of new street trees will have a powerful visual effect on the village setting, and these will be complemented by raised planter beds and sheltered seating areas. Type 2 mid-quality materials are proposed to be provided in front of the businesses that extend southwards along the western side of R817 Kimmage Road Lower over a length of 100m (subject to agreement with the landowners for repaving of the private landing areas), and westwards on both sides of Sundrive Road for a length of 70m to the entrance of the Sundrive Shopping Centre. Some permeable paving may be provided to infiltrate the ground rather than drain away to the piped drainage system, and this will help to irrigate the proposed planting.

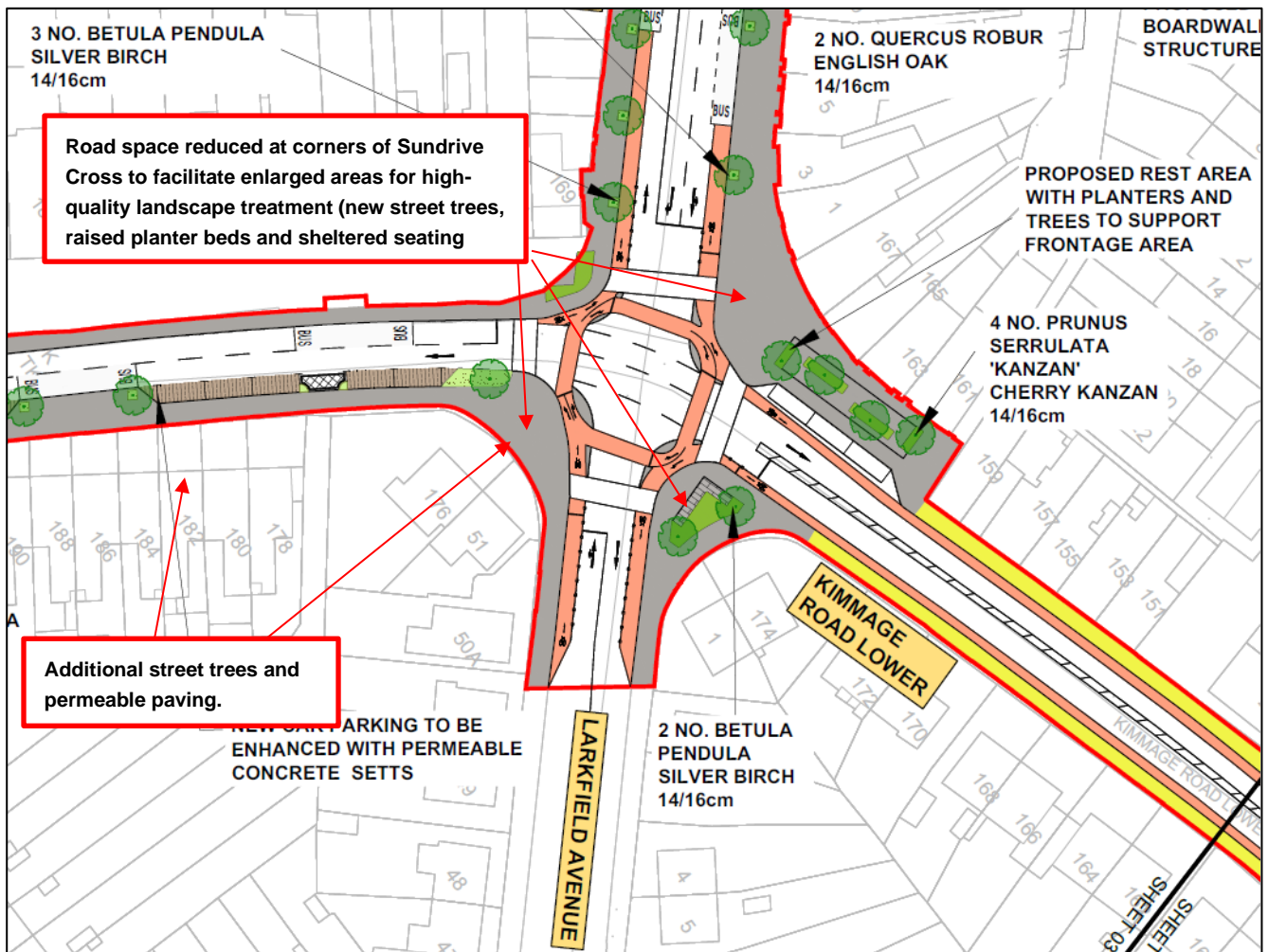


Image 4.2: Urban Realm Upgrade at the Junction of R817 Kimmage Road Lower and Sundrive Road

#### 4.5.1.10 Land Acquisition and Use in Section 1

Temporary and permanent land acquisition is required within Section 1 at the following locations:

- A car park on the northern side of Sundrive Road at the River Poddle crossing, to accommodate the proposed pedestrian and cycle link into Mount Argus View at the Stone Boat feature. Car parking will be reinstated after the works, apart from two spaces at the northern end. A small taxi rank will be relocated from Sundrive Road into the southern end of the car park with three taxi spaces provided. This car park will be used as Construction Compound K1 during the construction works; and
- A part of the private access road to Mount Argus Square will be acquired to become a public route for cyclists and pedestrians, with temporary acquisition of a part of the car park for access during construction of the proposed Stone Boat Boardwalk.

##### 4.5.1.10.1 Rights of Way

Table 4.8 outlines the locations where existing rights of way will be affected by the Proposed Scheme.

**Table 4.8: Existing Rights of Way Affected in Section 1**

Location	Chainage	Existing Situation	Proposed Change
Poddle Park / Ravensdale Park Junction	G6010	Currently, both Poddle Park and Ravensdale Park operate as two-way roads, connected by a junction with no turning or access restrictions.	It is proposed to impose a two-way traffic restriction (i.e. vehicular through traffic is not permitted in either direction) on the Poddle Park branch of the junction. This is intended to prevent rat-running with the implementation of the Bus Gate along Lower Kimmage Road. Vehicular traffic will be able to access Poddle Park (and Blarney Park) via Cashel Road and Stannaway Road. The two-way traffic restriction will facilitate a bike gate however to provide access to the proposed alternative off-line cycle route along Poddle Park and Blarney Park.
Corrib Road / Derravaragh Road Junction	N/A	Currently, both Corrib Road and Derravaragh Road operate as two-way road, connection by a junction with no turning or access restrictions.	It is proposed to impose a two-way traffic restriction (i.e. vehicular through traffic is not permitted in either direction) on the Derravaragh Road branch of the junction. This is intended to prevent rat-running with the implementation of the Bus Gate along Lower Kimmage Road. The two-way traffic restriction will facilitate a bike gate however to provide local access for cyclists.
Aideen Drive / Neagh Road / Derravaragh Road	N/A	Currently there exists a two-way traffic restriction on the Derravaragh Road branch of the junction, with no access available for vehicles or cyclists.	It is proposed to maintain this two-way traffic restriction as it currently exists however it will be enhanced to provide specific access for cyclists by way of the provision of a bike gate.
Aideen Avenue / Mount Tallant Avenue / Derravaragh Road	N/A	Currently there exists a two-way traffic restriction on the Mount Tallant Avenue branch of the junction, with no access available for vehicles or cyclists.	It is proposed to maintain this two-way traffic restriction as it currently exists however it will be enhanced to provide specific access for cyclists by way of the provision of a bike gate.

## 4.5.2 Section 2 - Harold's Cross Road from Harold's Cross Park to Grand Canal

### 4.5.2.1 General Overview of Section 2 of the Proposed Scheme

This section of the Proposed Scheme will commence at the junction of R817 Kimmage Road Lower and R137 Harold's Cross Road at the northern end of Harold's Cross Park and will proceed north for a distance of 400m, to the Grand Canal at Robert Emmet Bridge.

Priority for buses will be provided along the entire length of this section of the Proposed Scheme, with retention and minor extension of the existing dedicated bus lanes along R137 Harold's Cross Road. In the northbound direction, the existing bus lane will be extended by 60m to the stop line at the junction with R111 Parnell Road at the northern end. Left-turning general traffic will not be permitted in the bus lane, and there will be a separate signal stage for the bus only before the general traffic lane green signal. This will avoid any conflicts between left-turning traffic from the right-hand lane that will cross in front of the bus lane. To accommodate this revised signal control arrangement, the existing right-turn movement into R111 Grove Road will be prohibited and all general traffic will use the right-hand lane only. The number of right-turning vehicles is low, and these can instead turn right at Leonard's Corner into R811 South Circular Road, 300m further north. It is likely that traffic from the Kimmage direction and further south will change route away from R817 Kimmage Road Lower due to the proposed Bus Gates and may instead join the orbital route along the Grand Canal further west at Clogher Road.

In the southbound direction, the existing bus lane will be extended by 35m at the northern end, and by 95m at the southern end so that there will be a continuous bus lane over the full 400m length.

New segregated 1.5m wide cycle tracks will be provided in both directions along R137 Harold's Cross Road. Wider 2m cycle tracks are not feasible in the constrained context of the street as described below.

Between Harold's Cross Park and the entrance to Our Lady's Hospice (a distance of 85m) there is on-street parking in indented bays with 10 spaces on the western side in front of No. 66 to 84 Harold's Cross Road, and seven spaces on the eastern side in front of No.75 to 85 Harold's Cross Road. The existing 10 parking spaces on

the western side of the street will be removed to accommodate the proposed northbound cycle track. The existing seven parking spaces on the eastern side of the street will be retained. To compensate for the loss of the 10 on-street parking spaces, it is proposed to provide a new public car park with 22 spaces on the grounds of Our Lady's Hospice where there is a lawn area just inside the entrance. There will be a net additional 12 parking spaces available in this car park for the other residents along R137 Harold's Cross Road where there is a general shortage of parking in the local area.

To accommodate the proposed cycle tracks, road widening will be required of typically 2m over a length of 120m from the entrance to Our Lady's Hospice on the western side to the junction of Mount Drummond Avenue on the eastern side. There is a pinch-point between the hospice entrance and the gate of St. Clare's School on the opposite eastern side, where the distance between buildings is just 19m, and the public road width is 17.2m wide at the narrowest point. The proposed road cross-section will be 18m wide to include two 3m bus lanes, two 3m traffic lanes, two 2m footpaths and two 1.5m cycle tracks. Widening of approximately 0.8m will be required on the eastern side to achieve the 18m width. This will involve encroachment into a garden area at the front of a sheltered housing development operated by Focus Ireland, that is 2.6m wide at that location. It will also be necessary to set back the most northerly of the four gate pillars at the entrance to Our Lady's Hospice, which will be re-erected with the existing cut granite stone materials.

The proposed road widening will be on the eastern side of the street, north of St. Clare's School, with encroachment into the front gardens of 15 houses at No. 33 to 61 Harold's Cross Road and at the entrance to St. Clare's School. These houses are arranged in three terraces of four houses at each end, and a middle terrace of six houses, with the fifteenth property on the corner of Mount Drummond Avenue. The front gardens of the northern and southern terraces of houses are 5.5m long, and these will be reduced by the proposed 2m road widening to 3.5m long. The houses are set at a higher level at about 0.6m above the street level with a short set of steps on the path to the front door. There are no driveways, and residents with cars park on side streets nearby. Accommodation works will be required in the gardens behind the new boundary wall to provide replacement steps or ramps.

There is no on-street parking along this section of R137 Harold's Cross Road, north of Our Lady's Hospice, and this gives rise to difficulties for the residents to receive deliveries or for loading and unloading activities. To address this problem, it is proposed to provide an indented parking bay with four spaces in front of the middle terrace of houses at No. 43 to 53 Harold's Cross Road, which is setback from the adjoining terraces by an additional 3.5m, with 9m long front gardens. The parking bay will encroach by a further 2.5m into these gardens, which will be shortened by 4.5m to 4.5m long.

Four small street trees will be removed in the road widening on the eastern side and these will be replaced by a larger number of new trees at the proposed parking bay, and at the junction of Mount Drummond Avenue which will be narrowed at the corners to provide a shorter crossing for pedestrians, where four new on-street parking spaces will be provided in a revised junction layout with R137 Harold's Cross Road.

North of Mount Drummond Avenue, the existing road is wider at typically 20m wide between boundaries, which can accommodate the proposed 18m wide cross-section, with wider footpaths of up to 3m. This additional space will enable Island Bus Stops to be provided.

The street width reduces to 18m at the junction of Armstrong Street, 60m south of the junction with the R111 on Parnell Road and Grove Road at the Grand Canal. It narrows further to less than 18m over the final 20m to the corner of R111 Parnell Road, where road widening is proposed with encroachment into the garden space at the Fottrell House office building on the south-western side of the junction.

#### **4.5.2.2 Deviations from Standard Cross Sections in Section 2**

The Proposed Scheme has been designed in accordance with the PDGB (NTA 2021) (refer to Appendix A4.1 in Volume 4 of this EIAR) and the TII publications referenced within the PDGB. However, at a number of constrained locations across the Proposed Scheme, the width of the cross-sectional elements has been designed below the desirable minimum identified in the PDGB (as outlined in Section 4.6.1). The width of the cross-sectional elements, as outlined in Section 4.6.1, have been reduced at a number of constrained locations across the Proposed Scheme, as detailed in Table 4.9.

**Table 4.9: Reduced Standard Cross Sections on Section 2**

Location	Design Element	Desirable Minimum	Design	Justification
R137 Harold's Cross Road	Cycle Tracks	2m	1.5m generally and 1.2m over short lengths	Reduced width to fit within the constrained road width.

#### 4.5.2.3 Bus Lane Provision in Section 2

An overview of the bus facilities proposed as part of the Proposed Scheme is provided in Section 4.6.4. Bus lanes will be provided in both directions along the full length of Section 2 on R137 Harold's Cross Road from Harold's Cross Park to the Grand Canal.

#### 4.5.2.4 Bus Stops in Section 2

The different types of bus stop (Island, Shared Landing and Inline) are described in Section 4.6.4. The bus stop locations and types are outlined in Table 4.10 and shown in the General Arrangement series of drawings (BCIDD-ROT-GEO\_GA-0011\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR. Further details of bus stop design is included in the PDGB (NTA 2021) in Appendix A4.1 in Volume 4 of this EIAR.

**Table 4.10: Proposed Bus Stop Locations within Section 2 of the Proposed Scheme**

Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter
Inbound	St. Clare's National School	1344	A-2380	Existing bus stop will be removed and replaced 150m further north where there is space for an island.	
Inbound	New Bus Stop – Le Vere Terrace .	New Bus Stop – 1345.	A-2530	Island	Yes
Inbound	Le Vere Terrace	1345	A-2570	Existing bus stop will be removed and replaced 40m further south where there is space for an island.	
Outbound	Harold's Cross Road	1291	A-2550	Island	Yes

#### 4.5.2.5 Cycling Provision in Section 2

The specific proposals for cycling facilities in Section 2 of the Proposed Scheme are described below. Provisions for cyclists at the signal-controlled junctions are described in Section 4.6.3.5.

Segregated 1.5m wide cycle tracks will be provided along the full 400m length of R137 Harold's Cross Road in Section 2. The desirable width of 2m cannot be achieved in this section due to the limited space between buildings. Short lengths of orbital route cycle tracks will extend along the R111 on Parnell Road and Grove Road through the Grand Canal Junction. These will be extended in future as part of the Greater Dublin Area Cycle Network Plan 2013 / 2022 Greater Dublin Area Cycle Network (NTA 2013; 2022).

