Non-Technical Summary

Contents

1. Introduction

This document is the Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) for the Liffey Valley to City Centre Core Bus Corridor Scheme (referred to as the Proposed Scheme throughout this NTS). The Proposed Scheme will support integrated sustainable transport usage through infrastructure improvements for active travel (both walking and cycling), and the provision of enhanced bus priority measures for existing (both public and private) and all future services who will use the corridor.

The Proposed Scheme has an overall length of approximately 9.2km. It will commence at the Fonthill Road where it will tie into the new bus interchange facility on the northern boundary of the Liffey Valley Shopping Centre. The Proposed Scheme will continue along the Fonthill road to the west and south of Liffey Valley Shopping Centre in a southerly direction towards Coldcut Road. From here it will join the R833 Coldcut Road and continue to the bridge over the M50, subsequently turning onto the R833 Ballyfermot Road. The Proposed Scheme will then travel through Ballyfermot Village and continues onto the Sarsfield Road, whilst city bound general traffic is diverted via Le Fanu Road and Kylemore Road back to Ballyfermot Road.

The Proposed Scheme will continue along Ballyfermot Road and Sarsfield Road, turning right at the junction with Con Colbert Road before turning right again onto Grattan Crescent. At the intersection of Grattan Crescent and Emmet Road the Proposed Scheme will travel along Emmet Road, Old Kilmainham, Mount Brown and James's Street. From here the Proposed Scheme will join Thomas Street, Cornmarket and High Street to the junction with Nicholas Street and Winetavern Street, where it will join the existing traffic management regime in the City Centre.

The route of the Proposed Scheme is presented in Image 1.1, and general arrangement drawings of the Proposed Scheme are appended to this NTS.

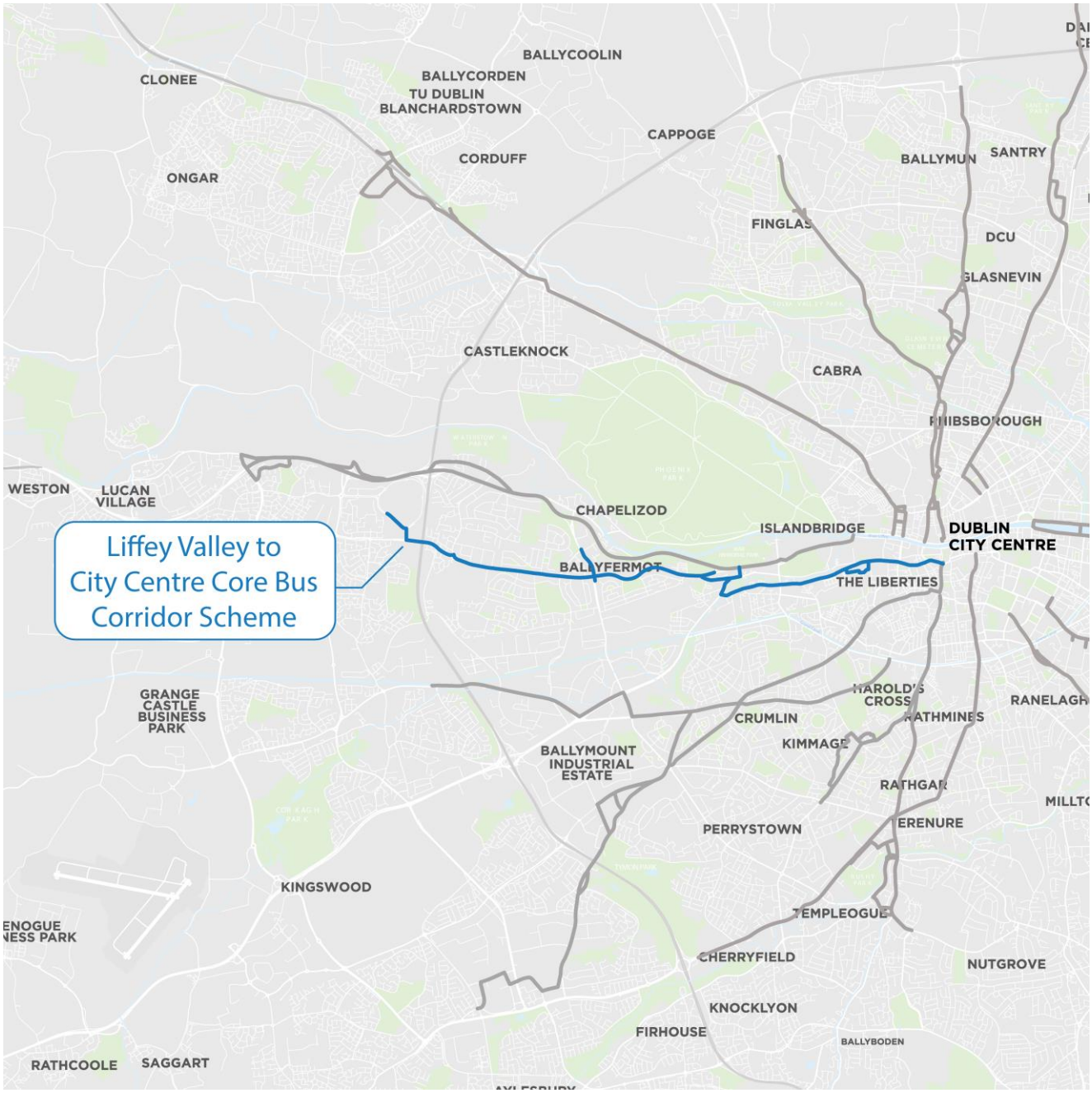

Image 1.1: Route of the Proposed Scheme

The Proposed Scheme would significantly enhance travel by public transport by providing bus priority as well as improved pedestrian and cycling infrastructure. Currently this access corridor is characterised by traffic congestion and while there are existing bus lanes on parts of the route, buses and cyclists are competing for space with general traffic for most of the journey, making it less attractive for pedestrians, cyclists and bus users.

Through the provision of increased bus priority infrastructure, the Proposed Scheme will improve both the overall journey times for buses along the route and their journey time reliability.

In addition to the improvements to bus journey times and journey time reliability, the Proposed Scheme will provide benefits for cyclists and pedestrians. The scheme design has been developed having regard to the relevant accessibility guidance and universal design principles so as to provide access for all users.

The provision of dedicated cycling infrastructure along the Proposed Scheme will make cycling trips safer and more attractive. In this regard, the Proposed Scheme delivers substantial elements of the National Transport Authority (NTA) Greater Dublin Area Cycle Network Plan (hereafter referred to as the GDA Cycle Network Plan) (NTA 2013), much of which does not currently have adequate provision - as well as linking with other existing and proposed cycling schemes and sustainable transport modes, contributing towards the development of a comprehensive cycling network for Dublin.

Several urban realm upgrades, including widened footpaths, high quality hard and soft landscaping and street furniture will be provided in areas of high activity to contribute towards a safer, more attractive environment for pedestrians.

The primary objective of the Proposed Scheme, therefore, is the facilitation of modal shift from car dependency through the provision of walking, cycle, and bus infrastructure enhancements thereby contributing to an efficient, integrated transport system and facilitating a shift to a low carbon and climate resilient City.

The Proposed Scheme is one of 12 schemes to be delivered under the BusConnects Dublin - Core Bus Corridors Infrastructure Works (hereafter called the CBC Infrastructure Works). The CBC Infrastructure Works is one of the initiatives within the NTA's overall BusConnects Programme. The BusConnects Programme seeks to greatly improve bus services in Irish cities, including Dublin, so that journeys by bus will be fast, reliable, punctual, convenient, and affordable. The proposed CBC Infrastructure Works are illustrated in Image 1.2.

Image 1.2: CBC Infrastructure Works

It is envisaged that the CBC Infrastructure Works, once completed, will deliver the radial Core Bus Corridors identified in the NTA's Transport Strategy for the Greater Dublin Area 2016-2035 (referred to as the GDA Transport Strategy) (NTA 2016).

1.1 Aims and Objectives

The aim of the Proposed Scheme is to provide improved walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the Proposed Scheme are 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;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the urban realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

The planning and design of the Proposed Scheme has been guided by these aims and objectives.

The outcomes achieved from delivering the Proposed Scheme will be:

- An attractive, resilient, equitable public transport network better connecting communities and improving access to work, education and social activity;
- To facilitate a transport infrastructure network that prioritises walking and cycling and a mode shift to public transport; and
- To support increased economic and social potential through integrated land-use and transport planning to reduce the time burden of travel.

1.2 Role of the National Transport Authority

The NTA is a statutory non-commercial body, which operates under the aegis of the Department of Transport. The NTA was established on foot of the Dublin Transport Authority Act 2008 (as amended) (the '2008 Act').

In the case of the Proposed Scheme, the functions of the NTA include undertaking the design and planning process, seeking (and obtaining) all development consents including related compulsory acquisition approvals from An Board Pleanála, and construction of the Proposed Scheme (if approved).

2. Environmental Impacts Assessment Process

2.1 EIA Process

Environmental Impact Assessment (EIA) is a systematic and an iterative that examines the potential environmental impacts of a proposed scheme and establishes appropriate design and mitigation measures to avoid, reduce or offset impacts.

The EIAR reports the findings of an assessment of the environmental impacts of the Proposed Scheme. The purpose of the EIAR is to:

- Describe the baseline conditions before any work on the Proposed Scheme has commenced;
- Describe the Proposed Scheme;
- Describe the assessment methodologies used to assess the potential environmental impacts of the Proposed Scheme;
- Describe environmental issues and any likely significant impacts which may arise during the Construction and Operational Phases of the Proposed Scheme;
- Consider the potential cumulative impacts as a result of potential impacts from other schemes in combination with the predicted impacts of the Proposed Scheme;

- Propose mitigation measures to reduce or avoid these impacts; and
- Identify the significant residual impacts which occur after the proposed mitigation measures have been implemented.

All assessments have been carried out in accordance with best practice and applicable guidelines. Some chapters of the EIAR use specific guidelines related purely to that particular discipline.

This NTS is Volume 1 of the EIAR and presents a summary of the EIAR, including key aspects of the Proposed Scheme and the associated beneficial and adverse impacts of importance.

The EIAR documents have been divided into the following Volumes for ease of use:

- Volume 1 – NTS (this document);
- Volume 2 - Main Report;
- Volume 3 – Figures; and
- Volume 4 – Appendices.

3. Need for the Proposed Scheme

3.1 Context

Private car dependence causes significant congestion, affecting our quality of life, our urban environment, and road safety. As the population of the Greater Dublin Area is projected to rise to almost 1.5 million by 2040, there will be an increased demand for travel on roads which currently do not have the capacity for more traffic. Therefore, enhanced sustainable transport options are needed. Without intervention, traffic congestion will lead to longer and less reliable pedestrian, cycle, and bus journeys throughout the region and this will affect the quality of people's lives. On the other hand, sustainable transport infrastructure helps create more sustainable communities and healthier places, while also stimulating our economic development. It contributes to good health and well-being when delivered effectively.

3.2 Project Ireland 2040 – National Development Plan 2021-2030

Under the heading 'Major National Infrastructure Projects' the National Development Plan 2021-2030 sets out a selection of 'Sustainable Mobility' projects included in the Plan as 'Strategic Investment Priorities'. The Proposed Scheme, forming part of the Core Bus Corridors Infrastructure Works within the overall BusConnects Programme is identified as a component of a Strategic Investment Priority, with an associated investment commitment, which has been determined as central to the delivery of the National Planning Framework vision. Delivering the Proposed Scheme will provide the infrastructure needed to help us move from excessive dependence on private car to walking, cycling and public transport.

3.3 Climate Action Plan 2021

The Climate Action Plan 2021 sets out at a National level how Ireland is to halve its emissions by 2030 (51% reduction) and reach net zero no later than 2050. The Climate Action Plan is a road map to delivering Ireland's climate ambition. There are 475 actions identified that extend to all sectors of the economy aiming to transform Ireland into a low carbon nation over the next three decades.