#### 4.5.2.6 Junction Information for Section 2

An overview of the approach to junction review and design is provided within Section 4.6.7 with the details of signal-controlled junctions summarised in Table 4.11.

**Table 4.11: Junctions (Signalised) within Section 2 of the Proposed Scheme**

Junction Location	Junction Category	Description	Note
Grand Canal Junction on R137 Harold's Cross Road at the R111 on Parnell Road and Grove Road	Major	4-arm	Modified layout for bus lanes to the stop lines on the northern and southern arms. Cycle tracks on all arms with protected corner islands. Northbound right-turn to R111 Grove Road to be prohibited. New right-turn filter signal from R111 Parnell Road (west) to R137 Harold's Cross Road (south) with a short approach lane.

#### 4.5.2.7 Parking and Loading Bays in Section 2

Changes to parking along Section 2 as a result of the Proposed Scheme are shown in Table 4.12. There will be no change to existing loading provision along this section.

**Table 4.12: Section 2: On-Street Parking Spaces Change Impact Summary**

Location	Type of Parking	Existing	Proposed	Change
Harold's Cross Road between north end of park and Grand Canal	Pay & Display	18	30	12
Harold's Cross Road East (North of Park)	Disabled	1	1	0
Harold's Cross Road between north end of park and Grand Canal - Side Streets	Adjacent	59	59	0
Total	All	78	90	+12 (15%)

#### 4.5.2.8 Structures in Section 2

##### 4.5.2.8.1 Major Structures

There are no existing major structures or new structures required in Section 2.

##### 4.5.2.8.2 Retaining Walls

There are no retaining walls proposed within this section of the Proposed Scheme.

#### 4.5.2.9 Landscape and Urban Realm in Section 2

For an overview of the design principles and approach please refer to Section 4.6.12. There are no specific urban realm improvements proposed within this section of the Proposed Scheme.

#### 4.5.2.10 Land Acquisition and Use in Section 2

Temporary and permanent land acquisition is required within Section 2 at the following locations.

- Our Lady's Hospice and the Focus Ireland housing on the western side of R137 Harold's Cross Road for the provision of a new public car park and some minor road widening;
- No. 33 to 61 and St. Clare's School on the eastern side of R137 Harold's Cross Road for minor road widening to fit cycle tracks in both directions separate from the existing bus lanes; and
- Fottrell House offices at the corner of R137 Harold's Cross Road and R111 Parnell Road for enlargement of the junction to accommodate a new cycle / pedestrian bridge on the western side of Robert Emmet Bridge over the Grand Canal.

##### 4.5.2.10.1 Rights of Way

No rights of way are affected in Section 2 of the Proposed Scheme.



### 4.5.3 Section 3 - Clanbrassil Street Upper and Lower and New Street South from the Grand Canal to the Patrick Street Junction

#### 4.5.3.1 General Overview of Section 3 of the Proposed Scheme

Section 3 of the Proposed Scheme will be approximately 1km long and will commence at Robert Emmet Bridge over the Grand Canal on R137 Clanbrassil Street Upper and will proceed through to the Leonard's Corner Junction at R811 South Circular Road, and then along the R137 on Clanbrassil Street Lower and New Street South, until it reaches the junction with R110 Kevin Street Upper and R137 Patrick Street.

At Robert Emmet Bridge over the Grand Canal, two new cycle / pedestrian bridge structures are proposed on either side of the existing arch bridge to provide footpaths and the northbound cycle track outside of the narrow bridge width.

Priority for buses will be provided mainly with dedicated bus lanes for most of the length, apart from short sections where bus lanes cannot be accommodated within the narrow street and signal controlled bus priority will be provided at the key junction of Leonard's Corner on R811 South Circular Road.

New segregated cycle tracks will be provided in both directions along the full length of this section of the Proposed Scheme.

#### 4.5.3.2 Deviations from Standard Cross Sections in Section 3

The Proposed Scheme has been designed in accordance with the PDGB (NTA 2021) (refer to Appendix A4.1 in Volume 4 of this EIAR) and the TII publications referenced within the PDGB. However, at a number of constrained locations across the Proposed Scheme, the width of the cross-sectional elements has been designed below the desirable minimum identified in the PDGB (as outlined in Section 4.6.1). The deviations for Section 3 are detailed in Table 4.13.

**Table 4.13: Reduced Standard Cross Sections on Section 3 of the Proposed Scheme**

Location	Design Element	Standard	Design	Justification
R137 Clanbrassil Street Upper and Lower	Cycle Tracks	2m	1.5m	Cycle tracks reduced to 1.5m wide over 500m length from the Grand Canal to St. Patrick's Court / Lombard Street West to fit in the constrained space available in the street.

#### 4.5.3.3 Bus Lane Provision in Section 3

An overview of the bus provision within the Proposed Scheme is provided in Section 4.6.4. As outlined within that section, full bus priority through the use of dedicated bus lanes will not be possible at all locations along the Proposed Scheme, and Signal Controlled Priority will be used at a number of junctions as set out in Section 4.6.4. Bus lanes will be provided in both directions along Section 3 as follows:

- Northbound bus lane from the Grand Canal to the Leonard's Corner Junction with R811 South Circular Road, over a length of 280m;
- Shared lane with general traffic over a length of 170m northbound from Leonard's Corner to St. Patrick's Court. The street is too narrow for bus lanes in both directions and a bus priority signal will be provided instead;
- Northbound bus lane from St. Patrick's Court to the junction with R110 Kevin Street Upper and R137 Patrick Street, over a length of 550m;
- Southbound bus lane from the junction with R110 Kevin Street Upper and R137 Patrick Street to the Leonard's Corner Junction with R811 South Circular Road, over a length of 720m;
- Shared lane with general traffic over a length of 100m southbound from Leonard's Corner to opposite Wesley Place where the street is too narrow for bus lanes in both directions and an upstream signal controlled bus priority signal will be provided instead; and

- Southbound bus lane from opposite Wesley Place to the Grand Canal Junction with R111 Grove Road, over a length of 180m.

Signal Controlled Priority will be used at a number of junctions, as well as a Bus Gate in one location, as set out in Table 4.14.

**Table 4.14: Proposed Signal Controlled Priority Junctions within Section 3**

Junction Location	Priority Type	Note
Leonard's Corner Junction on R137 Clanbrassil Street at R811 South Circular Road	Signal	Buses will be released in advance of general traffic by dedicated bus lane signals. This will enable the buses in both directions to enter the single shared lane downstream for a short section where there will be no bus lane. General traffic will move in a separate signal stage after the bus stage has finished, and all traffic will occupy a single lane for all movements. There will be no sharing of the bus lane by left-turning general traffic.  For the orbital bus route on the east-west axis through Leonard's Corner, the streets are too narrow to accommodate both bus lanes and cycle tracks alongside a general traffic lane. To provide both appropriate bus priority and segregated cycle tracks on this important orbital route, advance priority signals will be provided 30m upstream of the junction stop line for the orbital bus lanes on R811 South Circular Road with a single shared lane in the eastbound and westbound directions. General traffic will be held at these upstream signals so that buses can get to the stop line and bypass any traffic queue. The upstream traffic signal will then release just before the main traffic signal to allow vehicles to move forward if the storage area ahead is clear. A late arriving bus can merge right into the general traffic lane if necessary while the main green signal is operational.
R110 Kevin Street Upper Junction	Signal	An early release bus lane signal will allow buses to weave right across the head of the traffic lane to reach the right-turn lane for the movement into Kevin Street.

#### 4.5.3.4 Bus Stops in Section 3

The different types of bus stop (Island, Shared Landing and Inline) are described in Section 4.6.4. The bus stop locations and types are outlined in Table 4.15 and shown in the General Arrangement series of drawings (BCIDD-ROT-GEO\_GA-0011\_XX\_00-DR-CR-9001) in Volume 3 of this EIAR. Further details of bus stop design is included in the PDGB (NTA 2021) in Appendix A4.1 in Volume 4 of this EIAR.

**Table 4.15: Proposed Bus Stop Locations in Section 3 of Proposed Scheme**

Inbound / Outbound	Bus Stop Name	Bus Stop Number	Chainage	Bus Stop Type	Bus Shelter	Notes
Inbound	Clanbrassil Street Upper	1347	A-2850	Narrow island	Yes	N/A
Inbound	Clanbrassil Street	2634	A-3045	Narrow island	Yes	N/A
Inbound	Lombard Street West	2635	A-3200	Full Island	Yes	Moved 90m north to A-3270 for better spacing
Inbound	New Street South	2636	Bus stop to be removed for better spacing			
Inbound	Kevin Street	5097	A-3655	Full Island	Yes	N/A
Outbound	Clanbrassil Street Upper	1290	A-2825	Narrow island	Yes	N/A
Outbound	New Bus Stop – Leonard's Corner.	New	A-3025	Narrow island	Yes	N/A
Outbound	St. Kevin's Parade	2388	A-3250	Full Island	Yes	Moved 100m north to A-3350 for better spacing
Outbound	Long Lane	2387	Bus stop to be removed for better spacing			
Outbound	New Street South	2386	A-3775	Full Island	Yes	N/A

#### 4.5.3.5 Cycling Provision in Section 3

The specific proposals for cycling facilities in Section 3 of the Proposed Scheme are described below. Provisions for cyclists at the signal-controlled junctions are described in Section 4.6.3.5.

Segregated 1.5m wide cycle tracks will be provided along the southern half of the 1km length of Section 3 where the desirable width of 2m cannot be achieved due to the limited space between buildings. In the northern half of this section, wider 2m cycle tracks will be provided, mainly by narrowing the traffic lanes to 3m, and by encroaching for 0.5m into the footpaths, which are generously wide at typically 4m or more.

Short lengths of orbital route cycle tracks will extend along R811 South Circular Road through the Leonard's Corner Junction. These will be extended in future as part of the Greater Dublin Area Cycle Network Plan 2013 / 2022 Greater Dublin Area Cycle Network (NTA 2013; 2022).

#### 4.5.3.6 Junction Information for Section 3

An overview of the approach to junction review and design is provided within Section 4.6.7. The signal-controlled junctions within Section 3 are outlined in Table 4.16.

**Table 4.16: Junctions (Signalised) within Section 3 of the Proposed Scheme**

Junction Location	Junction Category	Description	Note
R137 Clanbrassil Street Upper / Windsor Terrace	Minor	3-arms	This minor junction at the northern end of Robert Emmet Bridge over the Grand Canal will be signalised and linked to the nearby junction on the southern side of the bridge, which will allow access for northbound cyclists to join the quiet streets route along the northern side of the canal.  A pedestrian crossing will also be provided across R137 Clanbrassil Street Upper on the northern side of the junction.
Leonard's Corner Junction on R137 Clanbrassil Street at R811 South Circular Road	Major	4 arms	Modified layout for bus lanes to the stop lines on the northern and southern arms.  Cycle tracks on all arms with protected corner islands.  Northbound right-turn pocket to R811 South Circular Road eastbound.  Advance priority signals upstream for orbital bus lanes on R811 South Circular Road with a single shared lane in the eastbound and westbound directions.
Clanbrassil Street Lower / Malpas Street / New Street South / Long Lane	Minor	4 arms	Existing junction with minor modification to bring bus lanes to the stop lines on the north-south axis.
New street South / Kevin Street Upper Link Road	Moderate	3 arms	Minor modification to bring bus lanes to the stop lines on the north-south axis.  New pedestrian crossing on the southern arm.
New street South / Kevin Street Upper / Patrick Street / Dean Street	Major	4 arms	No changes to the existing layout.

#### 4.5.3.7 Parking and Loading Bays in Section 3

Changes to parking and loading provision along Section 3 as a result of the Proposed Scheme are shown in Table 4.17 and Table 4.18, respectively.

**Table 4.17: Section 3: On-Street Parking Spaces Change Impact Summary**

Location	Type of Parking	Existing	Proposed	Change
Side Street parking between Grand Canal and Patrick Street junction	Adjacent	139	139	0
Clanbrassil Street Upper between Grand Canal and South Circular Road junction	Pay & Display	11	6	-5
Clanbrassil Street Lower and New Street South up to Patrick Street junction	Pay & Display	36	22	-14
Clanbrassil St. Lower West (across Lombard Street West junction)	Disabled	1	1	0
Total	All	187	168	-19 (-10%)

**Table 4.18: Section 3: Existing and Proposed Loading Bays**

Location	Type of Parking	Existing	Proposed	Change
Clanbrassil St. Lower West (across Lombard Street West junction)	Loading	3	3	0
Clanbrassil St. Lower East (McDonnell Street)	Loading	3	3	0
Clanbrassil St. Lower West (Malpas Steet)	Loading	3	3	0
Cathedral Court	Loading	2	2	0
New Street East (Maldron Hotel)	Loading	1	1	0
Total	All	12	12	0

#### 4.5.3.8 Structures in Section 3

The existing bridge structure in Section 3 of the Proposed Scheme is indicated in Table 4.19.

**Table 4.19: Existing Bridge Structure in Section 3 of the Proposed Scheme**

Identity	Chainage	Description
Robert Emmet Bridge Harold's Cross	A-2690	Early twentieth century single-arch concrete 15m wide bridge over the Grand Canal.

The road on the existing bridge is too narrow at just 15m wide to accommodate the required road layout with bus lanes and cycle tracks in both directions and new cycle / pedestrian bridge structures are proposed to accommodate an improved street layout, as outlined in Table 4.20.

**Table 4.20: Proposed Bridge Structures in Section 3 of the Proposed Scheme**

Identity	Chainage	Description
Kimmage 01A - Grand Canal Cycle / Pedestrian Bridge 1 - West	A-2690	A three-span 23.5m long x 6m wide steel bridge adjacent to Robert Emmet Bridge on the western side.
Kimmage 01B - Grand Canal Pedestrian Bridge 2 - East	A-2690	A three-span 24.5m long x 3.5m wide steel bridge adjacent to Robert Emmet Bridge on the eastern side.
Kimmage 04 – Windsor Terrace Ramp	A-2690	Extended ramp from Clanbrassil Street Upper along southern side of Windsor Terrace for improved footpath link: 2m wide x 20m long steel cantilever with reinforced earth sub-structure at the eastern end.

The road layout on the existing Robert Emmet Bridge will be modified to provide two 3m bus lanes, two 3m traffic lanes, a 2m wide southbound cycle track and two 0.5m wide rubbing strips beside the parapets within the 15m width available. The footpaths will be removed and replaced on the adjoining cycle / pedestrian bridges.

The western cycle / pedestrian bridge will carry a new 3m wide cycle track, which will be divided into a straight-ahead cycle lane and a right-turn cycle lane linking to Windsor Terrace on the northern bank of the Grand Canal. There will be a 2m wide footpath on the western side within the 5m space between the parapets.

The cycle / pedestrian bridge decks will be in perforated steel to allow drainage to the canal beneath and will be supported on a pair of longitudinal steel beams (0.5m in depth). The depth of the new bridges will be similar to that of the existing arch at the mid-span section, so the vertical clearance over the canal will remain the same. Glass parapets will retain visibility of the existing distinctive balustrades on the existing Robert Emmet Bridge.

The foundations of the bridge abutments and piers will be supported by bored concrete piles, which will avoid the need for deep excavations close to the canal.

#### 4.5.3.8.1 Retaining Walls

The existing retaining walls in Section 3 of the Proposed Scheme are indicated in Table 4.21.

**Table 4.21: Existing Retaining Walls in Section 3 of the Proposed Scheme**

Identity	Chainage	Description
Clanbrassil Street Retaining Wall 1	A-2700 to 2770	70m long x up to 3.5m high masonry retaining wall along the western side of R137 Clanbrassil Street Upper at the access to Gordon's Fuels beside the Grand Canal.
Clanbrassil Street Retaining Wall 2	A-2730 to 2760	30m long x up to 1.5m high masonry retaining wall along the western side of R137 Clanbrassil Street Upper between the access to Gordon's Fuels and Mullen Scrap.

The following retaining walls are proposed, as outlined in Table 4.22.

**Table 4.22: Proposed Retaining Walls in Section 3 of the Proposed Scheme**

Identity	Chainage	Description
Clanbrassil Street New Retaining Wall (Structure 03)	A-2700 to 2763	63m long x up to 3.5m high reinforced concrete retaining wall with reused masonry facing along the western side of R137 Clanbrassil Street Upper for a new combined access to Gordon's Fuels at Mullen Scrap. The existing granite coping stones and limestone masonry will be reused in the parapet on the new wall to retain the appearance of the original wall.

The existing Clanbrassil Street Retaining Wall 1 at the edge of the street will be retained below ground level in the widened street and will be buried behind the new retaining wall to be constructed approximately 4.5m to the west. The parapet wall above ground level will be carefully dismantled and the limestone masonry and granite coping stones retained for reuse in the parapet on top of the new retaining wall.

The existing lower Clanbrassil Street Retaining Wall 2 that divides the upper access lane to Gordon's Fuels from the lower access lane to Mullen Scrap will be demolished once the new retaining wall to the rear is constructed. That will enable the lower laneway to be widened for a shared access to both properties. The natural stone materials from this wall will be salvaged for reuse in cladding the new wall.

#### 4.5.3.9 Landscape and Urban Realm in Section 3

For an overview of the design principles and approach, please refer to Section 4.6.12. The following sections provide a description of specific landscape and urban realm designs in Section 3 of the Proposed Scheme.

##### 4.5.3.9.1 Urban Realm Improvement at St. Patrick's Court

At St. Patrick's Court, the R137 Clanbrassil Street Lower widens out on the western side by up to 20m in a triangular area that extends northwards for 50m. This area has some grass beds at present, with no further landscape planting. During the Construction Phase, parts of these landscaped areas will accommodate a small temporary Construction Compound. Afterwards, it will be reinstated and improved with some new trees and ornamental planting where the compound had been located.

#### 4.5.3.10 Land Acquisition and Use in Section 3

Temporary and permanent land acquisition is required within Section 3 at the residential dwelling at Gordon's Fuels and in front of the adjoining properties at No. 29 to 32 Clanbrassil Street Upper for minor road widening to fit bus lanes and cycle tracks in both directions.

##### 4.5.3.10.1 Rights of Way

Table 4.23 outlines the locations where existing rights of way will be affected by the Proposed Scheme.

**Table 4.23: Existing Rights of Way Affected**

Location	Chainage	Existing Situation	Proposed Change
Clanbrassil Street Lower (Gordon's Fuels)	A2775	Currently, Gordon's Fuels (and other businesses immediately adjacent to it) are accessed via two laneways running immediately parallel to Clanbrassil Street Upper.	It is proposed to realign and restructure the existing laneways to comprise of a single laneway positioned further west of their existing alignments to facilitate the widening of the carriageway along Clanbrassil Street Upper. All existing access requirements will be maintained under this new arrangement.

## 4.6 Key Infrastructure Elements

The following sections provide a description of the main infrastructure elements of the Proposed Scheme. The Proposed Scheme has been designed following guidance relating to the design principles for urban streets, bus facilities, cycle facilities and urban realm encapsulated in the PDGB (refer to Appendix A4.1 in Volume 4 of this EIAR), as outlined in Section 4.4.

### 4.6.1 Mainline Cross-Section

Traffic lane widths (including bus lanes) will follow the guidance outlined in DMURS (Government of Ireland 2013), with the preferred width of traffic lanes on the Proposed Scheme being:

- 3m in areas with a posted speed limit <60km/h; and
- 3.25m in areas with a posted speed limit >60km/h.

Traffic lane width of 2.75m is permissible but not desirable and should only be permitted on straight road sections with very low Heavy Goods Vehicle (HGV) percentage and where all desirable minimum widths for footpaths, cycle tracks, parking, bus lanes are not achievable without impact on third-party lands, if appropriate, taking all design factors into account in the context of the Proposed Scheme objectives.

The desirable minimum width for a single direction, with flow, raised adjacent cycle track is 2m. Based on the NCM (NTA 2011), this allows for overtaking within the cycle track. The minimum width is 1.5m. The desirable width for a two-way cycle track is 3.25m with a 0.5m buffer between the cycle track and the carriageway.

2m is a desirable minimum width for footpaths with 1.2m being an absolute minimum width at pinch points.

An example of the typical BusConnects road layout (without multiple traffic lanes in each direction or median) is shown in Image 4.3.

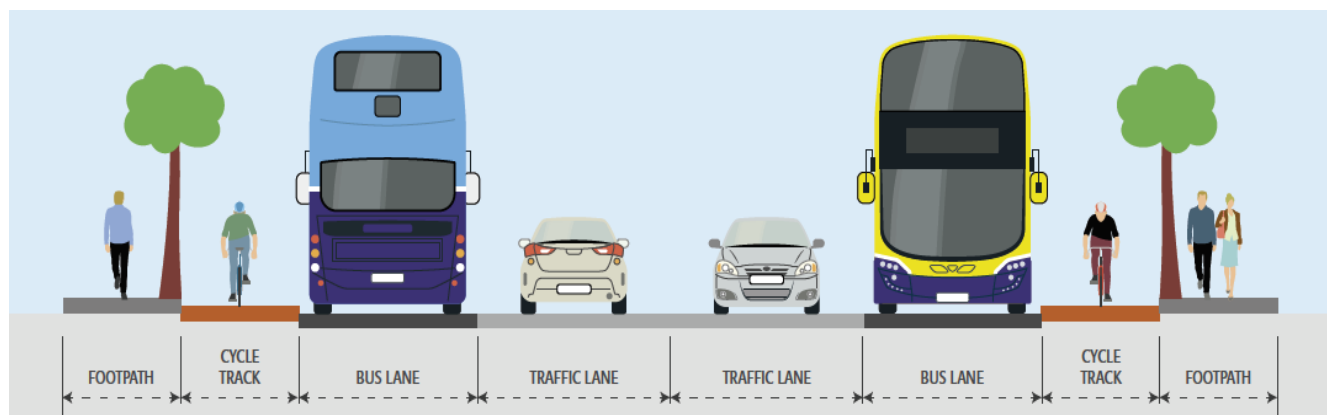


Image 4.3: Typical BusConnects Road Layout (as per the PDGB)

The cross-sectional design of the mainline has been developed to achieve the desirable width criteria contained within the PDGB, wherever reasonably practicable. Where these criteria are not achievable, for instance due to physical constraints at pinch points, the widths have been reduced as shown in Table 4.24.

Table 4.24: Cross-Sectional Design Parameters

Design Element	Desirable Minimum Standard	Minimum Width	Permitted Reductions at Constraints
Footway	2m	1.8m	1.2m (over distances <2m as per the PDGB in Appendix A4.1 in Volume 4 of this EIAR)
Cycle Track (one-way)	2m	1.5m	1.2m (over distances <2m as per the PDGB in Appendix A4.1 in Volume 4 of this EIAR:)
Cycle Track (two-way)	3.25m + 0.5m (buffer)	Refer to National Cycle Manual Width Calculator. 0.3m (buffer)	Reduced at bus stops.
Bus Lane	3m	3m	n/a
Traffic Lane	3m (<60km/h)	3m	2.75m (low HGV flow)

For the Proposed Scheme, the width of the bus lanes and traffic lanes have not been reduced below 3m. The width of some of the other cross-sectional elements detailed in Table 4.24 have been reduced at a number of constrained locations across the Proposed Scheme. These deviations from the standards are outlined for each section of the Proposed Scheme in Section 4.5.

## 4.6.2 Pedestrian Provision

### 4.6.2.1 Footpath Widths

The desirable minimum width for a footpath is 2m. This width should be increased in areas catering for significant pedestrian volumes where space permits. DMURS (Government of Ireland 2013) defines the absolute minimum footpath width for road sections as 1.8m based on the width required for two wheelchairs to pass each other. Building for Everyone: A Universal Design Approach (NDA 2020), defines acceptable minimum footpath widths at specific pinch points as being 1.2m wide over a 2m length of path.

In line with the Road User Hierarchy designated within DMURS, at pinch points, the width of the general traffic lane should be reduced first, then the width of the cycle track should be reduced before the width of the footpath is reduced, where practicable.

Throughout the Proposed Scheme, footpath widths of 2m or wider have been proposed.

#### 4.6.2.2 Pedestrian Crossings

Where possible, DMURS (Government of Ireland 2013) recommends that designers provide pedestrian crossings that allow pedestrians to cross the street in a single, direct movement. To facilitate road users who cannot cross in a reasonable time, the desirable maximum crossing length without providing a refuge island applied across the Proposed Scheme is 19m. This is applicable at stand-alone pedestrian crossings as well as at junctions. There are no pedestrian crossings in the Proposed Scheme that are not direct single stage crossings.

Along the Proposed Scheme, pedestrian crossings are generally 2.4m in width.

At signalised junctions and standalone pedestrian crossings, the footpath is to be ramped down to carriageway level to facilitate pedestrians who require an unobstructed crossing. At minor junctions, raised tables will be provided to raise the road level up to footpath level and facilitate unimpeded crossing. Tactile paving will be provided at the mouth of each pedestrian crossing and audio units will be provided on each traffic signal push button to assist mobility impaired users. Pedestrian crossings are indicated in the Landscaping drawings (BCIDD-ROT-ENV\_LA-0011\_ML\_00-DR-LL-9001) in Volume 3 of this EIAR.

One new pedestrian signal crossing will be provided on R137 Harold's Cross Road at St. Clare's School, just north of the entrance to Our Lady's Hospice. The nearest existing pedestrian crossings are 120m to the north and south. At several other locations, such as at the Ravensdale Park Junction, additional pedestrian crossing signals will be provided to ensure that all crossings are actively controlled.

#### 4.6.3 Cycling Provision

One of the objectives for the Proposed Scheme is to enhance the potential for cycling by providing safe infrastructure, segregated from general traffic, wherever practicable. Physical segregation ensures that cyclists are protected from motorised traffic and can bypass vehicular congestion, thus improving cyclist safety and reliability of journey times. Physical segregation can be provided in the form of vertical segregation (e.g. raised kerbs), horizontal segregation (e.g. parking / verge protected cycle tracks), or both. Bike racks will generally be provided, where practicable, at bus stops and key additional locations as noted in the Landscaping General Arrangement drawings (BCIDD-ROT-ENV\_LA-0011\_ML\_00-DR-LL-9001) in Volume 3 of this EIAR.

The 'preferred cross-section template' developed for the Proposed Scheme includes protected cycle tracks, providing vertical segregation from the carriageway to the cycle track and vertical segregation from the cycle track to the footpath.

The principal source for guidance on the design of cycle facilities is the NCM (NTA 2011) and the PDGB in Appendix A4.1 in Volume 4 of this EIAR.

The desirable minimum width for a single-direction, with-flow, raised-adjacent cycle track is 2m. This arrangement allows for two-abreast cycling, and based on the NCM Width Calculator, this also allows for overtaking within the cycle track. The minimum width is 1.5m, which based on the NCM Width Calculator, allows for single file cycling. Localised narrowing of the cycle track below 1.5m is also necessary over very short distances to cater for local constraints (e.g. exceptional mature trees).

The desirable minimum width for a two-way cycle track is 3.25m. In addition to this, a buffer of 0.5m should be provided between the two-way cycle track and the carriageway. Using the NCM Width Calculator, reduction of these desirable minimum widths can be considered on a case-by-case basis, with due cognisance of the volume of cyclists anticipated to use the route as well as the level of service required.

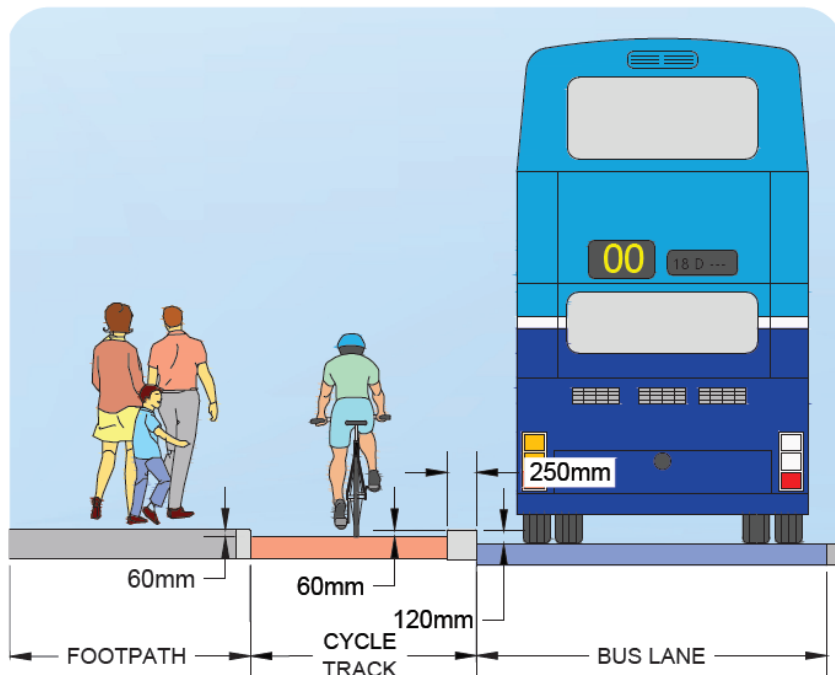
The Proposed Scheme is approximately 3.7km long (7.4km in the two directions) and includes approximately 3.5m of segregated cycle tracks (both directions combined) compared with an existing provision of no cycle tracks, and 6km of unsegregated cycle lane. These facilities combine with the existing bus lanes to form a continuous link for cyclists. However, the cycle lanes are narrow and advisory only, providing limited protection for users from other traffic. Furthermore, these cycle lanes only operate part-time, during peak-times (i.e. inbound in the morning and outbound in the evening), allowing for parking to be facilitated in the interim period. As such, the existing



quality of service for cycling is considered quite poor along the route of the Proposed Scheme. Details of the proposed cycle provision throughout the extent of the Proposed Scheme are provided in the following sections.

#### 4.6.3.1 Cycle Tracks

A cycle track is a segregated lane dedicated to cycling which is physically separated from the adjacent traffic lane and / or bus lane horizontally and / or vertically, as shown in Image 4.4 taken from the PDGB in Appendix A4.1 in Volume 4 of this EIAR.