In regard to modal shift the Climate Action Plan 2021 sets out that:

> *'The proposed pathway in transport is focused on accelerating the electrification of road transport, the use of biofuels, and a modal shift to transport modes with lower energy consumption (e.g. public and active transport)'.*

Promoting more sustainable travel modes is seen as critical for climate policy. It offers an opportunity to '*improve our health, boost the quality of our lives, meet the need of our growing urban centres and connects our rural, urban and suburban communities'.*

BusConnects is referenced as a major transport project that will help to deliver the 500,000 additional sustainable journeys. A key goal of the plan is to provide citizens with reliable and realistic sustainable transport options. The Climate Action Plan further states:

> '*The new approach to public transport will be based on a vision of an integrated public transport network, enabling short, medium and long distance trips for people in every part of Ireland. This will mean increasing the frequency of existing rail and bus services, and expanding the bus network through the Connecting Ireland approach.'*

The Proposed Scheme is needed to support the key actions set out in the Climate Action Plan 2021. At a local level, the Proposed Scheme directly supports the provision of sustainable transport options to meet travel demand. The Proposed Scheme will expand, enhance, and connect to pedestrian and cycle networks and will help to deliver compact growth on zoned development lands close to the Proposed Scheme.

3.4 Greater Dublin Area Transport Strategy

The Greater Dublin Area Transport Strategy 2016 - 2035 (referred to as the GDA Transport Strategy) is an essential component for the orderly development of the Greater Dublin Area (GDA) over the next 20 years. The purpose and primary objective of the GDA Transport Strategy is *'to contribute to the economic, social and cultural progress of the Greater Dublin Area by providing for the efficient, effective and sustainable movement of people and goods'.*

The Proposed Scheme is needed to support the implementation of the GDA Transport Strategy in regard to improving the pedestrian environment along the Proposed Scheme, while taking cognisance of and supporting pedestrian and urban realm planning objectives locally. In addition, the Proposed Scheme will improve the existing streetscape / urban realm setting along the corridor. This will include the provision of significantly enhanced crossing facilities, and the introduction of new and improved landscaping provisions along the corridor, and complimentary planting regime and streetscape improvements at key locations will also enhance the character of the surrounding built environment along the corridor.

The Proposed Scheme supports the implementation of the GDA Cycle Network Plan as it will provide infrastructure that will support and enhance cycling as a transport mode, including the delivery of infrastructure for specific routes identified as part of the cycle network plan.

As part of the GDA Transport Strategy the Core Bus Network is to be developed to achieve a continuous priority for bus movement on sections of the Core Bus Network within the Metropolitan area. This is to be achieved through enhanced bus lane provisions and the removal of delays along the routes, and thus enabling the bus to move more quickly than cars along these routes.

The Proposed Scheme is needed to support the GDA Transport Strategy in so far as it will provide infrastructure required to facilitate a continuous priority for bus movement on sections of the Core Bus network within the Metropolitan area. The Proposed Scheme is needed to help realise the objectives of the GDA Transport Strategy by making the bus a faster option for commuters than car-based transport.

The NTA prepared the Core Bus Network Report for the Dublin Metropolitan Area in 2015, which identified those routes upon which there needed to be a focus on high capacity, high frequency, and reliable bus services, and where investment in bus infrastructure should be prioritised and concentrated. The Core Bus Network is defined as a set of primary orbital and radial bus corridors which operate between the larger settlement centres in the Dublin Metropolitan Area.

The development and implementation of priority infrastructure on the Core Bus Network is needed to ensure that delays are minimised, reliability is improved and use of buses is made more attractive.

The Liffey Valley – Ballyfermot route was identified as one of the radial bus routes on the Core Bus Network. This route along the extent of the Proposed Scheme currently has a low proportion of inbound and outbound bus-lane infrastructure. Therefore, the quality of service is poor due to discontinuities of various types, with long lengths of the route lacking a dedicated bus lane. At key locations along the corridor the existing bus lanes are shared, with the designation of shared cycle / bus lanes along parts of the route where no segregated cycling infrastructure is available. This has the effect of slowing down bus journeys.

Based on the need to address the resulting service deficiencies along the route and the need to serve significant demand and a high level of scheduled bus services along this entire corridor, the Core Bus Network study included a recommended route from Liffey Valley to the City Centre.

The Proposed Scheme will increase the effectiveness and attractiveness of bus services operating along the corridor and will result in more people availing of public transport due to the faster journey times and reliability improvements which the Proposed Scheme provides. This in turn will support the potential to increase the bus network capacity of services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth. The Proposed Scheme has been designed to be accessible by all users.

In the absence of the Proposed Scheme bus services will be operating in a more congested environment, leading to higher journey times for bus and lower reliability which will lead to reduced levels of public transport use, making the bus system far less attractive and less resilient to higher levels of growth. The absence of walking and cycling measures, provided in the Proposed Scheme, will significantly limit the potential to grow those modes into the future. Overall, the Proposed Scheme will make a significant contribution to the overall aims and objectives of BusConnects, the GDA Strategy and allow the city to grow sustainably into the future, which would not be possible in the absence of the Proposed Scheme.

4. Consultation

Public participation has been an integral part of the development of the Proposed Scheme from the outset. Non-statutory consultation was carried out, in three phases (one in relation to the Emerging Preferred Route (EPR) and two in relation to the Preferred Route Option (PRO)), to inform the public and stakeholders of the development of the Proposed Scheme from an early stage and to seek feedback and participation throughout its development.

The primary objective of the non-statutory public consultation process was and is to provide opportunities for members of the public and interested stakeholders to contribute to the planning and design of the Proposed Scheme and to inform the development process. Public participation in the planning and design of the Proposed Scheme was encouraged from an early stage through on-the-ground engagement and information and media campaigns.

The non-statutory consultation process assisted in:

- The establishment of a sufficiently strong environmental baseline for the Proposed Scheme and its surroundings;
- The identification, early in the process, of specific concerns and issues relating to the Proposed Scheme so that they could be appropriately accounted for in the design and assessment scope; and
- Ensuring the appropriate involvement of the public and stakeholders in the design and assessment process.

These consultations are briefly described below.

4.1 EPR Option Consultation

The first phase of public consultation carried out was based on the EPR and this ran from 23 January 2019 to 30 April 2019.

The issues raised during the first non-statutory public consultation process were considered as part of the route options assessment process and in determining the preferred route. The EPR proposals were amended to address the issues raised in submissions where possible, incorporating suggestions and recommendations from residents, community groups and stakeholders, where appropriate. These amendments were incorporated into the design and informed the PRO design-development which was subsequently also published for non-statutory public consultation.

At the initiation of the public consultation process a Community Forum was established with the aim of facilitating communication between community representatives, elected representatives and the BusConnects Infrastructure team. Community Forum meetings took place, where the Community Forum was provided with an update on the design for the Proposed Scheme and given the opportunity to ask questions of the project team and provide feedback.

4.2 PRO Consultations

The PRO non-statutory public consultation took place from 4 March 2020 to 30 April 2020. The public were invited to make written submissions in relation to the published proposals to the BusConnects Infrastructure team either through an online form, by email or by post. Due to the COVID-19 pandemic all further planned events scheduled after 12 March 2020 were postponed. In deference to the submissions which had already been received, the decision was made not to cancel the consultation.

The NTA held a third round of public consultation prior to finalising the PRO in November 2020 and this took place from 4 November 2020 to 16 December 2020. This third round was carried out using virtual consultation rooms, offering a ‘call-back’ facility along with descriptions, supporting documentation and mapping of the draft PRO as well as information on all revisions, if any, made since the second round of non-statutory public consultation in March 2020.

The issues raised during the second and third rounds of public consultation have been considered as part of the final PRO and formed the basis of the preliminary design.

4.3 Consultation with Prescribed Bodies and Other Consultees

In addition to the public consultation on the Proposed Scheme, the NTA undertook consultation during the preparation / development of the EIAR with certain prescribed bodies and relevant non-statutory consultees.

During the development of the EIAR, prescribed bodies (including the Department of Communications, Climate Action and the Environment, the Department of Transport, Dublin City Council, South Dublin County Council and the Heritage Council) and relevant non-statutory consultees were provided with a report outlining the proposed approach to the environmental assessment and were invited to comment. Feedback from this consultation was also used to inform the EIAR and the preliminary design proposals.

4.4 Consultation with Landowners

There has been ongoing engagement with landowners whose properties will be impacted, or potentially affected, as the design development for the Proposed Scheme has progressed, from the earliest stages of the project in 2018 through to the Autumn of 2021. This engagement has overlapped with the public consultations (in January 2019, March 2020 and November 2020). A letter drop was also carried out in Summer 2020 to request access to properties to undertake more detailed surveys. Additional letters were sent to affected landowners between June and October 2021 offering further engagement. Over the course of the engagements, affected property owners have had the opportunity to discuss different aspects of the Proposed Scheme with the design team. Follow-up

conversations have been facilitated as a result of these letters on request. In addition, a further attempt was made to contact those occupiers that had yet to make contact by visiting each property during September 2021. Where no one answered the door, a letter was placed through the letterbox again requesting the occupiers to contact the NTA.

4.5 Consultation with Local Residents and Business Groups

Throughout the design development of the Proposed Scheme, from the initiation of the first non-statutory public consultation in January 2019, the NTA facilitated consultation on request with small local resident groups and with business interests on / adjacent to the route. Similar to the Community Forum meetings, such events facilitated discussion on the design for the Proposed Scheme and attendees were given the opportunity to ask questions of the BusConnects Infrastructure team and provide feedback.

5. Alternatives Considered

5.1 Strategic Alternatives

The Proposed Scheme has been developed following careful consideration of alternatives. The GDA Transport Strategy, and its associated Strategic Environmental Assessment, considered several strategic options relevant to the Proposed Scheme.

The consideration of alternative options included a 'Do Nothing' Scenario. This is a scenario where the Proposed Scheme would not be progressed. This option was deemed to be unacceptable as traffic congestion throughout the GDA is particularly high, with the number of cars on the road increasing and significant daily traffic delays. Without intervention, potential impacts could worsen for the region, including:

- Continued growth of traffic congestion;
- Impacts on the ability of the region to grow economically due to increased traffic congestion;
- Longer journey times and increased travel stress will diminish quality of life; and
- Environmental emissions targets will not be met.

The NTA carried out a review of the existing transport network and future forecasts of travel demand in Dublin. This review was further broken down into an assessment of existing and future land use and travel patterns and identified trends and issues within eight transport corridors. Based on these assessments, the most practical set of transport service proposals was set out for each of the eight corridors, combining to form the overall integrated transport system for the GDA up to 2035 in the GDA Transport Strategy.

The Proposed Scheme aligns generally with part of Corridor C in the GDA Transport Strategy which extends from the core city centre area along the N4 and R148 Chapelizod Bypass corridor and contains two of the region's most important future residential and commercial development areas at Clonburris and Adamstown, both based on the Kildare rail line. Major employers are also located in this corridor in Leixlip and Celbridge. Other key areas of transport demand include Lucan village, Liffey Valley Town Centre, and Ballyfermot.

Through the work undertaken in the preparation of the GDA Transport Strategy, including its supporting studies, various alternatives to deal with the transport needs which are intended to be addressed by the Proposed Scheme were identified and considered.

Other strategic alternatives considered included:

- Bus Rapid Transit;
- Light Rail;
- Metro;
- Heavy Rail;
- Demand Management; and
- Technological Alternatives.

The Proposed Scheme has been developed to provide a level of service similar to Bus Rapid Transit. The GDA Transport Strategy has concluded that new heavy rail and light rail/metro alternatives would not be justified by the predicted level of demand. However, the existing DART line will be upgraded and extended as part of the GDA Transport Strategy.

Demand management and technological alternatives, such as congestion charges, road pricing, electric vehicles on their own would not remove the need for additional bus transport or cycling infrastructure along the route of the Proposed Scheme.

5.2 Route Alternatives

Alternative route options have been extensively considered during the design development of the Proposed Scheme. The development of the design has also been informed by a review of feedback and new information received during each stage of public consultation and as the level of data, such as surveys, transport and environmental data was collected and assessed.

Development of the Proposed Scheme has evolved in the following stages:

1) **Feasibility and Options Report** was concluded in 2016, setting out the initial route options and concluding with the identification of the Emerging Preferred Route;
2) A first round of non-statutory **Public Consultation** was undertaken on the Emerging Preferred Route from 14 February 2018 to 29 March 2019;
3) Development of **Draft Preferred Route Option** (April 2019 to March 2020). Informed by feedback from the first round of public consultation, stakeholder and community engagement and the availability of additional design information, the design of the Emerging Preferred Route evolved with further alternatives considered;
4) A second round of non-statutory **Public Consultation** was undertaken on the Draft Preferred Route Option from 04 March 2020 to 17 April 2020. Due to the introduction of COVID-19 restrictions, some planned in-person information events were cancelled, leading to a decision to hold a third consultation later in the year;
5) Further development of an updated **Draft Preferred Route Option** was undertaken subsequent to the second round of public consultation, which took account of submissions received, continuing stakeholder engagement and additional design information;
6) A third round of non-statutory **Public Consultation** was undertaken on the updated Draft Preferred Route Option from 04 November 2020 to 16 December 2020; and
7) Finalisation of **Preferred Route Option**. Informed by feedback from the overall public consultation process, continuing stakeholder engagement and the availability of additional design information, the Preferred Route Option, being the Proposed Scheme, was finalised.