**Image 4.4: Fully Segregated Cycle Track**

Segregated cycle tracks will be provided along approximately 3.5km of the Proposed Scheme. The Proposed Scheme will provide new segregated cycle tracks in both directions alongside the bus lanes from Harold's Cross Park, northward, over a length of 1.5km along the R137 on Harold's Cross Road, Clanbrassil Street and New Street South. An additional length of 350m of cycle tracks will be provided along the eastern side of Harold's Cross Park to cater for cyclists on the route from Terenure. Further south, cycle tracks will be provided over a length of 260m along R817 Kimmage Road Lower, immediately to the north of the KCR Junction. These cycle tracks will generally be 2m wide but will narrow to a minimum width of 1.5m, where necessary, to fit within the constrained street widths along R137 Harold's Cross Road over a length of 400m, and a short length of R137 Clanbrassil Street Lower, just north of the Leonard's Corner Junction.

On the western side of the Robert Emmet Bridge over the Grand Canal on R137 Clanbrassil Street Upper, there will be a 4m wide cycle track divided into a pair of 2m wide lanes, which will cater for a large number of northbound cyclists turning right onto the 'Grand Canal Cycleway' at Windsor Terrace in the eastbound direction.

#### 4.6.3.2 Cycle Lanes

Cycle lanes do not have vertical and / or horizontal separation from adjacent traffic lanes. The existing advisory cycle lanes will be retained along R817 Kimmage Road Lower within the proposed Bus Gates, over a length of 2km between Ravensdale Park, just north of the KCR Junction at the southern end, and the northern end of Harold's Cross Park. The proposed Bus Gates will divert all through-traffic from this section of the street, which will greatly improve the safety and comfort of cyclists along a much quieter street. A reduced speed limit of 30km/h will also apply on this section of the street, which will considerably narrow the speed differential between traffic and cyclists.

#### **4.6.3.3 Quiet Street Treatment**

Where Core Bus Corridor roadway widths cannot facilitate cyclists without significant impact on bus priority, alternative cycle routes are explored, where appropriate and feasible, away from the Proposed Scheme bus route. Such offline options may include directing cyclists along streets with minimal general traffic other than car users who live on the street. Guidance in this regard has been provided within the PDGB in Appendix A4.1 in Volume 4 of this EIAR, which states:

*'Diversions of proposed cycle facilities on to quieter parallel routes, to avoid localised narrowing of cycle tracks on the main CBC route, is to be considered in the context of the CBC route being listed as a primary cycle route as per the Greater Dublin Area Cycle Network Plan. These diversions, however, may also be considered where appropriate cycle facilities cannot be provided along the CBC route without significant impact.'*

These are called Quiet Streets due to the low volume of only local general traffic users travelling at low speed and are deemed suitable and safe for cyclists sharing the roadway with the general traffic without the need to construct segregated cycle tracks or painted cycle lanes. The Quiet Street Cycle Routes would involve appropriate advisory signage for both the general road users and cyclists. Quiet Street Cycle Routes are available along the residential streets to the west and east of R817 Kimmage Road Lower. These streets have some existing restrictions for through-traffic, and a number of additional restrictions will be applied to prevent traffic from diverting off R817 Kimmage Road Lower due to the proposed Bus Gates.

On the western side of the Proposed Scheme corridor, 'The Poddle Way' will be an alternative Quiet Street Treatment route that generally follows the course of the River Poddle from Ravensdale Park northwards. The Quiet Street Treatment will involve appropriate direction signs, road markings and advisory signage for the general road users. The Quiet Street Cycle Route has been proposed over a length of 1.1km along Poddle Park Road, Bangor Road, Blarney Park, Mount Argus Way, and Mount Argus View where it will re-join R817 Kimmage Road Lower for a distance of 0.9km to Harold's Cross Park.

#### **4.6.3.4 Treatment of Constrained Areas**

At some locations along the Proposed Scheme, standard width of cycleways cannot be achieved, and localised narrowing will be required. All locations where substandard widths are required have been recorded and presented in each of the sections of the Proposed Scheme as described in Section 4.5.

#### **4.6.3.5 Cycle Provision Through Junctions**

Junctions have been designed to facilitate a high level of safety, comfort, and priority for sustainable modes of travel (i.e. walking and cycling) and for public transport by prioritising the space and time allocated to these modes within the operation of a junction. This will also accommodate the forecast future year traffic volumes as safely and efficiently as possible within the remaining space and time. This has allowed the BusConnects Infrastructure team to maximise the number of people moving through each junction and to prioritise these sustainable modes of travel.

These locations (as well as the location of cycle stands) are shown on the General Arrangement drawings (BCIDD-ROT-GEO\_GA-0011\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR.

#### **4.6.4 Bus Priority Provision**

One of the objectives of the Proposed Scheme is to enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements. Several measures can be used to achieve this. This is described further in this Section.

#### **4.6.4.1 Bus Lanes**

Bus Priority can be achieved by means of providing a dedicated lane within the carriageway for the bus to travel independently from the general traffic. This includes priority through junctions by bringing the bus lane to the junction stop line as per the general traffic lanes. This means in some circumstances that left-turning traffic cannot use the bus lane at junctions and instead will be provided a dedicated left-turn traffic signal phase for the turn movement off the general traffic lane or will be provided with a separate left-turning lane. In general, bus lanes will be a minimum of 3m wide. This is as per the guidance for traffic lane width outlined in DMURS (Government of Ireland 2013). Larger lane widths are needed in some instances to enable buses to navigate corners, etc. ('swept path'). Bus Lanes are shown on the General Arrangement drawings (BCIDD-ROT-GEO\_GA-0011\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR.

#### **4.6.4.2 Signal Controlled Priority**

An alternative measure for achieving bus priority at locations where the provision of bus lanes is not possible is the use of Signal Control Priority (SCP). SCP facilitates bus priority by using traffic signals to give buses priority ahead of general traffic on sections of a route with significant physical constraints or pinch-points impacting on the provision of a bus lane. Typical pinch-points arise where the existing carriageway is narrow (no bus lane or segregated cycle track) due to existing buildings or structures that cannot be demolished or modified to widen the road to make space for a bus lane. While SCP is a good alternative to a physical bus lane it is only effective for short distances. It works through the use of traffic signal controls (typically at junctions) where the bus lane and general traffic lane must merge ahead and share the road space for a short distance until the bus lane recommences downstream. The general traffic will be stopped at the signal to allow the bus pass through the narrow section first. SCP will fail if downstream congestion blocks access to the downstream bus lane. Image 4.5 illustrates a schematic operation of SCP.



Image 4.5: SCP Schematic Operation ((PDGB) (NTA 2021))

Continuous bus priority is being provided along the Proposed Scheme, insofar as possible. Bus priority signals have been allocated at every junction where bus services could suffer conflicts with turning vehicles. Where there is no space downstream to provide a bus lane, there will be a bus priority signal to enable the bus to proceed into the shared lane section before general traffic. This arrangement is proposed at the following junction:

- Leonard's Corner at R811 South Circular Road (all four directions on the radial and orbital routes).

#### 4.6.4.3 Bus Gates

A Bus Gate is a sign-posted short length of stand-alone bus lane. This short length of road is restricted exclusively to buses, taxis, cyclists and emergency vehicles. It facilitates bus priority by removing general through-traffic along the overall road where the Bus Gate is located. General traffic is directed by signage to divert towards other roads before it arrives at the Bus Gate.

The hours of operation of the Bus Gate will be subject to ongoing review based on prevailing traffic conditions and the goal of achieving the Proposed Scheme objectives. The NTA and local authority will co-operate in good faith to address any issues with the hours of operation that may arise during the lifetime of the Proposed Scheme.

Four Bus Gates are proposed along the Proposed Scheme to ensure bus priority, as follows:

- Bus Gate No.1: On R817 Kimmage Road Lower, just north of the Ravensdale Park Junction;
- Bus Gate No.2A: On R817 Kimmage Road Lower, just south of Harold's Cross Park;
- Bus Gate No.2B: On R817 Kimmage Road Lower, at the northern end of Harold's Cross Park; and
- Bus Gate No.3: On the R137 at the Harold's Cross Road and Kenilworth Park Junction.

Bus priority along R817 Kimmage Road Lower will be controlled by a total of three Bus Gates: one near the southern end, and a pair at each end of Harold's Cross Park. These Bus Gates will operate as described below.

It is proposed to provide a southern Bus Gate on R817 Kimmage Road Lower just north of the junction with Ravensdale Park. This will divert through traffic away from R817 Kimmage Road Lower. This Bus Gate will operate in the peak hour periods from 6am to 10am and 4pm to 8pm, 7 days a week in both directions, which will enable local access to and from the south at off-peak times that will not adversely affect bus operations and traffic conditions for cyclists.

The second pair of Bus Gates will control traffic movements at the northern end of R817 Kimmage Road Lower at each end of Harold's Cross Park. Southbound traffic on R137 Harold's Cross Road will not be permitted to turn right into R817 Kimmage Road Lower at the northern end of Harold's Cross Park. Southbound traffic heading to Mount Jerome Cemetery or Mount Argus Road will instead turn right at the southern end of Harold's Cross Park to connect westwards. Other traffic towards Kimmage will continue southwards along R137 Harold's Cross Road and turn right at Kenilworth Park, where a right-turn lane and filter traffic signal will be provided. Traffic, other than bicycles, will not be permitted to turn left from the southern end of Harold's Cross Park at McGowan's pub.

The proposed Bus Gate at the northern end of Harold's Cross Park will only operate in the northbound direction during the morning peak period from 6am to 10am, 7 days a week. This will prevent traffic from circumventing any peak period traffic queue on R137 Harold's Cross Road. At all other times this Bus Gate will be open for general traffic, which will suit exit movements from funerals at Mount Jerome Cemetery in particular, as well as for the local residents.

A fourth Bus Gate is proposed off the main bus corridor at the junction of R137 Harold's Cross Road with Kenilworth Park to the east of the route. This Bus Gate will operate on a 24-hour / 7-day basis and will reduce the entry movements of general traffic from 5-arms to 4-arms, which will simplify the signal operations to enable the provision of a southbound right-turn signal stage, as described above for the diversion route from R817 Kimmage Road Lower at Harold's Cross Park. It will also benefit the orbital bus movements in the westbound direction on the current bus routes 18 and 83.

#### **4.6.4.4 Treatment at Pinch Points**

In line with the Road User Hierarchy designated within DMURS (Government of Ireland 2013), at pinch points, the width of the general traffic lane should be reduced first, then the width of the cycle track should be reduced before the width of the pedestrian footpath is reduced. The Proposed Scheme design reflects this approach, where practicable.

#### **4.6.4.5 Bus Stops**

To improve the efficiency of the bus service along the Proposed Scheme, the position and number of bus stops has been evaluated as part of a bus stop assessment.

The criteria that are considered when locating a bus stop are as follows:

- Driver and waiting passengers are clearly visible to each other;
- Location close to key facilities;
- Location close to main junctions without affecting road safety or junction operation;
- Location to minimise walking distance between bus interchange stops;
- Where ideally there is space for a bus shelter;
- Location in pairs, 'Tail to Tail' opposite sides of the road;

- Close to (and on exit side of) pedestrian crossings;
- Away from sites likely to be obstructed; and
- Adequate footpath width.

For the CBC Infrastructure Works it is proposed that bus stops should be preferably spaced approximately 400m apart on typical suburban sections of route, dropping to approximately 250m in urban centres.

It is important that bus stops are not located too far from pedestrian crossings as pedestrians will tend to take the quickest route, which may be hazardous. Locations with no or indirect pedestrian crossings should be avoided.

The following bus stop designs were considered for use on the Proposed Scheme; the Island Bus Stop, the Shared Landing Bus Stop, the Inline Bus Stop, and the Layby Bus Stop.

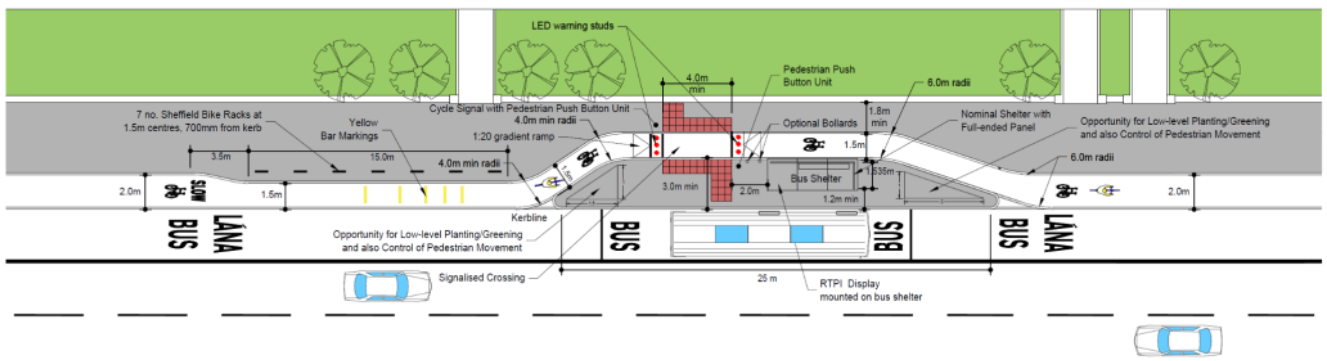
Further detail on the design and locations of bus stops along the Proposed Scheme is provided earlier in Section 4.5.

#### 4.6.4.5.1 Island Bus Stops

Where sufficient space allows, Island Bus Stops are the preferred bus stop option for the Proposed Scheme.

This option will reduce conflict between cyclists and stopping buses by deflecting cyclists behind the bus stop. To address the pedestrian / cyclist conflict, a pedestrian priority crossing point is provided for pedestrians accessing the bus stop area. Part-time signals will enable controlled crossing. Visually impaired pedestrians may call for a fixed green signal when necessary and the cycle signal will change to red. The cycle track will narrow from 2m to 1.5m for single file cycling through the bus stop, as overtaking is not required in this area.

Examples of Island Bus Stops are shown in Image 4.6 (one-way cycle track) and Image 4.7 (two-way cycle track).



**Image 4.6: Island Bus Stop Arrangement (One-Way Cycle Track)**

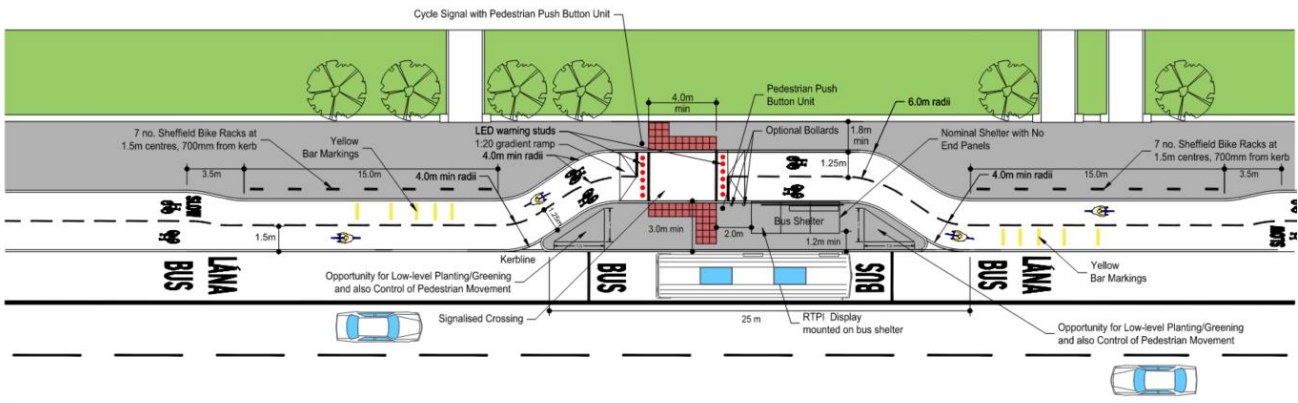


Image 4.7: Island Bus Stop Arrangement (Two-Way Cycle Track)

#### 4.6.4.5.2 Shared Bus Stop Landing Zone

Where space constraints do not allow for an Island Bus Stop, an option consisting of a Shared Landing Bus Stop Zone is proposed. It is designed to reduce conflict between cyclists and stopping buses by ramping cyclists up to footpath level where they continue through the stop. The cycle track will also be narrowed when level to the footpath and tactile paving provided to prevent pedestrian / cyclist conflict. An example of a Shared Landing Bus Stop is shown in Image 4.8.

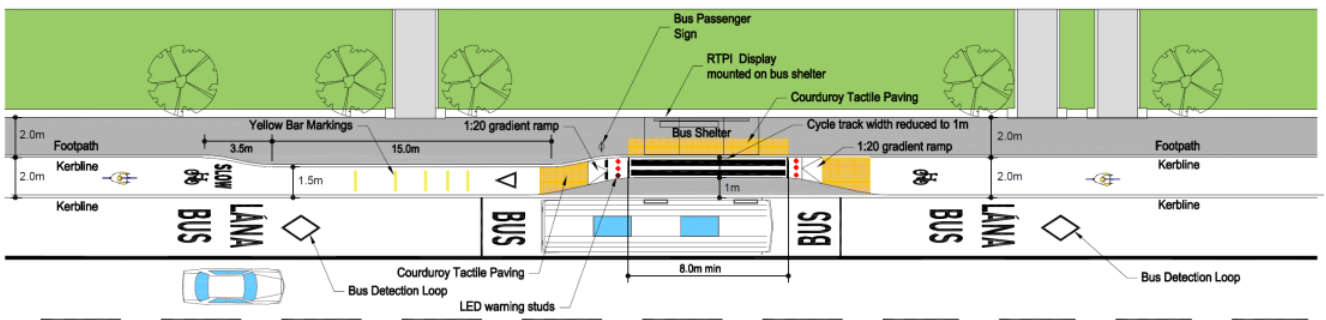


Image 4.8: Shared Landing Bus Stop Arrangement

The location of Shared Landing Bus Stops, which are required in some locations along the Proposed Scheme due to localised space constraints are outlined in Section 4.5.

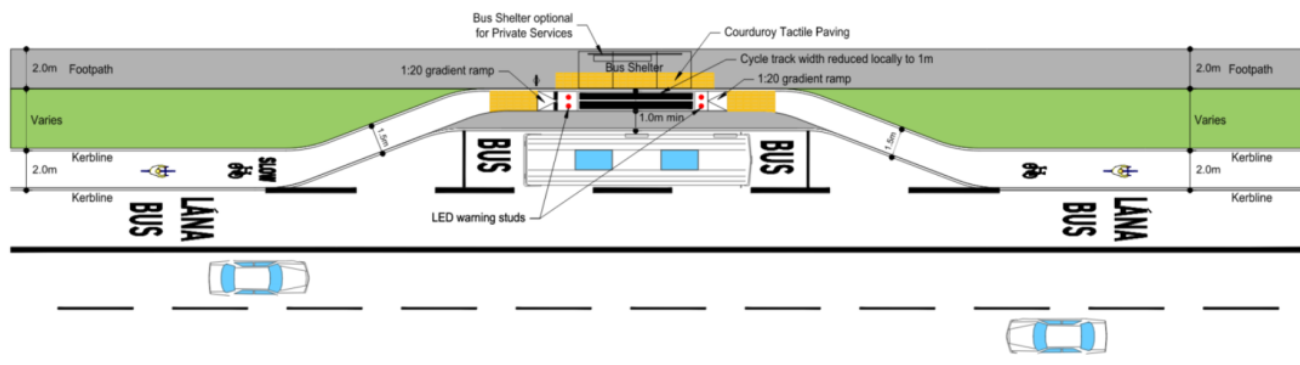
#### 4.6.4.5.3 Inline Bus Stops

Where there are no cycle tracks provided, Inline Bus Stops will be used, where the users departing the bus will exit straight onto the footway. Inline Bus Stops are proposed to be retained in the Bus Gate controlled section of R817 Kimmage Road Lower, as listed in Section 4.5.

#### 4.6.4.5.4 Layby Bus Stop

Layby Bus Stops can provide an effective solution for coaches with long dwell times at bus stops, allowing other buses to pass the stopped bus.

An example of a Layby Bus Stop arrangement is shown in Image 4.9. However, there are no Layby Bus Stops on the Proposed Scheme.



**Image 4.9: Layby Bus Stop Arrangement**

#### 4.6.4.5.5 Bus Stop Shelters

As a general policy, shelters will be provided at all bus stops on the Proposed Scheme. This will improve the comfort of passengers waiting for a bus during poor weather, as well as providing shade on sunny days.

### 4.6.5 Accessibility for Mobility Impaired Users

The aim of the Proposed Scheme is to provide enhanced walking, cycling and bus infrastructure along the corridor. In achieving this aim, the Proposed Scheme has been developed using the PDGB (refer to Appendix A4.1 in Volume 4 of this EIAR) and in accordance with the principles of DMURS (Government of Ireland 2013) and Building for Everyone: A Universal Design Approach (NDA 2020).

The following non-exhaustive list of relevant standards and guidelines have informed the approach to Universal Design in developing the Proposed Scheme:

- PDGB (refer to Appendix A4.1 in Volume 4 of this EIAR);
- Building for Everyone: A Universal Design Approach (NDA 2012a);
- How Walkable is Your Town? (NDA 2015);
- Shared Space, Shared Surfaces and Home Zones from a Universal Design Approach for the Urban Environment in Ireland (NDA 2012b);
- Best Practice Guidelines, Designing Accessible Environments. (Irish Wheelchair Association 2020);
- Inclusive Mobility (UK DfT 2005);
- Guidance on the use of Tactile Paving Surfaces (UK DfT 2007); and
- BS8300-1:2018 Design of an accessible and inclusive built environment. External Environment-code of practice (BSI 2012).

Number 14 of 2005 - Disability Act 2005 (as amended) places a statutory obligation on public service providers to consider the needs of people with disabilities. A Disability Audit of the existing environment and proposed draft preliminary design for the corridor was undertaken. The Audit provided a description of the key accessibility features and potential barriers to people with disabilities based on the Universal Design standards of good practice. The Audit was undertaken in the early design stages with the view to implementing any key measures identified as part of the design development process.

In achieving the enhanced pedestrian facilities there has been a concerted effort made to provide clear segregation of modes at key interaction points along the Proposed Scheme which was highlighted as a potential mobility constraint in the Audit. In addressing one of the key aspects to segregation, the use of the 60mm set down kerb between the footpath and the cycle track is of particular importance for guide dogs, whereby the use of white line segregation is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions.



One of the other key areas that was focused on was the interaction between pedestrians, cyclists, and buses at bus stops. The Proposed Scheme has prioritised, where possible, the use of Island Bus Stops, including a signal call button for crossing of cycle tracks, to manage the interaction between the various modes with the view to providing a balanced safe solution for all modes.

## **4.6.6 Integration**

### **4.6.6.1 Interchange with Existing and Proposed Public Transport Networks**

One of the objectives of the Proposed Scheme is to enhance interchange between the various modes of public transport operating in the city and wider metropolitan area. The Proposed Scheme will facilitate improved existing and new interchange opportunities with other transport services including:

- Existing Dublin Bus services at numerous locations along the route, including routes 17, 18, 68(a) and 122;
- The Proposed Scheme will cater for the Spine F services.
- Future interconnection with Orbital Bus Corridor S4 at the KCR at the southern end of the Proposed Scheme;
- Future interconnection with Orbital Bus Corridor S2 at Sundrive Road;
- Future interconnection with Orbital Bus Corridor O at the Leonard's Corner Junction on R811 South Circular Road;
- Spine D at the junction of R137 Patrick Street and R110 Kevin Street Upper at the northern end of the Proposed Scheme;
- The Tallaght / Clondalkin Core Bus Corridor Scheme from Tallaght along R110 Crumlin Road, will be located approximately 1.5km to the north-west; and
- The Templeogue / Rathfarnham Core Bus Corridor Scheme from Rathfarnham towards the City Centre via Rathgar and Rathmines will be located approximately 1km to the east.

### **4.6.6.2 Integration with Other Road Users**

Provision of bus priority will result in some impacts on general traffic flow along the Proposed Scheme corridor, where bus priority cannot be achieved through the provision of bus lanes and Bus Gates are necessary as an alternative. On the narrow street of R817 Kimmage Road Lower approaching Harold's Cross, it will not be feasible to widen the road into very small front gardens sufficiently for the addition of bus lanes. Instead, a Bus Gate will divert through-traffic off this route and thereby provide bus priority. Local access will generally be maintained along the Proposed Scheme corridor, although there could be some impacts on local traffic where it is required to follow diversion routes around Bus Gates. At some locations it may be necessary to adopt turning movement restrictions or local road closures for appropriate traffic management, and these are described for each section in Section 4.5. Reductions in traffic carrying capacity of the road network will be compensated for by the overall increase in quality and level of service of other modes (walking, cycling and public transport) on the Proposed Scheme, once implemented.

### **4.6.6.3 Integration with Other Infrastructure Projects**

No other infrastructure projects are planned within the vicinity of the Proposed Scheme which will interface with the proposals.

### **4.6.6.4 Integration with Other Adjacent BusConnects Core Bus Corridor Schemes**

As part of the design of the Proposed Scheme, consideration has been given to the potential coordination required in relation to other schemes within the BusConnects CBC Infrastructure Works. This Section outlines potential interactions of the Proposed Scheme with adjacent schemes and identifies any procedures within the construction strategies that may be required in order to account for various sequencing scenarios in the construction of the schemes.

The Rathfarnham Section of the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme will interface with the Proposed Scheme at two locations:

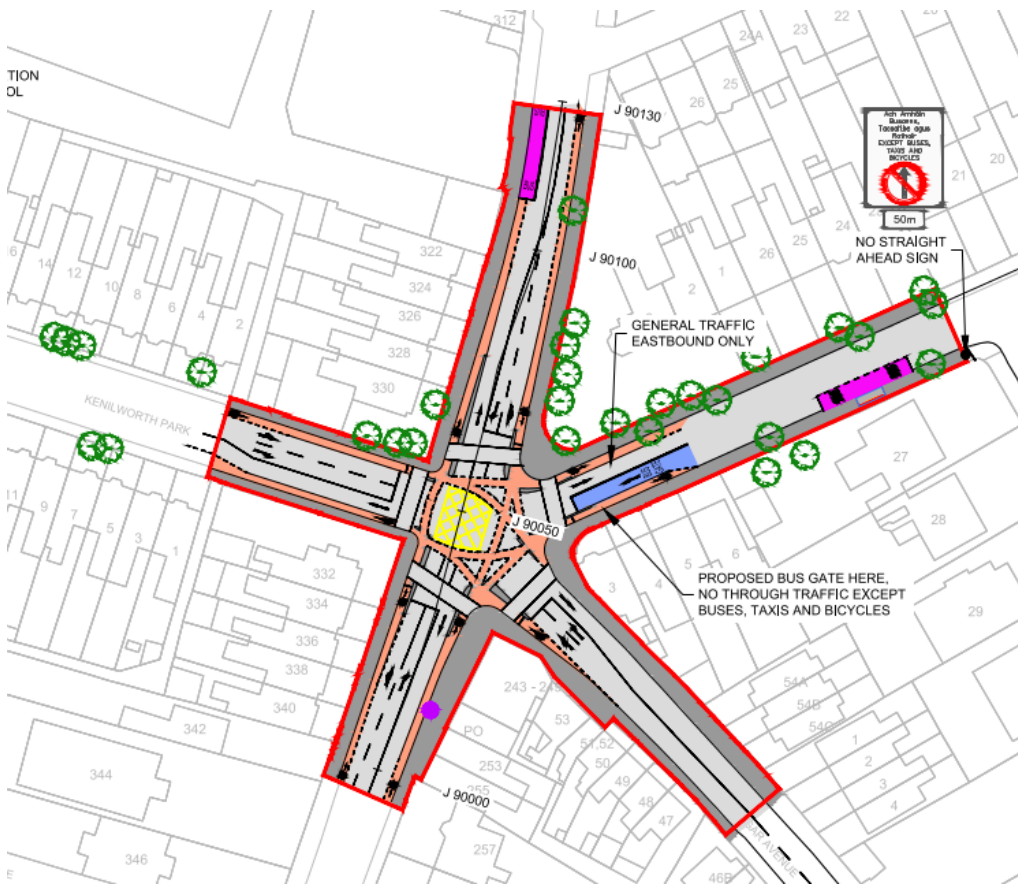
- At the junction of Harold's Cross Road / Kenilworth Park / Rathgar Avenue / Kenilworth Square North; and
- Harold's Cross Road and Parkview Avenue.

The Proposed Scheme will also interact with the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme at its terminal point at the junction of Kevin Street and Patrick Street. The BusConnects Infrastructure team has coordinated the design tie-ins at these locations to ensure a holistic design has been achieved, so that each scheme can be implemented, and integrated, regardless of the sequencing of their construction.

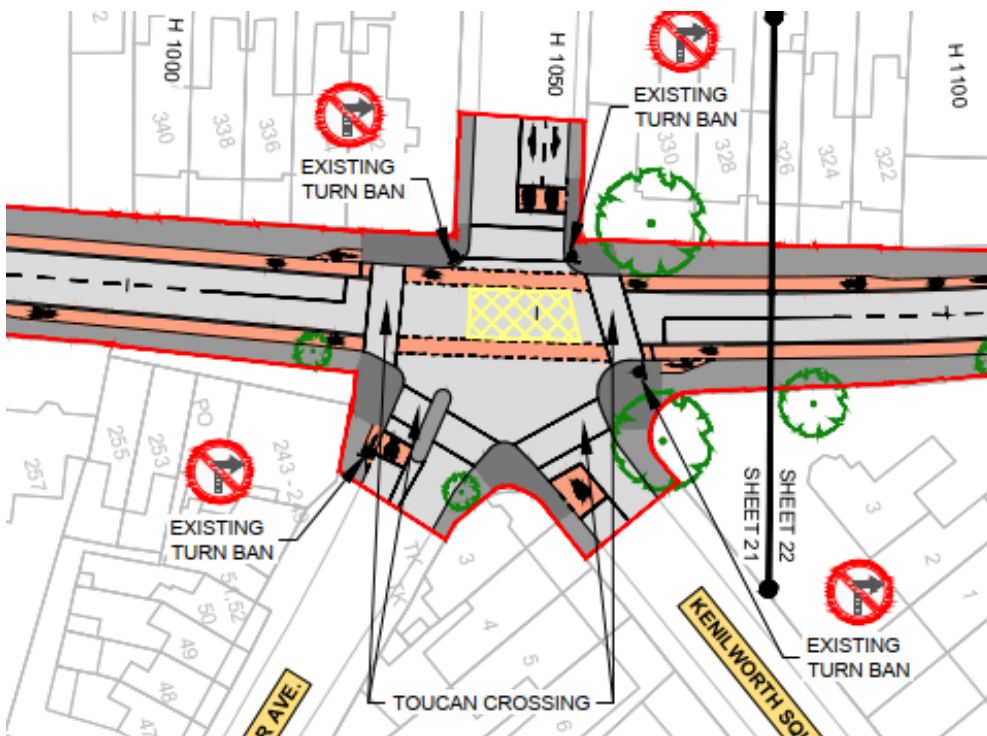
The Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme and the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme are subject to a separate planning process, the timing of which is independent to that of the Proposed Scheme, and as such no exact sequencing of construction works can be determined at this stage.