The initial route alternatives considered covered a network of roads between Liffey Valley and the City Centre. These were narrowed down using a high-level qualitative method based on professional judgement and a general appreciation for existing physical conditions / constraints including environmental considerations within the study area.

The alternative route options were then evaluated under the following criteria:

- Economy;
- Safety;
- Integration;
- Accessibility and Social Inclusion; and
- Environment.

Careful consideration for alternative cycling route options was also fundamental in the process of defining the EPR.

Informed by the appraisal of alternative route options, the EPR was identified. That EPR is summarised as follows:

'*The Liffey Valley Core Bus Corridor (CBC) commences at a new terminus close to the Liffey Valley Shopping Centre, in the vicinity of the shopping centre car park access roundabout (exact location to be determined as part of a separate study) and is routed along the distributor roads to the west and south of the shopping centre to the junction with the R833 Coldcut Road. It is then routed via the R833 along Coldcut Road and Ballyfermot Road to the junction with Sarsfield Road. From here, the CBC is routed via Sarsfield Road, the R839 along Grattan Crescent, the R810 along Emmett Road, Old Kilmainham, Mount Brown, James's Street, Thomas Street, and Cornmarket, and the R108 along High Street to the junction with Nicholas Street and Winetavern Street, where it will join the prevailing traffic management regime in the City Centre. Priority for buses is provided along the entire route, consisting primarily of dedicated bus lanes in both directions with alternative measures proposed at particularly constrained locations.'*

5.3 Design Alternatives

Following the completion of the public consultation process in relation to the EPR, various amendments were made to the scheme proposals to address some of the issues raised in submissions, including incorporating suggestions and recommendations from residents, community groups, businesses, elected representatives, and stakeholders, and/or arising from the availability of additional information. These amendments were incorporated into the designs and informed a Draft PRO. Alternatives considered during the development of the Draft PRO included the following:

- The EPR originally proposed that cyclists would share the bus lane between Le Fanu Road and Colepark Road. In order to provide cycle facilities along this section of the route alternative options were considered. The chosen option was to divert citybound general traffic along Le Fanu Road and Kylemore Road in order to provide segregated cycle tracks for the full length of the section, without requiring any land acquisition through Ballyfermot Village. Citybound general traffic through Ballyfermot Village would be prohibited but local access would be permitted to access Colepark Road from the Le Fanu Road / Ballyfermot Road junction. Citybound general traffic would be required to turn left onto Le Fanu Road to its intersection with Kylemore Road, and then travel along Kylemore Road to the intersection with Ballyfermot Road. General traffic would then turn left and re-join Ballyfermot Road in the direction of the city centre. Outbound traffic would operate as normal and travel through Ballyfermot Village. Fully segregated cycling facilities would be provided in both directions;
- To reduce the impact on Markievicz Park and the adjacent residential properties, the design was refined to provide signal controlled priority in lieu of a bus lane for inbound buses on Ballyfermot Road between Markievicz Park and St Laurence's Road. The inbound bus lane would then be reintroduced at St. Laurence's Road. To accommodate the revised arrangements, it is also intended to close Ballyfermot Road / O'Hogan Road junction of as part of the implementation of the signal controlled priority on Ballyfermot Road. The impact on the apartments at St. Laurence's Glen was also reduced by this design change. This revised option was considered to have some advantages in terms of lesser environmental impacts (cultural heritage, flora and fauna and landscape and visual), when compared to the EPR;
- Along Grattan Crescent, the EPR proposed to remove a number of existing mature trees to facilitate proposed road widening. Following concerns raised by the public, alternative options were considered. The chosen option was to provide new and upgraded bus lanes and pedestrian facilities on Grattan Crescent in both directions between Sarsfield Road and Emmet Road. To remove the need for carriageway widening and retain the existing mature trees, general traffic will be limited to a single lane along Grattan Crescent in a southbound direction between Sarsfield Road and Inchicore Terrace South. The space made available by removing a lane of general traffic will be utilised to widen the footways and carry out urban realm works along Grattan Crescent. Some car parking will be retaining along this section, and a new pedestrian crossing would be provided between Grattan Crescent Park and Inchicore National School. To reduce the impact of the proposed traffic restrictions on local residents; Memorial Road will be converted to two-way general traffic, the junction between Inchicore Road and Memorial Road will be modified to accommodate the traffic movements, and a new right turn will be made available for cars accessing the Chapelizod Bypass from the western end of Sarsfield Road.

A number of changes to the design were made based on feedback received during the second round of public consultation and dialogue with stakeholders. However, the changes made to the Draft Preferred Route Option were relatively small scale.

The assessment of alternatives took account of environmental impacts, alongside other relevant factors including the economy, safety and accessibility, to arrive at the Proposed Scheme.

6. Description of the Proposed Scheme

The Proposed Scheme has an overall length of approximately 9.2km. It will commence at the Fonthill Road where it will tie into the new bus interchange facility on the northern boundary of the Liffey Valley Shopping Centre. The Proposed Scheme continues along the Fonthill road to the west and south of Liffey Valley Shopping Centre in a southerly direction towards Coldcut Road. From here it joins the R833 Coldcut Road and continues to the bridge over the M50, subsequently turning onto the R833 Ballyfermot Road. The Proposed Scheme then travels through Ballyfermot Village and continues onto the Sarsfield Road, whilst city bound general traffic is diverted via Le Fanu Road and Kylemore Road back to Ballyfermot Road.

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 undertaken throughout the option selection and design development process has been incorporated where appropriate.

The Proposed Scheme has been developed to ensure that the principles of universal design are integrated fully in the design, providing access for all users, and eliminating barriers to disabled people.

A typical BusConnects road layout is shown in Image 6.1.

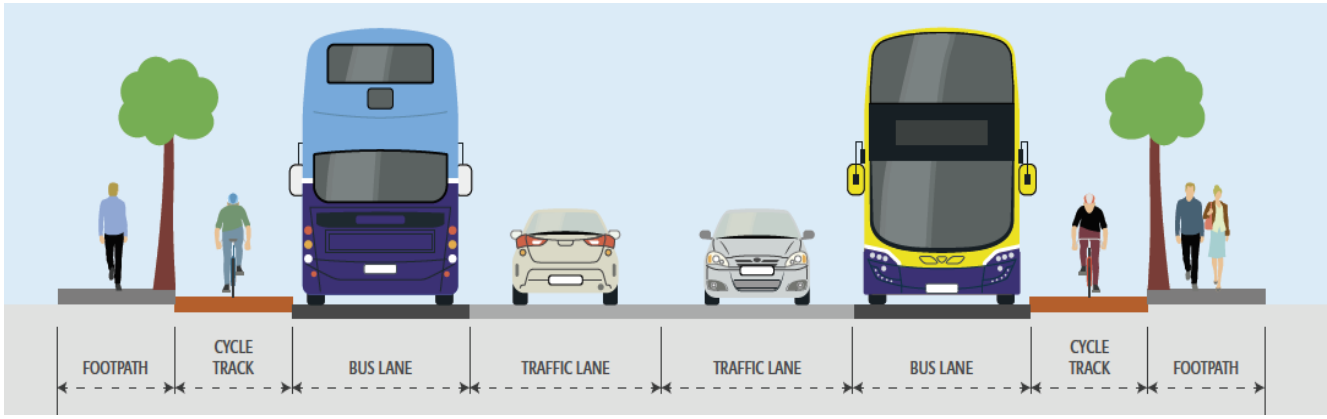

Image 6.1: Typical BusConnects Road Layout

The Proposed Scheme will make significant improvements to pedestrian and cycling facilities and to bus priority. Some of the key changes that will be made to the existing corridor as a result of the Proposed Scheme are the following:

- The number of pedestrian signal crossings will increase by 44% from 71 to 102 as a result of the Proposed Scheme;
- The proportion of segregated cycle facilities will increase from 12% on the existing corridor to 72% on the Proposed Scheme;
- The proportion of the route having bus priority measures will increase from 22% on the existing corridor to 100% on the Proposed Scheme.

The Proposed Scheme is described in the following geographical sections:

- Section 1: Liffey Valley to Le Fanu Road;
- Section 2: Le Fanu Road to Sarsfield Road; and
- Section 3: Sarsfield Road to City Centre.

6.1 Section 1: Liffey Valley to Le Fanu Road

It is proposed to commence the Proposed Scheme on Fonthill Road at the tie in with the Liffey Valley Shopping Centre Bus Interchange and Road Improvement Scheme. Between Fonthill Road and the junction with Coldcut Road, it is proposed to provide a continuous bus lane in each direction. Cycle tracks can be accommodated in both directions through dedicated cycle tracks. These proposals can be provided by widening into the central median, modifying the existing junctions and utilising existing green space adjacent to the road. The existing roundabout, one where Coldcut Road meets Fonthill Road and another heading towards Liffey Valley Shopping Centre on Fonthill Road are to be developed into signalised junctions and provide improved infrastructure for cyclists and pedestrians.

It is proposed to modify the Coldcut Road / Liffey Valley Entrance Road to accommodate the following lanes:

- Two bus lanes on Coldcut Road (westbound and eastbound);
- Three general traffic lanes (westbound, eastbound, and right turn lane for accessing Liffey Valley); and
- Cycle tracks and footways in both directions.

As Coldcut Road crosses over the M50, the carriageway width is restricted. To overcome this restriction and maintain bus priority over this section, it is proposed to provide Signal Controlled Bus Priority on both sides of the bridge crossing. The traffic signals at this location will be sequenced to ensure bus priority. To accommodate these changes, it is proposed to encroach on the green space to the east of the existing structure.

Between this bridge crossing and the junction with Ballyfermot Road, it is intended to maintain a single bus lane and general traffic lane in both directions. It is proposed to modify the Cloverhill Road and Kennelsfort Road junctions to provide improved facilities for cyclists and pedestrians. To accommodate these changes, it is proposed to utilise limited land take along the green space adjacent to Palmers Walk, Palmers Court and Palmers Drive area.

On Ballyfermot Road, it is proposed to maintain one single bus lane, one general traffic lane, and a cycle track in both directions. To accommodate this improved infrastructure, it may be necessary to acquire limited land take at the following locations:

- Cherry Orchard Industrial Estate;
- Cherry Orchard Hospital;
- Entrance Cherry Orchard Filling Station; and
- At junction with Le Fanu Road.

It is also proposed to amalgamate the main Ballyfermot Road and the access roads. This would provide sufficient space to improve the existing public transport infrastructure. Urban Realm works, additional tree planting and provision for parallel parking are proposed where the access road will be modified. An example of this is shown in Image 6.2.

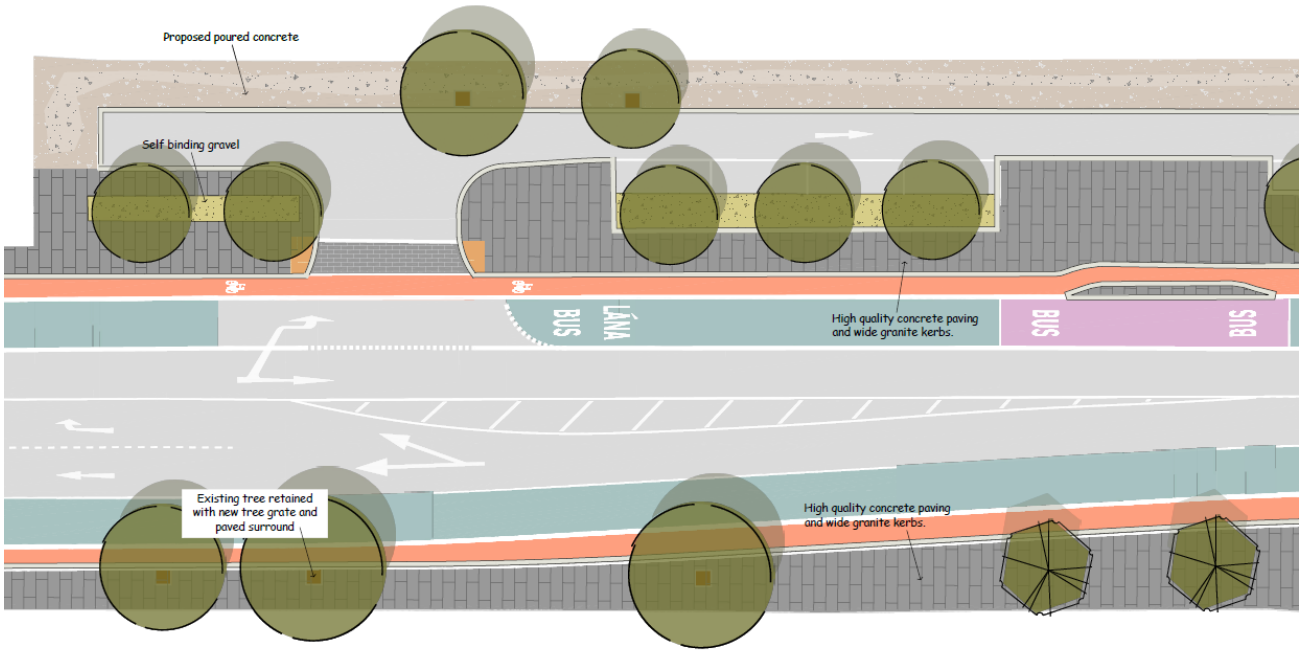

Image 6.2: House No. 388 to No. 370 Ballyfermot Road

6.2 Section 2: Le Fanu Road to Sarsfield Road

At the Le Fanu Road junction, it is proposed to divert city bound traffic on to Le Fanu Road. The section of Ballyfermot Road between Le Fanu Road and Kylemore Junction will be restricted to one bus lane in both directions and one outbound general traffic lane. Local access on Ballyfermot Road between La Fanu Road and Colepark Road has been maintained. City bound traffic will be redirected up Le Fanu Road and down Kylemore Road. It is intended to provide a cycle track in both directions on this section of the Ballyfermot Road and on Kylemore Road. Eastbound local access will still be permitted on Ballyfermot Road up to the junction with Colepark Avenue.

It is proposed to upgrade the existing roundabout junction on Kylemore Road / Ballyfermot Road to a signalised junction and provide improved infrastructure for cyclists and pedestrians. New green spaces, pocket parks, trees and parking are proposed around this new junction. An example of how this will look is shown in Image 6.3 and Image 6.4.

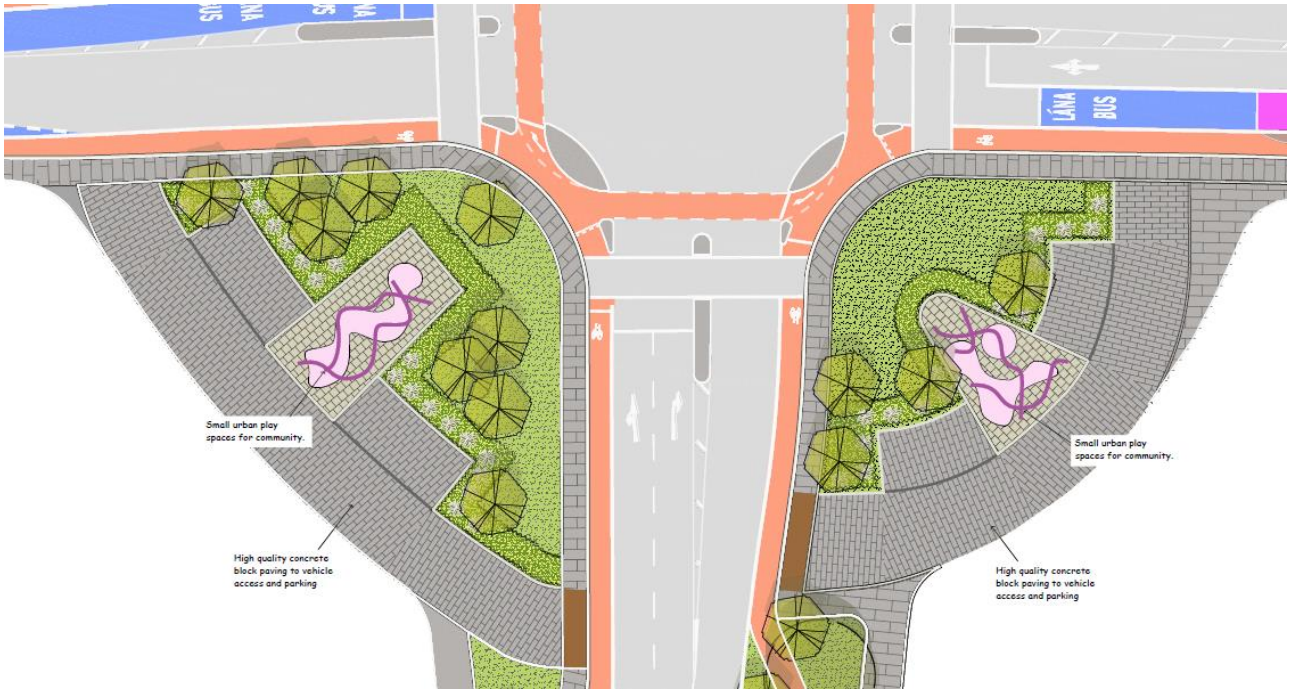

Image 6.3: Ballyfermot Roundabout South Quadrant, Residents Parking and Pocket Parks

Image 6.4: Pocket Parks in the South-Western and South-Eastern Quadrants

Between Kylemore Road and Markievicz Park, it is proposed to maintain one bus lane, one general traffic lane and one cycle track in both directions. To accommodate this modified cross section, it is anticipated that limited land take will be required at the following locations:

- Limited green space from St. Raphael's and St. Gabriel's Primary School; and
- Limited green space from the former De La Salle National School / Mount La Salle.

To reduce the impact on Markievicz Park and the adjacent residential properties, it is proposed to provide Signal Controlled Bus Priority for citybound buses with the traffic signals sequenced to ensure full bus priority. The citybound bus lane would then be reintroduced at St. Laurence's Road. To accommodate the revised arrangements, it is intended to close the junction of O'Hogan Road and Ballyfermot Road as part of the implementation of the Signal Controlled Bus Priority on Ballyfermot Road. O'Hogan Road can still be accessed via Garryowen Road and Decies Road. The proposals will require land take at the following locations:

- Limited land take at Markievicz Park;
- Boundary lands at the Steeples Estate;
- Private frontages between O'Hogan Road and St. Laurence's Road;

- Boundary lands on Longmeadows Pitch and Putt / Longmeadow Park; and
- Private frontages between First Avenue and Saint Mary's Avenue West.

Between Sarsfield Road and Chapelizod Bypass it is proposed to extend the proposed cycle track to tie into the proposed cycle infrastructure that forms part of the Lucan to City Centre Core Bus Corridor Scheme. If the cycling infrastructure proposed as part of the Lucan to City Centre Core Bus Corridor Scheme was delayed, cyclist have an alternative route to the City Centre via Sarsfield Road, Inchicore Road, Kilmainham Lane and Bow Lane where they will re-join the route and continue along James's St and Thomas Street.

6.3 Section 3: Sarsfield Road to City Centre

It is proposed to change Memorial Road from one way to two way for general traffic. Traffic will also be able to turn right from the Chapelizod Bypass to Memorial Road. It is intended to provide cycle track in both directions on Memorial Road. On Inchicore Road, between Memorial Road and Grattan Crescent, it is proposed to retain the existing lane configuration.

On Grattan Crescent, it is proposed to provide bus lanes in both directions and one general traffic lane in a southbound direction. Northbound traffic will be permitted up to the junction with the Córas Iompair Éireann (CIÉ) Inchicore Works to maintain local access. It is anticipated that the existing footway will be widened, and a new crossing will be provided between Grattan Crescent Park and Inchicore National School. Several of the car parking spaces adjacent to the entrance to Grattan Park will be retained. This design revision has been implemented due to feedback received as part of the Public Consultation carried out on the Emerging Preferred Route (EPR) published in January 2019. The proposed urban realm enhancements for this area are shown in Image 6.5 and Image 6.6.

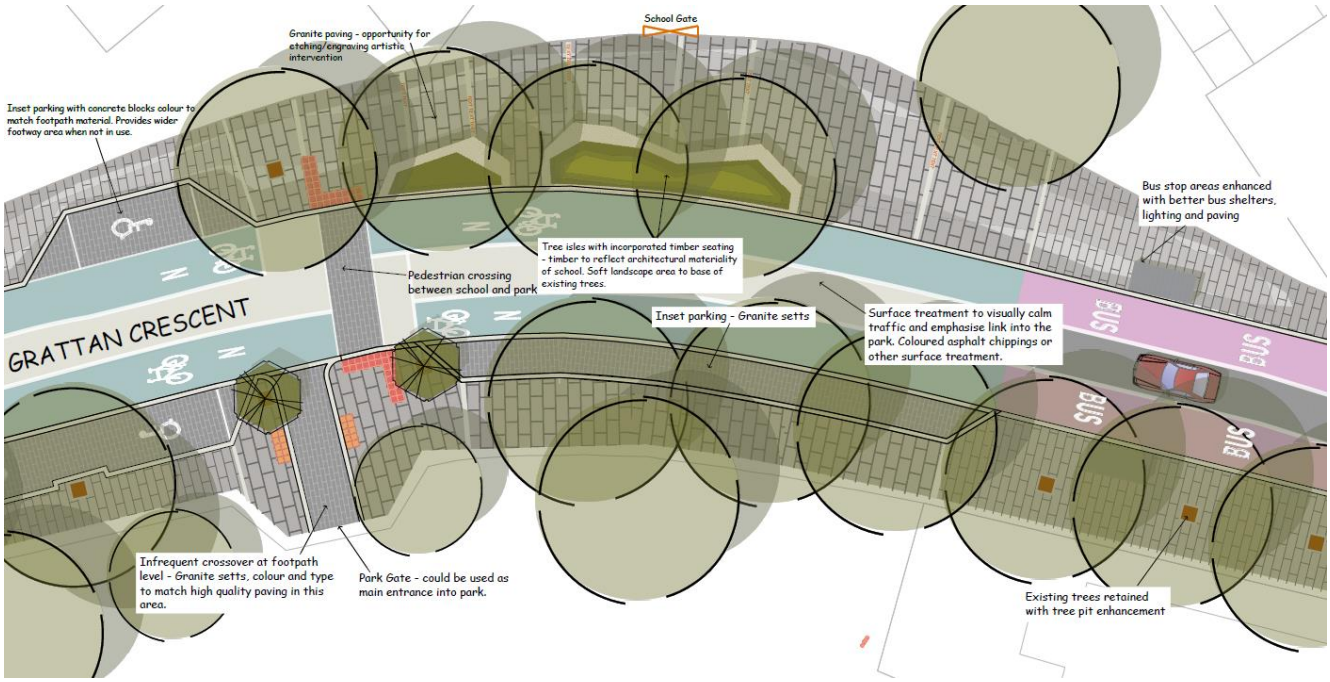

Image 6.5: High Quality Urban Realm Proposed to Enhance School and Park Interface

Image 6.6: Indicative Visualisation of the Grattan Crescent Scheme

At the junction of Emmet Road and Tyrconnell Road, general traffic turning right from Emmet Road to Grattan Crescent will be for access to Inchicore Works only.

Between St. Vincent's Street West and South Circular Road, Emmet Road is proposed to be reconfigured to provide a bus lane and general traffic lane in both directions. To facilitate this wider road configuration some local on-street parking will need to be removed, but a focus has been to retain as much as possible.

To maintain bus priority on Old Kilmainham / Mount Brown, it is proposed to provide a staggered Bus Gate which will operate in the AM and PM peaks. This Bus Gate would prevent general through-traffic using Old Kilmainham / Mount Brown; however, it will not impact access to the Children's Hospital, St James's Adult Hospital or the local area.

Between the St. James' Adult Hospital Entrance and the Junction with Bow Lane West, it is proposed to retain the existing road layout. From Bow Lane West to High Street, it is intended to provide continuous cycle tracks, a bus lane where possible and general traffic lane in both directions. Bus priority is provided via a combinations of bus lanes, signals controlled priority and by the reduction in general traffic in the area as a result of the Bus Gate in Mount Brown.