#### 4.6.6.4.1 Harold's Cross Road / Kenilworth Park / Rathgar Avenue / Kenilworth Square North

The Proposed Scheme will also interact with the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme at the junction of Harold's Cross Road / Kenilworth Park / Rathgar Avenue / Kenilworth Square North in order to facilitate the provision of a Bus Gate and cycling connections at the aforementioned junction. The provision of these measures at this junction is a key component of the alternative segregated cycling facility being proposed as part of the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme (see Section 4.6.6.4.2 for further details). Image 4.10 shows an extract of the preliminary design of the Proposed Scheme at the junction of Harold's Cross Road / Kenilworth Park / Rathgar Avenue / Kenilworth Square North, while Image 4.11 shows an extract of the preliminary design of the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme at the same location.



**Image 4.10: Preliminary Design of the Proposed Scheme Tie-in with the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme at the Junction of Harold's Cross Road / Kenilworth Park / Rathgar Avenue / Kenilworth Square North**



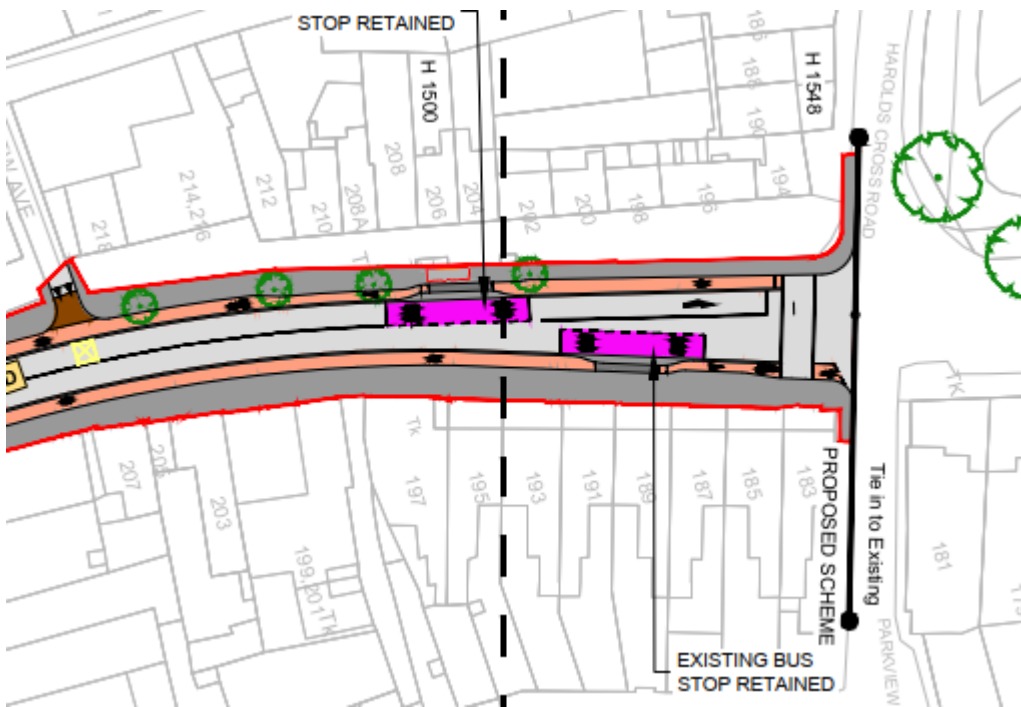
**Image 4.11: Preliminary Design of the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme Tie-in with the Proposed Scheme at the Junction of Harold's Cross Road / Kenilworth Park / Rathgar Avenue / Kenilworth Square North**

#### 4.6.6.4.2 Harold's Cross Road / Parkview Avenue Junction

As mentioned above, the Proposed Scheme intends to tie-in with the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme. at the junction of Harold's Cross Road and Parkview Avenue in order to provide a cycling connection between the two schemes. This cycling connection will provide an alternative segregated cycling facility to the City Centre. Image 4.12 shows an extract of the preliminary design of the Proposed Scheme at the tie-in location at the junction of Harold's Cross Road and Parkview Avenue, while Image 4.13 shows an extract of the preliminary design of the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme at the same location.



**Image 4.12: Preliminary Design of the Proposed Scheme Tie-in with the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme at Harold's Cross Road and Parkview Avenue Junction**



**Image 4.13: Preliminary Design of the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme Tie-in with the Proposed Scheme at Harold's Cross Road and Parkview Avenue Junction**

Table 4.25 presents a matrix of potential interactions and impacts associated with various potential sequencing scenarios in relation to the construction and operation of both schemes.

**Table 4.25: Matrix of Potential Interactions and Impacts Associated with the Different Sequencing Scenarios of Both Schemes.**

Scenario	Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme: Not Yet Commenced	Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme: Under Construction	Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme: Completed
Proposed Scheme: Not Yet Commenced	N/A	Construction of the proposed Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme shall be carried out in accordance with the Construction Strategy within that scheme's planning application, without any potential interaction with works associated with the Proposed Scheme.	The Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme shall be in full operation, designed in accordance with its planning application which will allow for the Proposed Scheme to tie in at a future date.
Proposed Scheme: Under Construction	Construction of the Proposed Scheme will be carried out in accordance with the Construction Strategy within its planning application, without any potential interaction with works associated with the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme.	It is not envisaged that both schemes will be under construction at the same time at this location.	The Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme will be completed and the Proposed Scheme will tie into the revised layout at the junction of Harold's Cross Road and Parkview Avenue.
Proposed Scheme: Completed.	The Proposed Scheme shall be in full operation, designed in accordance with its planning application as per Image 4.12 which will allow for the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme to tie-in at a future date.	The Proposed Scheme will have been completed and the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme will tie into the revised layout at the junction of Harold's Cross Road and Parkview Avenue, which will provide a cycling connection between the two schemes.	The arrangement will be as shown in Image 4.12 and Image 4.13.

#### 4.6.6.4.3 New Street South / Kevin Street Upper / Patrick Street Junction

The Proposed Scheme intends to tie-in to the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme at its terminus at the junction of New Street South / Kevin Street Upper / Patrick's Street. The connection to the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme will facilitate a continuation of the improved bus, cycling and pedestrian facilities proposed under the Proposed Scheme. Image 4.14 shows an extract of the preliminary design of the Proposed Scheme at the aforementioned location, combined with an extract of the preliminary design of the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme at the same location.



**Image 4.14: Preliminary Design of the Proposed Scheme Tie-in with the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme at the Junction of New Street South / Kevin Street Upper / Patrick's Street.**

The potential interactions and impacts associated with the various potential sequencing scenarios in relation to the construction and operation of both schemes is the same as that identified in Table 4.25, albeit in respect to the Tallaght / Clondalkin to City Centre Core Bus Corridor Scheme rather than the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme.

### 4.6.7 Junctions

The design and modelling of junctions has been an iterative process to optimise the number of people (rather than vehicles) that can pass through each junction, with priority given to pedestrian, cycle, and bus movements. The design for each junction within the Proposed Scheme was developed to meet the underlying objectives of the Proposed Scheme.

Junctions have been designed to ensure a high level of comfort and priority for sustainable modes of travel (e.g. walking, cycling and public transport), by prioritising the space and time allocated to these modes within the operation of a junction, and subsequently to accommodate the forecasted future year traffic volumes as safely and efficiently as possible within the remaining space and time. This has allowed the design to maximise the number of people moving through each junction and to prioritise these sustainable modes of travel.

Junction design on the Proposed Scheme falls into four categories, namely:

- Major Junctions (Signalised);
- Moderate Junctions (Signalised); and
- Minor and Priority Junctions.

The categorisations are based on:

- Size;
- The extent of physical work required to establish them; or
- The degree of change compared to the existing layout.

The junction locations along the Proposed Scheme route and the layouts that will be implemented at these locations are presented Section 4.5.

#### 4.6.8 Structures

Where the route interfaces with an existing structure, a visual inspection has been carried out to identify the current condition of the structure and any repair / maintenance works required. Where alterations to the existing carriageway lines, kerbs lines and verge widths are proposed to the superstructure of an existing structure, a structural assessment has been carried out to ensure the structural capacity is fit-for-purpose for the revised arrangement. The existing structures are detailed in Section 4.5 and proposed structures are listed in Table 4.26.

**Table 4.26: Proposed Bridge Structures**

ID	Name	Type	Obstacle	Expected Structural Works
Kimmage 01A	New cycle / pedestrian bridge adjoining Robert Emmet Bridge on the western side over the Grand Canal at Harold's Cross	Steel Beam	Grand Canal	New
Kimmage 01B	New pedestrian bridge adjoining Robert Emmet Bridge on the eastern side over the Grand Canal at Harold's Cross	Steel Beam	Grand Canal	New
Kimmage 02	New cycle / pedestrian bridge boardwalk at the Stone Boat beside the River Poddle in Kimmage	Steel Beam	River Poddle	New
Kimmage 04	New pedestrian ramps along Windsor Terrace to connect to Structure Kimmage 01B (the footbridge adjoining Robert Emmet Bridge on the eastern side over the Grand Canal at Harold's Cross).	Steel Beam / reinforced soil ramp	Steep gradient up to the Grand Canal bridge	New

##### 4.6.8.1 Retaining Walls

A retaining wall is proposed along the western side of R137 Clanbrassil Street Upper (Structure Reference: Kimmage 03) for a new combined access to Gordon's Fuels at Mullen Scrap. The retaining wall has an overall length of approximately 63m and its height is 3.5m.

#### 4.6.9 Other Street Infrastructure

There are a number of other elements of street infrastructure included as part of the design of the Proposed Scheme. These elements include signage, road markings and communications infrastructure. Signage and road markings will be provided along the extents of the Proposed Scheme to clearly communicate information, both regulatory and safety messages to the road user. In addition, the existing communication equipment along the Proposed Scheme has been reviewed and proposals developed to upgrade, where necessary.

##### 4.6.9.1 Traffic Signs and Road Markings

###### 4.6.9.1.1 Traffic Signage Strategy

A preliminary Traffic Signage design has been undertaken to identify the requirements of the Proposed Scheme, whilst allowing for further design optimisation at the detailed design phase. A combination of Information,

Regulatory, and Warning signs, have been assessed taking consideration of key destinations / centres; intersections / decision points; built and natural environment; other modes of traffic; visibility of signs and viewing angles; space available for signs; existing street furniture infrastructure; and existing signs. In line with DMURS (Government of Ireland 2013), the signage proposals have been kept to the minimum requirements of the TSM (DoT 2019), particularly where place values are very high.

A review of the existing regulatory and warning signs in the vicinity of the Proposed Scheme was carried out to identify unnecessary repetitive and redundant signage to be removed. This includes rationalising signage structures by better utilising individual sign poles and clustering signage together on a single pole.

As stated in TSM Chapter 1, in urban areas, the obstruction caused by posts located in narrow pedestrian footpaths should be minimised. Therefore, where practicable, signs are to be placed on single poles, or larger signs will be cantilevered from a post at the back of the footpath using H-frames where necessary. Passively safe posts will be introduced where possible to eliminate the need for vehicle restraint systems.

#### 4.6.9.1.2 Gantry Signage

No gantry signage exists along the route, and the Proposed Scheme has no requirement for any new gantry signage.

#### 4.6.9.1.3 Road Markings

A preliminary design of road markings has been undertaken in accordance with TSM Chapter 7 (DoT 2019). This exercise also included the preliminary road marking design of the following items:

- Bus lanes;
- Cycle tracks: the pavement will be marked according to best practice guidelines such as DMURS (Government of Ireland 2013) and the NCM (NTA 2011), with particular attention given to junctions. Advance Stacking Locations (ASLs) have been designed where possible to provide a safer passage for cyclists at signal-controlled junction for straight ahead or right turn movements; and
- Pedestrian crossings have been incorporated throughout the design to connect the network of proposed and existing footpaths. Wider pedestrian crossings have been provided in locations expected to accommodate a relatively high number of pedestrians. DMURS classifies pedestrian crossing widths in areas of low to moderate pedestrian activity as 2.5m and areas of moderate to high pedestrian activity as 3m.

### 4.6.10 Pavement

Pavement assets along the Proposed Scheme comprise bus lanes, general traffic lanes, cycle lanes and specific trafficked areas (e.g. offline bus stops, bus terminals, offline parking and loading bays).

Kerbs, Footways and Paved Areas (KFPA) assets along the Proposed Scheme comprise kerbs, footways and cycle tracks.

For the purpose of design, the pavement assets are categorised into two networks. The primary network refers to the bus corridor under consideration, while the secondary network refers to the roads impacted by the re-routing of existing traffic from the Proposed Scheme to the nearby road network.

As part of the Proposed Scheme, varying pavement works will be undertaken. These works will comprise of the following:

- Widening of the existing carriageways;
- Carriageway realignment;
- Rehabilitation and strengthening of the existing carriageways;
- Other specific trafficked areas (e.g. bus lay-bys, offline parking and loading bays);
- New pedestrianised areas including footways; and
- New cycle facilities.



Pavements are designed and constructed in accordance with TII's publications, international standards and relevant local authority standards.

#### **4.6.10.1 Design Requirements**

The Proposed Scheme pavement design will include new pavement, pavement strengthening, or rehabilitation works where the existing pavement will be disturbed by construction works, as indicated in the Pavement Treatment Plans (BCIDD-ROT-PAV\_PV-0011\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR. Special attention to addressing problems associated with wheel-track rutting and ensuring that ponding will not arise at bus stops and pedestrian / cycle crossings will be a key focus.

The prevailing principle being followed by the Proposed Scheme pavement design is the provision of a high-quality pavement construction. Therefore, the Proposed Scheme pavement must provide sufficient durability, longevity, and strength, to be able to withstand repetitive wheel track loading on a frequent basis. The pavement design strategy includes for minimising ongoing maintenance requirements along the route to minimise impact on continuity of bus service operations.

The Proposed Scheme design for KFPA will include new improved pedestrian and cycle facilities including landscaped areas.

#### **4.6.10.2 Design Standards**

The preliminary design of pavement assets is based on the following standards:

- Pavement and Foundation Design – DN-PAV-03021 (December 2010) (TII 2010a);
- Surfacing Materials for New and Maintenance Construction for Use in Ireland – DN-PAV-03023 (June 2020) (TII 2020a);
- Pavement Assessment, Repair and Renewal Principles - AM-PAV-06050 (March 2020) (TII 2020b);
- Traffic Assessment – PE-SMG-02002 (December 2010) (TII 2010b);
- Specification for Road Works Series 600 – Earthworks – CC-SPW-00600 (March 2013) (TII 2013a);
- Specification for Road Works Series 700 – Road Pavements – General – CC-SPW-00700 (March 2015) (TII 2015);
- Specification for Road Works Series 800 – Road Pavements – Unbound and Cement Bound Mixtures – CC-SPW-00800 (March 2013) (TII 2013b); and
- Specification for Road Works Series 900 – Road Pavements – Bituminous Materials.

The preliminary design of KFPA assets is based on the following standards:

- Pavement and Foundation Design – DN-PAV-03021 (December 2010) (TII 2010a);
- Footway Design - DN-PAV-03026 (January 2005) (TII 2005);
- Construction Standards for Road and Street Works in Dublin City Council (May 2016) – Revision 1 (DCC 2016a);
- Traffic Assessment – PE-SMG-02002 (December 2010) (TII 2010b);
- Specification for Road Works Series 600 – Earthworks – CC-SPW-00600 (March 2013) (TII 2013a);
- Specification for Road Works Series 700 – Road Pavements – General – CC-SPW-00700 (March 2015) (TII 2015);
- Specification for Road Works Series 800 – Road Pavements – Unbound and Cement Bound Mixtures – CC-SPW-00800 (March 2013) (TII 2013b);
- Road Pavements – Bituminous Materials – CC-SPW-00900 (September 2017) (TII 2017);
- Specification for Road Works Series 1000 – Road Pavements – Concrete Materials - CC-SPW-01000 (March 2013) (TII 2013c);
- Specification for Road Works Series 1100 – Kerbs, Footways and Paved Areas - CC-SPW-01100 (February 2012) (TII 2012); and

- BS 7533 series of standards (1999 – 2021) – Pavement Constructed with Clay, Natural Stone or Concrete Pavers (BSI 1999-2021).

#### 4.6.10.3 Pavement Rehabilitation Strategy

At Specimen Design stage, different pavement strategies will be developed for:

- Areas to be widened or fully reconstructed; and
- Areas to be rehabilitated (do minimum, intermediary strategies, fully reconstruct).

Additional testing requirements in line with Pavement Assessment, Repair and Renewal Principles - AM-PAV-06050 (March 2020) (TII 2020b) will be specified for the successful appointed contractor to complete the Detailed Pavement Design.

The risk of tar contaminated material presence in the existing pavement is expected to be mitigated at Specimen Design stage with the delivery of the Ground-Penetrating Radar (GPR) survey through the testing of the calibrating cores for tar.

In order to estimate the waste quantities and the carbon emissions from the Proposed Scheme pavement works, the following assumptions were made:

- Where full depth reconstruction is anticipated (e.g. widening, traffic island relocation...), a conservative fully flexible pavement design is assumed: 350mm of bituminous mixtures on top of 150mm of subbase material and 400mm of capping material;
- Where the existing pavement is anticipated to only require rehabilitation, the assumed materials and associated depths depend on the Pavement Surface Condition Index (PSCI) for the pavement design:
  - Fully Flexible Carriageway:
    - PSCI  $\geq$  7: no works;
    - PSCI = 5 or 6: 50mm Bituminous Inlay;
    - PSCI = 3 or 4: 200mm Bituminous Inlay; and
    - PSCI = 1 or 2: 350mm Bituminous Inlay + 150mm Subbase Inlay + 400mm Capping Inlay.
  - Rigid Carriageway:
    - PSCI  $\geq$  5: no works; and
    - PSCI  $\leq$  4: 200mm Concrete Inlay.

The appropriate pavement structures for footways and cycle tracks will be defined at Specimen Design stage.

#### 4.6.11 Parking and Loading

As part of the design of the Proposed Scheme, an assessment has been carried out into the impact on existing parking.

The number and type of parking spaces and loading bays were counted along the Proposed Scheme, and the proposed losses of these parking spaces and loading bays has been quantified. Mitigation measures have been identified to reduce the impact of the Proposed Scheme in so far as is reasonably practicable, by incorporating some parking provision and compensatory loading provision, and providing enhanced cycle parking facilities.

Changes to the parking and loading provisions along each section of the Proposed Scheme are described further in Section 4.5. Reference should be made to Chapter 6 (Traffic & Transport) for further information on the impacts on parking as a result of the Proposed Scheme.

## 4.6.12 Landscape and Urban Realm

Urban realm refers to the everyday street spaces that are used by people to shop, socialise, play, and for activities such as walking, exercise, or commute to / from work. The urban realm encompasses all streets, squares, junctions, and other rights-of-way, whether in residential, commercial, or civic use. When well designed and laid out with care in a community setting, it enhances the everyday lives of residents and those passing through. It typically relates to all open-air parts of the built environment where the public has free access. It would include seating, trees, planting, and other aspects to enhance the experience for all.

Successful urban realms or public open space tend to have certain characteristics. These include:

- They have a distinct identity;
- They are safe and pleasant;
- They are easy to move through; and
- They are welcoming.

### 4.6.12.1 Landscape and Character Analysis

The landscape and urban realm proposals are derived from analysis of the existing urban realm, including existing character, any heritage features, existing boundaries, existing vegetation and tree planting, and existing materials. For each section of the route, the design took a broad overview of typical dwelling age and style, extents of vegetation and tree cover. The predominant mixes of paving types, appearance of lighting features, fencing, walls, and street furniture was considered. The purpose of this analysis was to assess the existing character of the area and how the Proposed Scheme may alter this. The outcome of the analysis allowed the designers to consider appropriate enhancement opportunities along the route. The enhancement opportunities include key nodal locations which focus on locally upgrading the quality of the paving materials, extending planting, decluttering of streetscape and general placemaking along the route. Where possible, a Sustainable Drainage Systems (SUDS) approach has been taken to assist with drainage along the route.

### 4.6.12.2 Hardscape

#### 4.6.12.2.1 Typical Material Typologies

Through the process of developing the Proposed Scheme, a typology and palette of proposed materials was developed to create a consistent design response for various sections of the route. The proposed materials were based on the existing landscape character, existing materials, historical materials while also identifying areas for betterment through the use of higher quality surface materials. The Landscaping General Arrangement drawings (BCIDD-ROT-ENV\_LA-0011\_XX\_00-DR-LL-9001) in Volume 3 of this EIAR illustrate these elements.

The material typologies employed in the preliminary design are:

- **Poured in situ concrete pavement** - Used extensively on existing footpaths. Concrete pavements can be laid without a kerb, can have neatly trowelled edges and textured surface for a clean, durable, slip resistant surface;
- **Asphalt footpath** - Widely used on existing footpaths and will tie in with other sections of urban realm. Laid with a road kerb, can have a smooth finish or textured aggregate surface, provides a strong flexible slip resistant surface. Opportunities to retain good quality kerbs have been explored and tie-in points considered;
- **Precast concrete unit paving** - Either concrete paving slabs or concrete block, there is a very wide variety of sizes and colours available to provide an enhanced urban realm. The use/reuse of granite kerbs where appropriate will further enhance the urban realm. This type of material use is mostly employed in non-inner-city urban realm enhancements;
- **Natural stone paving** - Employed for high quality urban realm areas, mostly in city centre locations. This typology represents natural stone surface treatments such as granite and are used to create enhanced public spaces for major urban realm interventions;

- **Stone or Concrete setts** - Proposed for distinguishing pedestrian crossing points either on raised table or at road level;
- **Self-binding gravel** - Proposed for pedestrian paths set away from the road expected to see less traffic. Used for natural areas, for example, paths through wildflower meadows. They provide a defined informal route as an alternative to asphalt or concrete; and
- **No change** - In addition to areas with proposed material changes, there were also areas identified where no change in materials would be required. For example, where pavement has recently been laid and is in good condition. The design also explores opportunities where good quality kerbs such as granite kerbs could be reused, which would have both cost and sustainability advantages.

Other design responses include:

- The reuse of existing high-quality and natural stone kerbs to maintain streetscape character, reduce construction costs and maximise sustainability;
- Pedestrian crossings at side streets will be raised where possible and will be distinguished using stone or concrete setts as appropriate to the locality;
- In some locations, existing street trees have disturbed or broken footpath surfaces. The footpath around such trees will be replaced where appropriate with self-binding gravel to improve the vitality of the trees and ensure accessible pedestrian facilities;
- Informal footpaths through landscaped areas that are set back from the main carriageway will be formed using self-binding gravel as an alternative to asphalt or concrete;
- Where private or commercial property boundaries are realigned, boundary walls and railings will be reinstated to match the existing and may be extended to other properties along the same street to enhance streetscape character; and
- Existing street furniture such as seating will be relocated within the revised streetscape and new street furniture will be provided at locations where opportunity sites have been identified to establish or enhance public spaces.

#### 4.6.12.3 Softscape

Soft landscape design proposals include the following components that provide mitigation for loss of trees, ecological benefits and visual enhancements to the urban realm:

- New tree planting;
- Native hedgerows;
- Native planting;
- Ornamental planting;
- Amenity grass areas; and
- Species rich grasslands.

##### 4.6.12.3.1 Planting Strategy

The planting strategy has been developed to meet the needs of the Dublin City Tree Strategy 2016 – 2020 (DCC 2016b) and the Dublin Biodiversity Action Plan as follows:

- Where possible the initial conservation of existing biodiversity has been considered;
- Opportunities have been identified to enhance biodiversity through green infrastructure;
- Promote the role of street trees planting consistent with the recommendations of the Dublin City Tree Strategy; and
- Develop the role of SUDS opportunities within the Proposed Scheme to ideally reduce impervious areas for drainage management benefit.

#### 4.6.12.4 Arboricultural Survey

##### 4.6.12.4.1 Scope of Assessment

An Arboricultural Impact Assessment (AIA) Report (Appendix A17.1 in Volume 4 of this EIAR), identifies the likely direct and indirect impacts to trees of the Proposed Scheme along with suitable mitigation measures, as appropriate to allow for the successful retention of significant trees, or to compensate for trees to be removed.

#### 4.6.12.5 Typical Planting Typologies

Several typologies were developed. These are discussed further below.

##### 4.6.12.5.1 New Street Trees

As noted on the Landscaping General Arrangement drawings (BCIDD-ROT-ENV\_LA-0011\_XX\_00-DR-LL-9001) in Volume 3 of this EIAR, medium to large canopy trees will be provided in large urban tree pit systems to allow for protection of the soil structure and good root development (Image 4.15). In addition, ornamental planting will also be provided, providing small landscape interventions at local community spaces that comprise of a combination of street trees, seating and more formal planting arrangements. These exist at certain intervals and are often picked up as 'focal points'.



**Image 4.15: Example of Mature Street Trees on New Street South that will be retained**

In line with the overall objectives of the CBC Infrastructure Works as set out in Chapter 1 (Introduction), the urban realm has been carefully considered in the design and development of the Proposed Scheme. Where feasible, opportunities for protection and enhancement of the urban landscape and urban realm have been identified during the design of the Proposed Scheme with the following aims:

- a) To retain as many existing street trees as possible, and to provide replacement or additional trees, where possible; and
- b) To enhance the urban realm at key locations of commercial and civic activity.

Three types of urban realm arrangements are proposed to suit the varying functions along the street as follows:

- Type 1 Street Finishes: This type will be the most commonly applied along the Proposed Scheme, and will essentially retain the existing arrangements with poured concrete footpaths and kerbs;
- Type 2 Street Finishes: At local zones of commercial and civic activities a mid-level of materials quality will apply with concrete paving slabs and concrete block detailing with the use / reuse of granite kerbs where appropriate; and
- Type 3 Street Finishes: High-quality materials will be provided at important focal points for the local community with natural stone surface treatments such as granite, and features such as raised planter beds and selected street furniture to widen the uses of the urban realm.

The landscape and urban realm proposals along the various sections of the Proposed Scheme are outlined in Section 4.5.

#### 4.6.12.5.2 Boundary Planting

The Proposed Scheme corridor is bounded by a wide range of established private, institutional, commercial and public land boundaries. While the design development has sought to avoid impacts on such boundaries, the Proposed Scheme will nonetheless require a limited degree of both temporary and permanent acquisition of lands.

Impacted property boundaries will be reinstated following construction with similar materials. In some instances, will be re-built along their original alignments. In other cases, boundaries will be re-built on a new setback alignment. In general, property boundaries will be reinstated on a 'like for like' basis, including any walls, piers, fences, railings, gates, driveway finishes and private landscaping. Private grounds that are utilised in part for construction access will be reinstated following completion of the works to match the existing landscaping of the property. Where private grounds are reduced by permanent land take required for the Proposed Scheme, the remaining grounds will be reinstated to match the landscape and character of the existing grounds in consultation with the property owner.

### 4.6.13 Lighting

A review of the existing lighting provision along the extent of the route has been carried out to understand the impact of the Proposed Scheme on lighting columns and associated infrastructure. Several existing columns are proposed to be relocated or replaced to accommodate the Proposed Scheme, as shown on the Street Lighting drawings (BCIDD-ROT-LHT\_RL-0011\_XX\_00-DR-EO-9001) in Volume 3 of this EIAR.

Light Emitting Diode (LED) lanterns will be the light source for any new or relocated public lighting provided. The lighting design will involve works on functional, heritage and contemporary lighting installations on a broad spectrum of lighting infrastructure along the Proposed Scheme. This will include, but not exclusively, luminaires supplied by underground and overhead cable installations and those located on Electricity Supply Board (ESB) infrastructure.

In locations where road widening and / or additional space in the road margin is required, it is proposed that the public lighting columns will be replaced and relocated to the rear of the footpath to eliminate conflict with pedestrians, eliminating pedestrian obstruction. For existing columns that have specific aesthetic requirements, the intent for the replacement (where applicable) of such columns will include:

- Replacing the existing heritage columns and brackets with identical replica columns and brackets;
- Replacing existing luminaires with approved LED heritage luminaires; and
- Ensuring the electrical installation is compliant with the latest version of the National Rules for Electrical Installations (I.S. 10101).

#### **4.6.13.1 New Lighting**

All new public lighting will be designed and installed in accordance with the requirements of the relevant National standards and guides, including but not limited to:

- Local Authority Guidance Specifications;
- BS EN 13201 Road Lighting Standards (all sections) (BSI 2014);
- ET 211:2003 Code of Practice for Public Lighting Installations in Residential Areas (Electro-Technical Council of Ireland 2003);
- BS 5489-1:2003 Code of practice for the design of road lighting (BSI 2003);
- Specification for Road Works Series 1300 – Road Lighting Columns and Brackets (Volume 1) (TII 2011a);
- Specification for Road Works Series 1400 – Electrical Work for Road Lighting and Traffic Signs (Volume 1) (TII 2011b);
- Standard Construction Details - Series 1300 (Volume 4) (TII 2017b);
- Standard Construction Details - Series 1400 (Volume 4) (TII 2017c);
- BS EN 40-3-1:2013 – Lighting Columns (BSI 2013); and
- Guidance Note 01/21- The Reduction of Obtrusive Light (Institution of Lighting Professionals 2021).

Lighting schemes will comply with the Guidance notes for the reduction of light pollution (Institution of Lighting Professionals 1992).

#### **4.6.13.2 Lighting at Bus Stops**

The design shall include for the standards and requirements for lighting at bus stops.

#### **4.6.14 Utilities**

There are a number of measures proposed to protect existing utilities during the Construction Phase of the Proposed Scheme. These are specifically outlined in Chapter 5 (Construction) and Chapter 19 (Material Assets).

Where there are clashes between the existing utility infrastructure, measures are proposed to either protect the infrastructure in place or divert the utility infrastructure as required.

The utility design strategy included the analysis of records provided by all utility providers associated with the Proposed Scheme corridor. The analysis included desktop reviews including review of topographic surveys together with site reconnaissance. In locations where critical assets were identified and the risk of interference was considered high, GPR surveys were undertaken to inform the design.