At the Cornmarket junction the priority has been changed from High Street / Thomas Street to High Street / Bridge Street Upper. The Proposed Scheme will join the prevailing City Centre traffic management regime at the junction with Nicholas Street and Winetavern Street.

7. Construction

The Construction Phase for the Proposed Scheme is anticipated to take approximately 30 months to complete. It will be constructed based on individual sectional completions that will individually have shorter durations typically ranging between 3 to 9 months.

The construction of the Proposed scheme will include the following activities:

- Site preparation and clearance works, including:

    - Land acquisition where temporary or permanent land take is required;
    - Installation of fencing and signage;
    - Protection of trees and vegetation to be retained;
    - Vegetation clearance and treatment of non-native invasive plant species;
    - Archaeological investigations;
    - Ground investigations;
    - Set up of Construction Compounds;
    - Installation of temporary lighting; and
    - Demolition of items such as walls, gates, fencing, lighting poles and bus stops.
- Road and street upgrades, including:
    - Alterations to parking and access;
    - Implementation of pedestrian and cyclist safety measures;
    - Implementation of road closures or diversions;
    - Topsoil and subsoil excavation;
    - Works to cellars;
    - Adjustment or upgrades to drainage;
    - Realignment, replacement or protection of utilities and services;
    - Construction of pavement, including carriageway, kerbs; changing roundabouts to signalised junctions; modifications to parking and loading bays; upgrades to footpaths; installation of cycle tracks; improvements covering existing and new bus stops (island, shared landing area, inline, layby types, plus shelters, CCTV and information displays); etc.;
    - Upgrade of road furnishings (including street furniture, signage, lighting, and communication systems); and
    - Landscaping.
- Construction site decommissioning, including the removal of all construction facilities and equipment.

Construction Compounds along the Proposed Scheme will be located as follows:

- Construction Compound LV1 at Fonthill Road;
- Construction Compound LV2 at Cold Cut Road; and
- Construction Compound LV3 at Con Colbert Road / Liffey Gaels Park.

Construction Compounds will be used as the primary location for the storage of materials, plant and equipment, site offices, worker welfare facilities and limited car parking. They will be secured, to ensure the safe storage of all on-site material and machinery. Temporary fencing will be erected, and site security will be employed. The Construction Compounds are shown in Image 7.1 to Image 7.3.

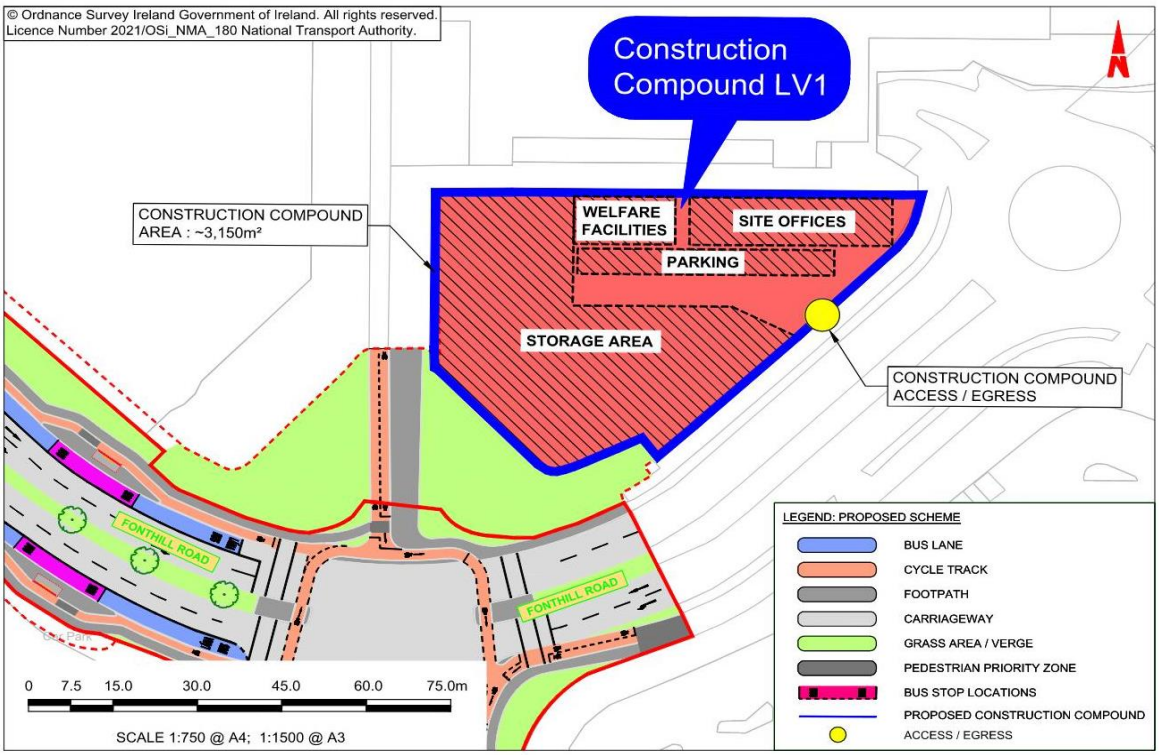

Image 7.1: Location and Extent of Construction Compound LV1

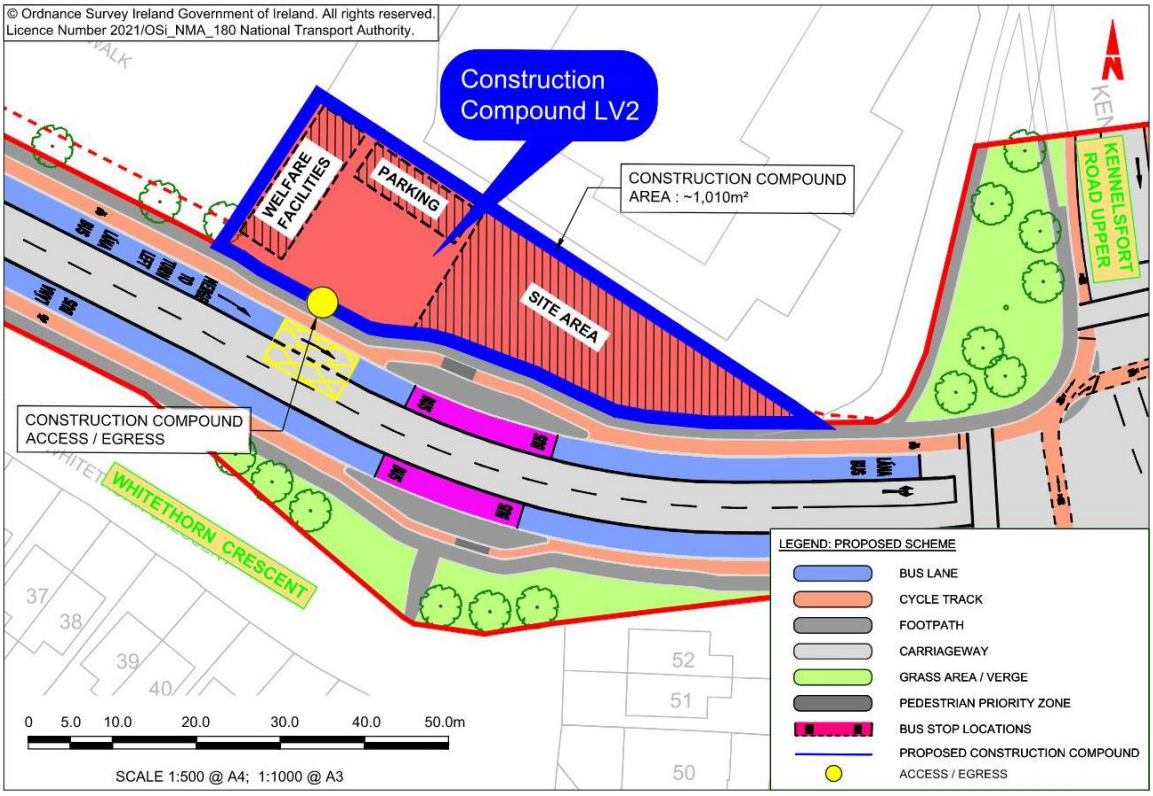

Image 7.2: Location and Extent of Construction Compound LV2

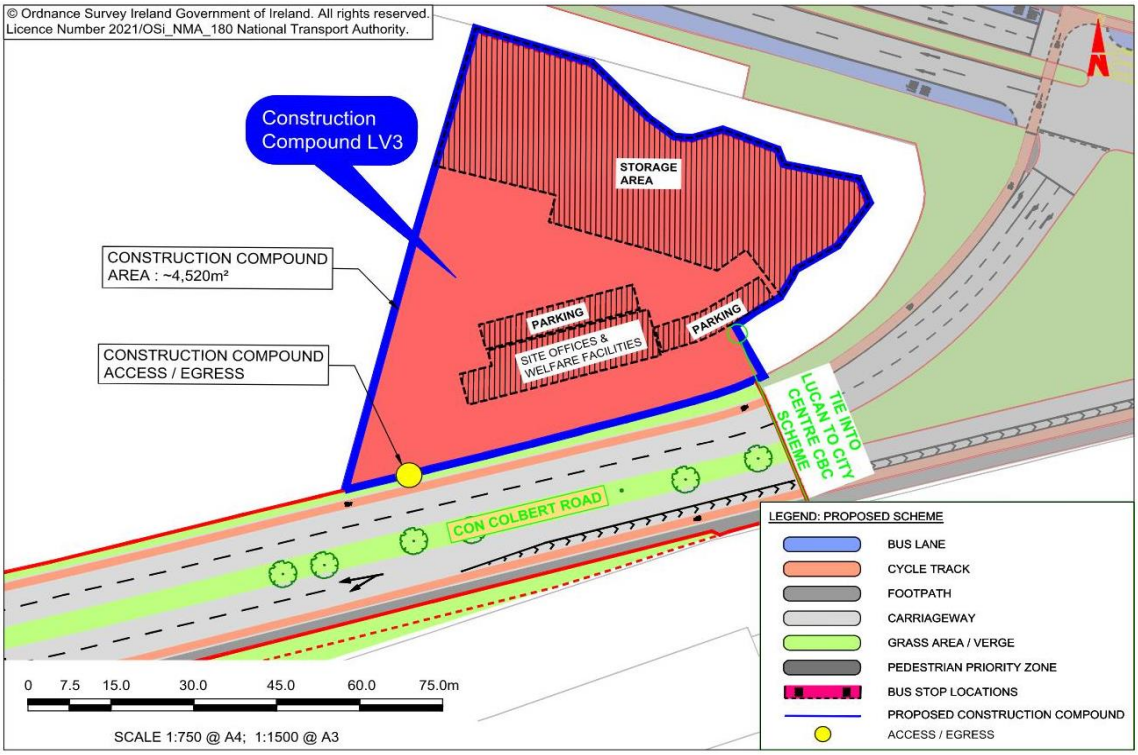

Image 7.3: Location and Extent of Construction Compound LV3

7.1 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared which describes the overall environmental management strategy that will be implemented during the Construction Phase of the Proposed Scheme. The CEMP includes the mitigation measures which will be implemented to provide environmental protection during the Construction Phase of the Proposed Scheme. The CEMP addresses construction traffic management, resource and waste management, invasive species management, surface water management and environmental incident response measures.

The CEMP will be updated by the NTA (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. The NTA shall set out the Employer's Requirements in the Construction Contract including all applicable mitigation measures identified in this EIAR, as well as additional measures required pursuant to conditions attached to any decision to grant approval.

The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan, and the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

7.2 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) has been prepared to demonstrate the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled.

The roads and streets along the Proposed Scheme that will be upgraded will remain open to traffic, wherever practicable, during the Construction Phase. To maintain traffic movements, it will be necessary, in limited

instances, to undertake some traffic diversions or lane restrictions locally to complete particular elements of the works.

Access to properties will be maintained as far as reasonably practicable. While there will be temporary constraints to access during the normal hours of work these will be communicated and arranged in consultation with the impacted users. Access for emergency vehicles will be maintained at all times.

Wherever possible, cycle and pedestrian routes will be maintained along the route throughout the duration of the construction works. If necessary, alternative routes will be provided to facilitate both pedestrian and cycle movements. Bus services will be maintained, however some existing bus stop locations will need to be temporarily relocated to accommodate the works.

The works will be completed on a sectional basis along the corridor such that no areas will experience an extended period of construction disruption over the approximate 30-month duration. NTA will facilitate pro-active communication of the scheduled planned works by the appointed contractor to ensure that impacted individuals, businesses and communities are kept aware of upcoming likely temporary disruptions.

8. Environmental Impacts and Mitigation

The EIA process provides a valuable opportunity to reduce potential environmental impacts through design refinement, and this has formed an integral part of the design process for the Proposed Scheme, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process has been incorporated where appropriate.

The design of the Proposed Scheme has been developed to a stage where all potential environmental impacts can be identified, and a fully informed environmental impact assessment can be carried out.

The NTA (the Employer for the construction works) shall set out the Employer's Requirements in the Construction Contract and will ensure that all applicable mitigation measures identified in the EIAR, as well as additional measures required in any conditions attaching to An Bord Pleanála's decision to grant approval are adhered to. The procurement of the construction contractor will involve the determination that the appointed contractor is competent to carry out the works, including the effective implementation of the mitigation measures. The appointed construction contractor will be required to plan and construct the Proposed Scheme works in accordance with the Employer's Requirements, and the NTA will employ an Employer's Representative team with appropriate competence to administer and monitor the construction contract for compliance with the Employer's Requirements, which in turn shall contain all mitigation measures detailed in this EIAR and the relevant documentation appended thereto.

The following sections provide a summary of the assessments for each environmental topic and sets out the likely significant residual effects as a result of the construction and operation of the Proposed Scheme. The following environmental topics are described:

- Traffic and Transport;
- Air Quality;
- Climate;
- Noise & Vibration;
- Population;
- Human Health;
- Biodiversity;
- Water
- Land Soils Geology & Hydrogeology;
- Archaeological & Cultural Heritage;
- Architectural Heritage;

- Landscape (Townscape) & Visual;
- Waste & Resources;
- Material Assets;
- Risk of Major Accidents and / or Disasters; and
- Cumulative Impacts and Environmental Interactions.

8.1 Traffic & Transport

The traffic and transport impact assessment has two distinct parts: the physical changes to transport networks; and the traffic modelling.

The traffic and transport impacts have been broken down into the following assessment topics for both the Construction and Operational Phases:

- The assessment of physical changes:
  - **Pedestrian Infrastructure:** The changes to the quality of the pedestrian infrastructure as a result of the Proposed Scheme;
  - **Cycling Infrastructure:** The changes to the quality of the cycling infrastructure as a result of the Proposed Scheme;
  - **Bus Infrastructure:** The changes to the quality of the bus infrastructure as a result of the Proposed Scheme; and
  - **Parking / Loading:** The changes to the availability of parking and loading as a result of the Proposed Scheme.
- The modelling-based assessment:
  - **People Movement:** An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on the projected volume of people (by mode – Walking, Cycling, Bus and General Traffic) moving along the Proposed Scheme during the Operational Phase;
  - **Bus Performance Indicators:** The changes to the projected journey times and reliability for buses as a result of the Proposed Scheme; and
  - **General Traffic:** The direct and indirect impacts on general traffic using the Proposed Scheme and surrounding road network.

For the Construction Phase temporary traffic management arrangements will be prepared in accordance with Department of Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks'. Measures to minimise the impacts associated with the Construction Phase will be implemented. A Construction Stage Mobility Management Plan, as described in the CEMP, will be prepared by the appointed contractor to encourage its personnel to travel to site by sustainable modes.

The assessment concludes that the impact during the Construction Phase will be negative and temporary in nature, and with the application of the proposed mitigation measures described above, the impact on traffic and transport will not be significant.

The impacts assessed for the Operational Phase determines how the Proposed Scheme integrates within the existing network and changes to traffic flows in the direct and indirect study area. The assessment demonstrates the following:

- **Pedestrian Infrastructure:** Overall, the improvements to the quality of the pedestrian infrastructure will have a Positive, Significant and Long-Term effect across the Proposed Scheme.
- **Cycling Infrastructure:** Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will have a Positive, Profound and Long-Term effect in Section 1 of the Proposed Scheme, and a Positive, Moderate and Long-Term effect on the rest of the Proposed Scheme.
- **Bus Infrastructure:** The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will have a Positive, Profound and Long-Term effect in Section 1 of

the Proposed Scheme, and a Positive, Very Significant and Long-Term effect on the rest of the Proposed Scheme.

- **Parking and Loading:** Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to be Negative, Slight and Long-Term across the Proposed Scheme.
- **People Movements:** Overall, it is anticipated that the increases to the total number of people travelling along the Proposed Scheme will have a Positive, Very Significant and Long-Term effect.
- **Bus Network Performance Indicators:** Overall it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will be Positive, Significant and Long-Term.
- **General Traffic Network Performance Indicators:** Overall, it has been determined that the impact of the reduction in general traffic flows along the Proposed Scheme will be Positive, Moderate and Long-Term, whilst the impact of the redistributed general traffic along the surrounding road network will be Negative, Moderate and Long-Term.

The Proposed Scheme will deliver strong positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase, improving people movement in line with the scheme objectives. These improvements will help to provide attractive alternatives to the private car and promote changes from the use of private cars to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future. The scheme design has been developed with cognisance of the relevant accessibility guidance and universal design principles so as to provide access for all users.

Given that the Proposed Scheme results in a positive impact for walking, cycling, bus and people movements, mitigation and monitoring measures have not been considered beyond those already incorporated as part of the Proposed Scheme.

The impacts to general traffic and parking / loading, including the mitigation measures are incorporated into the Proposed Scheme and no further mitigation measures are required to be considered.

Additional analysis undertaken using the Proposed Scheme models has shown that the new bus infrastructure facilitates a significant level of resilience for bus services that will use the Proposed Scheme, from implementation into the future. The Proposed Scheme will provide a higher level of protection to bus journey time consistency and reliability and will allow the service pattern and frequency of bus services to be increased into the future to accommodate additional demand without having a significant negative impact on bus journey time reliability or the operation of cycle and pedestrian facilities.

8.2 Air Quality

The air quality assessment involved a review of available published data, a review of applicable guidelines, air quality monitoring at sensitive locations along the Proposed Scheme and calculations to assess air quality impacts that are predicted to occur as a result of the Proposed Scheme.

The existing air quality along most parts of the Proposed Scheme meets National and European Union air quality standards. However, the annual mean limit value for nitrogen dioxide (NO_2) was exceeded in 2018 at monitoring locations around Heuston Station and in 2020 at St. James's Hospital.

The impacts assessed for the Construction Phase include dust emissions from activities such as site clearance and preparation, utility diversions, road and junction construction works, and landscaping. Appropriate mitigation measures to ensure that construction dust nuisance is minimised will be implemented for the duration of the Construction Phase.

Air quality impacts associated with Construction Phase traffic and changes in traffic flows have also been assessed. The assessment concluded that Construction Phase traffic emissions will be short-term and/or temporary in nature and therefore the impact on air quality will not be significant.

The assessment of potential air quality impacts associated with Construction Phase activities concludes that the works will be temporary and/or short-term in nature, and with the application of the proposed mitigation measures, the impact on air quality will not be significant.

The impacts assessed for the Operational Phase include the potential air quality impacts associated with changes to traffic flows along the Proposed Scheme and realigned traffic lanes and traffic flows. No mitigation measures will be required during the Operational Phase as all ambient air pollutant levels are predicted to comply with air quality standards. The assessment identifies a generally neutral impact on air quality as a result of the Operational Phase of the Proposed Scheme.

8.3 Climate

Climate is defined as the average weather over a period of time. Climate change is a significant change to the average weather, and while climate change is a natural phenomenon, human activities are negatively impacting on the climate, through the release of greenhouse gases.

The climate assessment involved a review of greenhouse gas emissions, a review of applicable guidelines and predictive calculations to assess climate impacts. The Proposed Scheme was also assessed in terms of its vulnerability to climate change.

The impacts assessed during the Construction Phase included emissions from activities such as site clearance, utility diversions, road widening and excavation works (where required), works at junctions and landscaping. Construction traffic routes are also assessed as part of the assessment. Construction traffic and the embodied carbon (i.e. the total energy required to make / produce and product of services) for any construction materials required will be the main sources of greenhouse gas emissions during construction.

Mitigation measures have been incorporated into the construction design with the goal of reducing the embodied carbon associated with the Construction Phase of the Proposed Scheme. These mitigation measures include the replacement, where feasible, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag.

The Proposed Scheme is estimated to result in total Construction Phase greenhouse gas emissions of approximately 5,473 tonnes embedded CO_2eq for materials over the approximate 30-month construction period, equivalent to an annualised total of 0.006% of Ireland's national emissions in 2019 or 0.004% of Ireland's non-Emission Trading Scheme 2020 target.

Following the application of these mitigation measures, it is expected that there will be a short-term, negative, significant residual impact on climate as a result of the Construction Phase of the Proposed Scheme.

The Proposed Scheme is estimated to result in no increase in the Maintenance Phase GHG emissions as there is no overall increase in road widening as a result of the Proposed Scheme compared to the existing road infrastructure. The predicted impact to climate during the Maintenance Phase is therefore Neutral and Permanent.

The operational traffic greenhouse gas emissions associated with the Operational Phase of the Proposed Scheme is predicted to be Neutral and Permanent. Thus, the residual Operational Traffic Phase impact of the Proposed Scheme is Neutral and Permanent.

The Proposed Scheme will be an enabler to allow for further reductions in car mode share with corresponding transfer to public transport, walking and cycling modes. This can be achieved through signal optimisation, increased bus frequency, further growth in cycling and demand management measures. A greater increase in sustainable mode share will in turn lead to further reductions in GHG emissions, beyond those reported in the above assessment. The Proposed Scheme has the potential to reduce GHG emissions equivalent to the removal of approximately 15,700 and 15,100 car trips per weekday from the road network in 2028 and 2043 respectively. This represents a significant contribution towards the national target of 500,000 additional trips by walking, cycling and public transport per day by 2030 as outlined as a target in the Government's 2021 Climate Action Plan. The

greenhouse gas emissions associated with the Operational Phase of the Proposed Scheme (i.e. maintenance of the scheme infrastructure), after mitigation, is predicted to be Neutral and Permanent.

The CBC Infrastructure Works will also support the delivery of government strategies outlined in the Climate Action Plan and the 2021 Climate Bill by enabling sustainable mobility and delivering a sustainable transport system, aligning with aims to provide enhanced walking, cycling and bus infrastructure on key access corridors in the Dublin Region. This will subsequently enable and deliver integrated sustainable transport movement along these corridors. The CBC Infrastructure Works will provide connectivity and integration with other public transport services leading to more people availing of public transport.

By creating a resilient, accessible public transport network, BusConnects will provide an attractive alternative to private car travel, encouraging more passenger travel by more sustainable modes. As a result, a greater share of the demand will be by sustainable modes (public transport, walking and cycling).

8.4 Noise & Vibration

The noise and vibration assessment involved a review of available published baseline noise data, the completion of baseline noise and vibration monitoring to establish the current background levels, and a detailed noise and vibration impact assessment associated with the Construction and Operational Phases.

The baseline surveys determined that currently the main source of noise within the study area is road traffic with a small contribution from local urban and suburban sources such as pedestrian movements and commercial activities. There are no notable sources of vibration in the surrounding environment. Road traffic along the existing road network generates a negligible level of vibration that would not be perceptible to building occupants.

The impacts assessed for the Construction Phase included the generation of noise and vibration from general road works including road and junction reconfiguration and resurfacing works, and where required, road widening works, utility diversions, bus gate construction, quiet street treatment, urban realm improvements including landscaping, boundary wall construction and other ancillary works. Construction traffic routes were also assessed as part of the assessment.

For the duration of the Construction Phase, appropriate mitigation measures will be implemented, including the appropriate use of acoustic enclosures or screens where required, and the monitoring of vibration at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values.

Following the application of these mitigation measures, it is expected that there will be no significant residual noise or vibration impacts, as a result of the Construction Phase of the Proposed Scheme.

The impacts assessed during the Operational Phase relate to changes in traffic noise levels along the Proposed Scheme as a result of reconfigured cross sections to include new or upgraded bus lanes and predicted changes in traffic movement. The Proposed Scheme aligns with policy objectives to reduce populations exposure to traffic noise across the city through the incorporation of improved public transport, and increasing bus, train and bicycle journeys.

The results of the noise assessment for the design year (2043) Operational Phase have determined that long-term changes in traffic noise levels will be Positive, Slight to Negative, Not Significant along the Proposed Scheme. Along the surrounding road network, very small changes in traffic noise levels will occur as a result of traffic redistribution off the Proposed Scheme during daytime periods only.