##### **4.6.14.1 Utility Diversions**

Due to the extensive nature of the Proposed Scheme, there are certain areas along the route which will require utility diversions, due to localised conflicts. Identified service conflicts and recommended diversions are described and assessed in Chapter 19 (Material Assets).

#### **4.6.15 Drainage**

##### **4.6.15.1 Existing Drainage Description**

The design basis statement was developed whilst taking into account the Greater Dublin Regional Code of Practice (GDRCoP), the GSDS (Irish Water 2005), planning requirements of local authorities within the Dublin region, TII requirements and international best practices such as CIRIA The SUDS Manual (C753) (CIRIA 2015). Agencies consulted included DCC and Irish Water, where applicable.

#### 4.6.15.2 Existing Watercourses and Culverts

The location of existing watercourses and culverts have been identified from surveys. Table 4.27 shows where the Proposed Scheme will cross the existing watercourses and culverts.

**Table 4.27: Existing Watercourses and Culverts**

Watercourse	Chainage	Crossing Detail
River Poddle	A50	Culverted under existing road
River Poddle	G60000	Culverted under existing road
River Poddle	H70000	Culverted under existing road
River Poddle	H70200	Existing Bridge
Grand Canal	I80050	Existing Bridge

#### 4.6.15.3 Existing Drainage Description

Based on the information received from Irish Water, TII, DCC, the Proposed Scheme the existing surface water drainage system along the Proposed Scheme is arranged in two ways:

- a) At the southern end of the Proposed Scheme, south of Sundrive Road, there is a separated sewer system, with surface water drainage collected by gullies with pipes discharging to the nearby River Poddle at a number of locations. There is a separate foul sewer system that drains northwards to the Wastewater Treatment Plant (WwTP) at Ringsend; and
- b) In the northern, older, part of the urban area along the route north of Sundrive Road, there is a combined sewer that collects both rainwater from the street surfaces and foul sewage from the houses and other buildings. In that case, the rainwater adds to the volume of sewage that requires treatment at the Ringsend WwTP.

The surface water drainage system is managed by the local authority, whilst the combined sewer systems are managed by Irish Water. Flows are typically collected in standard gully grates and routed via a gravity network to outfall points. There are no SUDS / attenuation measures on the existing drainage networks to treat or attenuate runoff from the existing highway.

The existing drainage network along the Proposed Scheme can be split into 22 catchment areas based on topography and the existing pipe network supplied by Irish Water. The approximate catchment areas, existing sewer networks, outfalls and watercourses are shown on the existing catchment drawings, refer to the Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG\_RD-0011\_XX\_00-DR-CD-9001) in Volume 3 of this EIAR. The existing catchments are summarised in Table 4.28.



**Table 4.28: Summary of Existing Catchments**

Existing Catchment Reference	Approx. Drainage Catchment Area (m <sup>2</sup> )	Existing Network Type	Existing Outfalls
K_01	66,470	Combined sewer	Ringsend WwTP
K_02	401,840	Combined sewer	Ringsend WwTP
K_03	56,100	Combined sewer	Ringsend WwTP
K_04	15,290	Combined sewer	Ringsend WwTP
K_05	58,560	Combined sewer	Ringsend WwTP
K_06	132,900	Surface water	River Poddle (culverted)
K_07	204,440	Combined sewer	Ringsend WwTP
K_08	70,030	Combined sewer	Ringsend WwTP
K_09	105,280	Surface water	River Poddle
K_10	162,600	Surface water and Combined sewer	Ringsend WwTP (surface water outfall not clear)
K_11	78,230	Surface water	River Poddle
K_12	22,780	Surface water	Ringsend WwTP
K_13	431,720	Surface water	Ringsend WwTP
K_14	2,153,760	Surface water and Combined sewer	Ringsend WwTP (surface water outfall not clear)
K_15	25,700	Combined sewer	Ringsend WwTP
K_16	102,260	Surface water and Combined sewer	Ringsend WwTP. Surface water into River Poddle
K_17	38,305	Surface water	River Poddle
K_18	470,350	Surface water	River Poddle
K_19	343,470	Surface water	River Poddle
K_20	1,690,940	Surface water	River Poddle
K_21	17,580	Surface water	River Poddle
K_22	26,940	Surface water	River Poddle

#### 4.6.15.4 Proposed Drainage / Runoff

Whilst in some areas the Proposed Scheme will increase the impermeable areas, additional permeable areas will also be provided by the softening of urban realm along the routes. The drainage design aims to sustain flow levels within the existing pipe network after a rainfall event by controlling discharge rate within each catchment. Flows will be controlled by the implementation of SUDS techniques, where practicable. One of the principal objectives of the road drainage system is to minimise the impact of the runoff from the roadways on the surrounding environment via the position of: filter drains, swales, bio retention areas, tree pits, oversized pipes, silt traps and attenuation features, if necessary.

Each catchment area has been broken down into sub-catchments to define the change in impermeable surface area as a result of the Proposed Scheme. Where there is a net increase in impermeable surface area, a form of attenuation will be required prior to discharge. Where there is no net change or net decrease, then no form of attenuation will be required prior to discharge.

A summary list of the sub-catchments, the associated chainage, and impermeable surface area differential is given in Table 4.29. In addition, this table contains a column entitled 'Net Change' which takes account of the change of use from impermeable to permeable areas and vice versa.

**Table 4.29: Summary of Increased Permeable and Impermeable Areas**

Existing Catchment Reference	Section / Chainage	Road Corridor Area (m <sup>2</sup> )	Change of Use to Impermeable Areas (m <sup>2</sup> )	Change of Use to Permeable Areas (m <sup>2</sup> )	Net Change (m <sup>2</sup> )	Percentage Change (%)
K_01	A3100 - A3700	7,603	0	0	0	0
K_02	A2680 - A3710	14,059	77	0	77	0.55
K_03	A2680 - A3100	7,226	34	0	34	0.47
K_04	A2470 - A2680	5,008	0	86	-86	-1.69
K_05	A2010 - A2650	2,445	485	0	485	24.7
K_07	B10050&A1950 - A2480	15,706	731	0	731	4.88
K_08	A1740 - A2000	1,855	0	0	0	0
K_09	H70090 - A1740	5,359	285	0	285	5.62
K_10	A1250 - A 1420	2,342	0	0	0	0
K_11	G60600-H70030	7,679	0	86	-86	-1.1
K_12	A900 - A1160	6,595	0	132	-132	-1.96
K_13	Derravaragh Road	571	0	75	-75	-11.6
K_14	J90000-J90130& A1420-A1940	10,748	0	0	0	0
K_15	G60140-G60250	1,391	0	0	0	0
K_16	A60 - A900	15,647	0	320	-320	-2
K_17	A10 - A210	392	0	0	0	0
K_18	G60000-G60140	2,564	0	0	0	0
K_19	A0 - A60	1,098	0	0	0	0
K_20	A0 - A60	903	0	0	0	0
K_21	G60140-G60450	213	0	0	0	0
K_22	G60230-G60590	4,365	0	0	0	0

#### 4.6.15.5 Proposed Drainage System

The principal objectives for the drainage design are as follows:

- To drain surface water from existing and proposed pavement areas throughout the Proposed Scheme and maintain the existing standard of service;
- To maintain existing runoff rates from existing and newly paved surfaces using SUDS;
- To minimise the impact of the runoff from the carriageway on the surrounding environment using SUDS and / or silt traps;
- No drainage features like gullies or manholes will be located at, or any ponding will be allowed to occur at, pedestrian cross-walk locations or at bus-stop locations. Where any such drainage features currently exist at such locations, they will be relocated. Drainage of newly paved areas includes SUDS measures to treat and attenuate any additional runoff. These measures ensure that there is:
  - No increase in existing runoff rates from newly paved areas; and
  - The provision of appropriate treatment to ensure runoff quality.
- A hierarchal approach to the selection of SUDS measures has been adopted with 'Source' type measures (e.g. tree pits) implemented in preference to catchment type measures (e.g. attenuation tanks).

The following drainage types are proposed for the Proposed Scheme catchments comprising newly paved and combined existing / newly paved areas, as indicated on the Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG\_RD-0011\_XX\_00-DR-CD-9001) in Volume 3 of this EIAR:

- Reuse of existing drainage;

- Sealed Drainage, with gullies and sealed pipes will be located within the kerb line mostly between the cycle track and bus lane and/or the footpath and the cycle track depending on the highway profile;
- Tree pits are provided near the road. These receive flows from the sealed pipe network and are designed to convey, attenuate, and treat runoff prior to discharge; and
- Oversized Pipes.

#### **4.6.15.6 Runoff Attenuation and Sustainable Drainage Systems**

SUDS measures and / or attenuation systems will be provided to ensure no increase in existing run off rates from newly paved and combined existing / newly paved catchment areas. The capacity of the proposed SUDS measures and attenuation systems was based on the incoming flows and existing discharge rates for each catchment. A range of storm durations was tested for each catchment from 30-minutes to 24 hours to ensure that the proposed measures have sufficient capacity to cater for high intensity, short duration storms and longer duration, low intensity storms where the total runoff volumes are greater.

#### **4.6.15.7 Pollution Control**

One of the principal objectives of the road drainage system is to minimise the impact of the runoff from the roadways on the surrounding environment via the provision of SUDs. The proposed road drainage system is shown in the Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG\_RD-0011\_XX\_00-DR-CD-9001) in Volume 3 of this EIAR. In a few locations, where appropriate, the proposed system incorporates a variety of pollution control measures which will provide interception and treatment as the types indicated below:

- Tree pits: Trees contribute to effective surface water management strategies. They also reduce annual building energy consumption by moderating the local climate, filter harmful pollutants from the air, and absorb and store atmospheric carbon dioxide (carbon sequestration). In the process of drawing water from the soil, trees also take up trace amounts of harmful chemicals, including metals, organic compounds, fuels and solvents that are present in the soil. Inside the tree, these chemicals can be transformed into less harmful substances, used as nutrients and /or stored in roots, stems and leaves.

#### **4.6.16 Maintenance**

All traffic signal, CCTV, and communications equipment are designed based on long-term maintenance requirements. All equipment will be accessible without significantly disrupting pedestrian, bicycle, or vehicle traffic.

Apparatus have been designed and located to allow for easy access and the safe maintenance of the Proposed Scheme into the future. This included provision, where practicable, of:

- Use of retention sockets, where applicable, for the erection of Traffic Signal, CCTV, Above Ground Detection, and other equipment mounting poles to allow for the ease of installation, maintenance and replacement;
- The use of lightweight equipment poles, where appropriate, such as cantilever signal poles. Products that allow for maintenance activities to be undertaken from ground level, where practicable, such as tilt down poles or poles with wind-down mechanisms;
- Placement of poles and retention sockets within 7m of chambers to provide ease of installation and replacement of cables;
- Location of chambers away from pedestrian desire lines, and areas of tactile paving;
- Chambers to be placed at 180m centres, where practicable, on longitudinal duct runs to allow for the ease of installation and replacement of cables;
- Safe areas for the access and parking of maintenance vehicles, where practicable; and
- Controller, and other, cabinets located in positions that allow for safe access and clear visibility of the operation of an adjacent road junction.

#### **4.6.17 Safety and Security**

In addition to public lighting, it is proposed to install traffic monitoring cameras at key locations including junctions to enable the monitoring of traffic flows along the Proposed Scheme and to provide rapid identification of any events that are causing, or are likely to cause, disruption to bus services on the route and to road users in general. Junctions System Design information is included in the drawings (BCIDD-ROT-TSM\_SJ-0011\_XX\_00-DR-TR-9001) in Volume 3 of this EIAR.

#### **4.6.18 Land Use and Accommodation Works**

The Proposed Scheme has retained, as far as practicable, the existing horizontal and vertical layout along the route to minimise the amount of land acquisition required. However, in order to construct the Proposed Scheme, it is necessary to compulsorily acquire individual plots of land along sections of the route.

The extent of permanent land acquisition and land required temporarily for the construction of the Proposed Scheme is shown on the General Arrangement Drawings (BCIDD-ROT-GEO\_GA-0011\_XX\_00-DR-CR-9001) included in Volume 3 of this EIAR.

Construction of the Proposed Scheme will require land acquisition from several different parties, as outlined in Section 4.5 for each section of the Proposed Scheme.

Mitigation for accommodation works are proposed in the affected locations, including reconstruction of boundary walls and fences, as required, as outlined in Section 4.6.18.1.

##### **4.6.18.1 Summary of Accommodation Works and Boundary Treatment**

There are a number of areas along the extents of the Proposed Scheme where there will be the requirement for accommodation works and boundary treatments. Specific accommodation works will be considered on a case-by-case basis.

To maintain the character and setting of the Proposed Scheme, the approach to undertaking the new boundary treatment works along the corridor will be replacement on a 'like for like' basis in terms of material selection and general aesthetics, unless a section of street can benefit from urban improvement appropriate to the area.

Modifications to driveways and entrances will be guided by DCC's Parking Cars in Front Gardens Advisory Booklet (DCC 2011).

Where cellar and private landings are affected by the Proposed Scheme pre-construction and post construction surveys will be performed by the appointed contractor. It will be determined during the detailed design stage if strengthening works are required to these existing structures.

Existing gates will be reused where possible. However, considerations will be required for the use of bifold gates, or other appropriate alternatives to mitigate impacts on parking in driveways. All gates will be hung such that they will open inwards onto the property, where practicable.

## 4.7 References

- BSI (1999-2021). BS 7533 series of standards (1999 – 2021) – Pavement Constructed with Clay, Natural Stone or Concrete Pavers
- BSI (2003). BS 5489-1:2003 Code of practice for the design of road lighting
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- BSI (2018). BS8300-1:2018 Design of an accessible and inclusive built environment - External environment – Code of practice
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- NDA (2012b). Shared Space, Shared Surfaces and Home Zones from a Universal Design Approach for the Urban Environment in Ireland
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- NTA (2011). National Cycle Manual
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- NTA (2022). 2022 Greater Dublin Area Cycle Network
- TII (2005). Footway Design - DN-PAV-03026 (January 2005)
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- TII (2012). Specification for Road Works Series 1100 – Kerbs, Footways and Paved Areas - CC-SPW-01100 (February 2012)
- TII (2013a). Specification for Road Works Series 600 – Earthworks – CC-SPW-00600 (March 2013)
- TII (2013b). Specification for Road Works Series 800 – Road Pavements – Unbound and Cement Bound Mixtures – CC-SPW-00800 (March 2013)
- TII (2013c). Specification for Road Works Series 1000 – Road Pavements – Concrete Materials - CC-SPW-01000 (March 2013)
- TII (2015). Specification for Road Works Series 700 – Road Pavements – General – CC-SPW-00700 (March 2015)
- TII (2017a). TII Specification for Roadworks Series 900 – Bituminous Materials
- TII (2017b). Standard Construction Details - Series 1300 (Volume 4)
- TII (2017c). Standard Construction Details - Series 1400 (Volume 4)
- TII (2020a). Surfacing Materials for New and Maintenance Construction for Use in Ireland – DN-PAV-03023 (June 2020)
- TII (2020b). Pavement Assessment, Repair and Renewal Principles - AM-PAV-06050
- UK DfT (2005). Inclusive Mobility
- UK DfT (2007). Guidance on the Use of Tactile Paving Surfaces

#### Directives and Legislation

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Number 14 of 1993 - Roads Act, 1993 (as amended)

Number 14 of 2005 - Disability Act 2005 (as amended)