8.5 Population

The population assessment considered impacts on residential properties, community facilities and commercial businesses within the study area. The Population study area comprised 10 community areas: Rowlagh – Quarryvale, Palmerstown, Ballyfermot Upper, Chapelizod, Ballyfermot, Inchicore (Mary Immaculate), Inchicore (St Michael's), James's Street, Meath Street and Merchant's Quay, and Francis Street.

The Proposed Scheme will commence on the Fonthill Road at the tie in point with the new Liffey Valley Shopping Centre Bus Interchange and Road Improvement Scheme, in the community area of Rowlagh – Quarryvale, just west of the M50 Motorway which it then crosses on the R833 Coldcut Road. The Proposed Scheme continues between a series of housing estates before entering Ballyfermot Upper on the R833 Ballyfermot Road running in between Cherry Orchard Industrial Estate and Cherry Orchard Hospital. The Proposed Scheme continues towards the community area of Ballyfermot and the route is mainly residential in character, with a mixture of houses lining the road and entrances to adjacent housing estates. The Proposed Scheme continues towards Inchicore (Mary Immaculate and St Michael's) and continues to pass mostly residential or mixed residential / commercial properties lining both sides of the route. The Proposed Scheme continues east along R810 Emmet Road towards the community area of R810 James Street where the nature of the route changes from a predominantly suburban residential character to a more urban character with fewer houses and an increasing number of commercial properties and apartments lining the route. The Proposed Scheme terminates in the community area of R804 Meath Street and R148 Merchants Quay in Dublin City Centre.

The impacts on population assessed for the Construction and Operational Phases include:

- Indirect amenity impacts on community facilities and commercial businesses from a combination of residual air, noise, traffic and visual impacts. Direct amenity impacts on commercial businesses that may impact on business viability;
- Temporary and permanent land acquisition from residential properties, community facilities and commercial businesses including reduction of front garden areas, driveways, private landings and private parking spaces; and
- Changes in accessibility for walkers, cyclists, bus users and private vehicles along the Proposed Scheme and in the surrounding road network as a result of construction traffic, diversions and traffic management measures during the Construction Phase and redistributed general traffic during the Operational Phase.

The community assessment concluded that there will be a Negative, Moderate, Short-Term impact on three community areas due to land take and a Negative, Significant but Short-Term impact on community receptors; St James's Hospital, St Michael's and St Gabriel's Primary Schools, and Liffey Gaels Park due to land take in the Construction Phase.

The economic assessment concluded that there will be a Negative, Moderate, and Short-Term impact on 5 community areas due to commercial land take in the Construction Phase, with three commercial receptors; Cherry Orchard Service Station, First Stop Tyres and Long Meadows Pitch and Putt experiencing a Negative, Significant, Short-Term impact as a result of land take during the Construction Phase.

There are also a number of Negative, Moderate, Short-Term impacts predicted with respect to community and commercial accessibility during the Construction Phase.

During the Operational Phase Long-Term, Positive, Not Significant impacts are expected on the community and commercial amenity of the Proposed Scheme. Long-Term, Positive, Not Significant to Profound impacts are predicted on community and commercial accessibility for pedestrians, cyclists and bus users.

There are Negative, Moderate, Long-Term Operational Phase impacts predicted due to community land take (Ballyfermot Upper, Ballyfermot and James's Street) and commercial land take (Ballyfermot Upper, Ballyfermot, Inchicore (Mary Immaculate), Chapelizod, and Rowlagh – Quarryvale).

There are also some localised Negative, Long-Term, Slight to Moderate impacts predicted with respect to accessibility for private vehicles during the Operational Phase, particularly in the James's Street, Palmerstown, Chapelizod and Francis Street areas.

The improvements will help to achieve the aims and objectives of the Proposed Scheme by providing an attractive alternative to the use of private vehicles and promoting a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to access residential, community and commercial receptors.

8.6 Human Health

The interaction of factors such as individual characteristics, lifestyle and 'wider determinants of health' (the physical, social and economic environment) have an important influence on the health of a population. These are illustrated in Image 8.1.

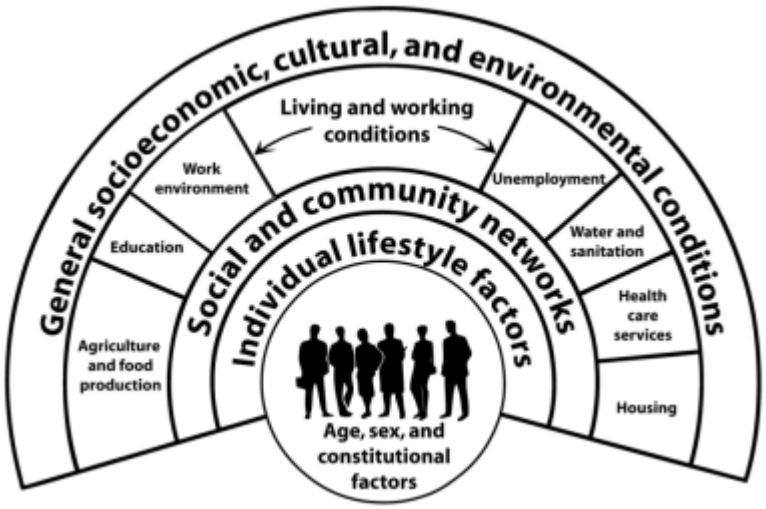

Image 8.1: Wider Determinants of Health

A related issue is that of social inequalities of health, which are the unfair and avoidable differences in health status across groups in society. The aim of this assessment was to identify the wider determinants of health that would likely be affected by the Proposed Scheme and how those impacts are associated with health outcomes.

Currently, Dublin's population has a better overall health status than average for Ireland with lower death rates.

Levels of air pollution within Dublin are almost entirely within the set EU limit values for nitrogen dioxide and particulate matter.

Exposure to traffic noise causes annoyance and, in very high levels of exposure, is linked to several other adverse health outcomes. There is widespread exposure in the study area to noise levels which exceed the levels set by the World Health Organization to prevent adverse health outcomes. However, the noise levels experienced are typical of an urban environment.

Temporarily increased traffic congestion because of traffic management measures and diversions during construction will likely cause frustration and annoyance particularly for commuters and people travelling to appointments. Construction noise and vibration, as well as dust may cause annoyance for some nearby residents and workers. The temporary to short-term nature of these impacts means that no lasting impact on health is likely.

There may be a requirement for some works to take place at night. This will temporarily increase the likelihood of sleep disturbance in the nearby residential population as a result of noise associated with the construction works. During the day there is risk of sleep disturbance for shift workers due to construction noise. Mitigation measures to control and limit noise associated with the construction works are included in the EIAR.

The need for pedestrian and cycle diversions around areas of construction works may increase the risk of collisions, unless appropriately designed and managed. Cyclists and pedestrians are more vulnerable to injury and death in the event of a collision and so need greater protection. Construction traffic management has been considered to outline measures deemed necessary to provide protection for pedestrians and cyclists in each location of the Proposed Scheme. With these measures in place the risks will be mitigated. Since the construction works will be short-term overall and temporary, the Proposed Scheme is not likely to result in any increased exposure to risk for pedestrians and cyclists over and above trends in the current street environment in Dublin.

No other health effects are considered likely from the Construction Phase of the Proposed Scheme.

The Proposed Scheme will create opportunities for building in regular physical activity into daily life through the improved pedestrian and cycling facilities, as well as through walking to and from bus stops. It is predicted that this will result in positive health outcomes as some people will change their travel behaviours and benefit from increased regular physical activity as a result.

With mitigation in place, people living near some of the proposed new bus stops may experience a new noise source. A small proportion of residents may experience an increase in traffic noise from redirected traffic along some side streets. However, for most people, there will be no perceptible change in environmental noise from the Proposed Scheme.

Reductions in general through-traffic, improved pedestrian infrastructure and improvements to the streetscape are likely to encourage more social interaction along the Proposed Scheme, resulting in positive health outcomes such as good mental wellbeing. The new public transport infrastructure is expected to bring improved journey times and improved reliability for public transport journeys, resulting in improved mental health outcomes such as reduced stress, as well as improved access to health, employment, education, and leisure services.

The inclusion of bus priority measures and improvements to pedestrian and cyclist infrastructure will support safer and more equitable access for those who do not or cannot use a car. This is expected to have positive impacts on health, by addressing these wider determinants and health inequalities. In addition, the urban environment would be improved and easier to use for a wider variety of pedestrians, including the visually impaired, wheelchair users and the persons with mobility impairment.

No other health hazards or likely health outcomes have been identified as relevant for the Operational Phase of the Proposed Scheme.

8.7 Biodiversity

The biodiversity (ecology) assessment included a review of available published data to identify any features of ecological value and field surveys of habitats, bats, ground mammals, birds, amphibians (frogs and common newts) and reptiles.

The Proposed Scheme does not overlap with any nature conservation sites of European importance (European site). The nearest European sites with a direct hydrological connection (connection by water) to the Proposed Scheme is South Dublin Bay and River Tolka Estuary Special Protection Area (SPA), which is located approximately 3.3km away.

The main habitats within the Proposed Scheme include mixed broadleaf woodland, hedgerows, treelines, scrub, flower beds and borders, grassland, and building and artificial surfaces. The study identified:

- No protected plant species along the Proposed Scheme;
- One non-native invasive species (Japanese knotweed) along St Laurence's Road and on Sarsfield Road;
- Five bat species (Leisler's, common pipistrelle, soprano pipistrelle, unidentified pipistrelle species and myotis);
- Potential roost features (locations where bats rest) in two locations;
- No evidence of badgers;
- No evidence of otters;
- No evidence of amphibians or reptiles; and
- A total of 67 breeding bird species and 38 wintering bird species.

Potential impacts on biodiversity for the Construction Phase may arise from:

- Site preparation and clearance;
- Removal of existing boundaries, pavements, lighting columns, bus stops, and signage;

- Removal of trees and vegetation;
- Protection and / or diversion of buried services;
- Road widening, pavement reconstruction, and kerb improvements;
- Demolition of existing retaining walls;
- Installation of new bus stops and junction / roundabout modification;
- Property boundary reinstatement, signage replacement; installation of lighting columns; and
- Landscaping and tree planting, and reinstatement of temporary land acquisitions.

A range of mitigation measures will be implemented to avoid or reduce negative impacts on biodiversity during the Construction Phase, including retaining trees identified as containing potential roost features for bats, and planting new street trees, hedgerows and species-rich grasslands. Invasive species management will be implemented to mitigate any risk of the Proposed Scheme contributing to the spread of invasive species during the Construction Phase.

The assessment concluded that with the application of the proposed mitigation measures, the impact on biodiversity during the Construction Phase will not be significant beyond the local level.

Potential impacts on biodiversity for the Operational Phase may relate to habitat loss, habitat degradation as a result of water quality changes from pollution or accidental spillage and non-native invasive plant species.

The measures proposed to avoid or reduce negative impacts on biodiversity during the Operational Phase will include:

- Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme, as outlined in the design, will provide suitable habitats for breeding birds and foraging / commuting habitat for bats; and
- The implementation of sustainable drainage measures will prevent habitat degradation.

The assessment concluded that there will be no significant impacts on habitats, rare and protected plant species, mammals, amphibians, reptiles, and fish during the Operational Phase.

In addition, potential impacts on designated European sites are specifically assessed in the Natura Impact Statement (NIS), which also forms part of this application. The conclusion of the NIS is that the Proposed Scheme will not have any adverse effect on the integrity of any European site.

8.8 Water

The water assessment involved a desk-based study and the completion of field surveys to establish the current surface water conditions to identify the likely impacts of the Proposed Scheme.

The Proposed Scheme will be located within the River Liffey catchment which is mainly urban and industrial in character. The waterbodies relevant to the Proposed Scheme are:

- Liffey_180, which is approximately 25km and consists of the main channel of the river from Lucan and Chapelizod, the Rusk River tributary (from Dunboyne to Lucan) and a number of other minor tributaries (Hermitage River, Annfield River, Quarryvale River, Astagob River, unnamed River at Carpenterstown, Longmeadow Stream and Glenaulin Stream). It is within the Liffey Nutrient Sensitive Area;
- Liffey_190, which is approximately 3km between Chapelizod and Islandbridge, consisting of the small section of the main channel of the River Liffey and tributaries, Magazine Stream and Creosote Stream. It is within the Liffey Nutrient Sensitive Area;
- Camac_040, which is approximately 14km and includes the primary segment of the river from Clondalkin to where it joins the river Liffey Estuary Upper at Heuston station. It also includes a number of significant and minor tributaries including; Ballymount Stream, Robinhood Stream, Walkinstown Stream and Drimnagh Castle or Walkinstown Stream;

- Poddle_010, which is approximately 10km and contains the main segment of the River Poddle and Tymon River; it joins the Liffey Estuary Upper at Wellington Quay, upstream of Father Mathew Bridge;
- Grand Canal Main Line (Liffey and Dublin Bay), which is an artificial waterbody, primarily used for recreation. Constructed in the 18th century, the Grand Canal traverses the country from Dublin to Shannon for approximately 131km. Waterways Ireland are responsible for the monitoring of this waterbody; and
- Liffey Estuary Upper, which is a transitional waterbody and is within the Liffey Nutrient Sensitive Area. It flows into Liffey Estuary Lower before reaching Dublin Bay. The waterbody covers an area of 0.2km2 from the National War Memorial Garden to approximately 40m upstream of the Talbot Memorial Bridge, which marks the upstream limit of the Liffey Estuary Lower.

The current European Union Water Framework Directive (WFD) status of the waterbodies, and their Risk (of not achieving their WFD objectives) status are as follows:

- Liffey_180: has Unassigned Status; is At Risk of not achieving GES;
- Liffey_190: has Moderate Ecological Status; is At Risk of not achieving GES;
- Camac_040: has Poor Ecological Status; is At Risk of not achieving GES;
- Poddle_010: has Unassigned status;
- Grand Canal Main Line (Liffey and Dublin Bay): has Good Ecological Potential (GEP); is Not At Risk of being able to maintain GEP; and
- Liffey Estuary Upper: Good Ecological Status, At Risk of not maintaining GES.

The surface water along the Proposed Scheme corridor currently drains into a surface water system which discharges into all of the waterbodies except Poddle_010 and Liffey Estuary Upper. In the northern part of the Proposed Scheme the surface water drains to a combined sewer and on to Ringsend Wastewater Treatment Plant. The main existing pressure on water quality relates to urban runoff and overflows from the foul and combined sewer network.

A Flood Risk Assessment has been completed for the Proposed Scheme which determined that the Proposed Scheme will be located in two Flood Zones, referred to as A and B, where the probability of flooding from rivers and the sea is high and moderate respectively.

The impacts assessed during the Construction Phase included impacts from construction runoff and watercourse disturbance due to utility diversions, road resurfacing and road realignments.

During the Construction Phase, the water quality of four of the six waterbodies could potentially be impacted by surface water runoff containing fine sediments, accidental spillages and accidental leakages of construction materials via surface water system connections. There is also the potential to disrupt local drainage networks if they require to be diverted to allow construction works to take place.

Surface water management is addressed in the CEMP, which details control and mitigation measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. These include a requirement for an environmental incident response plan; the control of runoff of fine sediments; the management of storage of materials / fuels; management of the batching and use of concrete; and the management of vehicles and plant. Additionally, site specific measures are proposed to avoid or reduce negative impacts related to the Construction Compound on the Con Colbert Road.

Following the implementation of the mitigation measures no significant impacts are anticipated on any water body as result of the Construction Phase of the Proposed Scheme.

The impacts assessed during the Operational Phase include the potential surface water impacts associated with areas of impermeability and traffic displacement. During the Operational Phase, the design of the Proposed Scheme will ensure that there will be no net increase in surface water runoff rates to any of the connected waterbodies, using a combination of sustainable drainage systems in the form of filter drains and bioretention systems, which also reduce the potential risks to water quality from routine road contaminants.

In the Operational Phase the infrastructure (including the sustainable drainage systems) will be maintained by the Local Authorities and will be subject to their management procedures. No additional mitigation is required, and no impacts are anticipated on any water body as result of the Operational Phase of the Proposed Scheme.

8.9 Land Soils Geology & Hydrogeology

The land, soils, geology and hydrogeology assessment included a desk-based study of publicly available information, historic ground investigations and a scheme walkover survey.

The geology (soils and rock) beneath the study area of the Proposed Scheme mainly comprises made ground, alluvium and glacial till derived from limestone which are underlain by limestone rock. The land within the study area is mainly used for urban developments, including but not limited to; industrial, commercial, residential, and recreational.

Aquifers (which store / produce groundwater) within the study area of the Proposed Scheme are classified as 'Locally Important' (moderately productive in local zones) in terms of their ability to produce water.

As the Proposed Scheme is in an urban environment, there is the potential for some contaminated ground in the study area. The assessment of contaminated land focused on the footprint and directly on either side of the Proposed Scheme unless there is likely to be a pathway connecting the possible source of contamination to the footprint of the Proposed Scheme. These potential sources are outlined and assessed.

The impacts assessed during the Construction Phase of the Proposed Scheme include:

- Loss or damage of topsoil;
- Excavation of potentially contaminated ground;
- Loss of future quarry or pit reserves;
- Loss or damage of proportion of Geological Heritage Area;
- Loss or damage / contamination of parts of an aquifer; and
- Change to groundwater flows.

Appropriate mitigation measures will be implemented to avoid or reduce negative impacts on land, soils, geology and hydrogeology during the Construction Phase. It is expected that there will be no residual construction impacts on land, soils, geology and hydrogeology.

The impacts assessed during the Operational Phase include the potential land, soils, geology and hydrogeology impacts associated with changes to water supply and the pollution of groundwater and watercourses.

In the Operational Phase the infrastructure will be maintained by the Local Authority and will be subject to their management procedures to ensure that the correct measures are taken in the event of any accidental spillages and this will reduce the potential for any impact.

It is predicted that there will be no residual operational impacts on land, soils, geology and hydrogeology.

8.10 Archaeological & Cultural Heritage

The archaeological and cultural heritage assessment included a desk-based review of published and unpublished documents, historical mapping, and a field survey, and has been carried out according to best practice and guidelines relating to archaeological and cultural heritage.

The Proposed Scheme will run through the suburbs of Ballyfermot, Inchicore, the former village of Kilmainham, along James's Street, Thomas Street, and High Street, following the southern edge of the River Liffey valley and an ancient routeway into Dublin City. Prior to the growth of the suburbs in the 20th century, the area outside of the city was rural in character, with milling activity focused on the River Liffey and its tributaries. The Proposed

Scheme will also be located in the old medieval suburb of Dublin along Thomas Street, continuing beyond the line of the medieval City Defences, into the heart of the historic Viking and medieval city.

Key archaeological sites in this area include St Audoen's Church, the only medieval parish church remaining in Dublin City, a standing section of the medieval city wall at Lamb Alley, and Christchurch Cathedral. These are national monuments, all of which lie outside the Proposed Scheme. Two other sections of the medieval City Defences national monument (the ditch / wall) may survive below ground within the Proposed Scheme and have the potential to be impacted.

There are also 38 archaeological heritage features on the Records of Monuments and Places / Sites and Monuments Record, four on the Dublin City Industrial Heritage Record, one cultural heritage asset, one Zone of Archaeological Potential, and two non-designated archaeological sites that have the potential to be impacted within the Proposed Scheme.

The main potential impacts on archaeology and cultural heritage as a result of construction works could arise from:

- Pavement construction, repairs and reconstruction works;
- Road resurfacing works;
- Any excavations of soil, including landscaping works; and
- Any ground disturbance for utility works.

There is the potential for the discovery of previously unknown below ground archaeological features, materials, and deposits along the Proposed Scheme. Such works may also result in temporary negative impacts on the settings of the upstanding national monuments for the duration of the works.

The mitigation measures proposed to avoid or reduce negative impacts on archaeological and cultural heritage during the Construction Phase include the provision for and funding of the necessary archaeological monitoring, inspection and excavation works that will be required prior to and during construction.

There will be no Operational Phase impacts as a result of the Proposed Scheme and no mitigation is required.

With the implementation of the proposed mitigation measures, it is expected that there will be no residual negative impacts on archaeological and cultural heritage. There will be a Positive, Significant, Long-Term impact on the upstanding National Monuments, St Audoen's Church, Christ Church Cathedral and the section of city wall at Lamb Alley, following the improvement of the urban realm.

8.11 Architectural Heritage

The architectural heritage assessment included a desk-based study including a review of all available relevant and published and unpublished documents, and field surveys, which were carried out to identify known architectural heritage sites, and to identify any previously unrecorded features.

Liffey Valley, Cherry Orchard and Ballyfermot remained largely rural until the 20th century. Settlement consisted of country houses and their demesnes. The majority of the development of Cherry Orchard and Ballyfermot dates to the mid-20th century onward. Much of this development consisted of the construction of religious and institutional buildings in the early 1950s, e.g. Mount La Salle, De La Salle National Schools, St Raphael's, St Gabriel's and St Michael's National School, the Church of Our Lady of the Assumption, and Cherry Orchard Hospital complex. These were associated with the growth of the suburbs and the development of housing estates from the Mid-20th century onwards. Significant surviving street furniture features along the Proposed Scheme including post boxes and a Statue of the Virgin Mary at the junction of Kylemore Road.

Inchicore was initially a small village on the Camac River and was a watering place for sheep prior to their being brought to market, hence the name, *Inse Coire* or Sheep Island. The area was also known for milling in the 16th century. A spa was also located on Spa Road near where the old tram depot. There are significant houses in the area included Inchicore House which was recorded in the Civil Survey of 1654 to 1656 which mentions the ruins

of a brick house at Inchicore. This structure was replaced with a later house and in the 19th century it was located in a large demesne. It has since been demolished and the demesne has been built upon. Other smaller demesnes included Inchicore Lodge, Mount Vernon House, and Seven Oaks on Sarsfield Road. The area greatly expanded following the establishment of Richmond Barracks and the Great Southern & Western Railway later in the 19th century. Industrial heritage includes the railway and associated bridges on Sarsfield. The village developed considerably in the 19th century as a suburb heavily associated with the railway and subsequently as a tramway terminus. Terraces of workers cottages remain as evidence of this. Similarly, the Omnibus Coach Works on Spa Road was a former Tramway Depot. The village itself consists of predominantly two storey 19th century terraces shops, banks and public houses. Notably public buildings include Inchicore United Workman's Club, St. Michaels Church, Inchicore National School and Inchicore College of Further Education, and the Art Deco Inchicore Library.

Kilmainham is of medieval origin and is named after the seventh century monastery of *Cill Maighneann*. Kilmainham formed part of a small settlement that had developed around the mills that once stood to the north, along the banks of the River Cammock. Buildings and features that were noted on the route which are of industrial or scientific interest include Kilmainham Bridge and the Academy Of Medical Laboratory Science at 31a Old Kilmainham Road. Terraces of 18th 19th and 20th century houses and cottages were identified on Brookfield Road and in Mount Brown.

James's Street is located within the old Liberty of Dublin. Historically, James Street forms part of the main thoroughfare into Dublin on the west side of the walled town. The route follows an early medieval roadway, known as the Slighe Mhór, that extended from the City of Dublin across the country as far as Galway. The medieval and post-medieval settlement within this western suburb first developed in the 13th century. The name James's Street is derived from James's Gate which was one of the outer defences of the walls of Dublin City and was extant in 1555 but was taken down in the 18th century. Today the name James's Gate is associated with the Guinness Brewery founded by Arthur Guinness on the street in 1759. St James's Hospital which is located at the west end contains workhouse buildings which functioned as a foundling hospital from 1729. The surviving buildings in the complex consist of 18th, 19th and 20th century hospital buildings. In 1722 the City Basin was completed by Dublin Corporation to supply water for the City. It was located to the south of James's Street. Initially it was supplied by the thirteenth-century City Watercourse which in turn was fed by the Poddle River. Water was subsequently supplied to basin from the Grand Canal following its construction in the 1770s. The Basin closed in 1869.

Grand Canal Harbour, was located to the south of Echlin Street. A malt house, built in c. 1850 for the Guinness Brewery stands on the site of the harbour. The harbour was built in 1785, as the original Dublin terminus of Grand Canal comprising three basins. By 1830s various stores and other buildings had been constructed in and around the harbour. The curved form of the malt house is preserved the outline of the Turf Harbour. The construction of the Grand Canal represents a major engineering achievement which had a significant impact on industrialization and commercial development. By 1830 the Grand Canal Harbour, linked the industries of the area to the west of Ireland via the River Shannon. The Corporation of Dublin fully supported the construction of the Harbour, financing the acquisition of the necessary lands, in order to ensure a water supply to their City Basin reservoir which was of benefit to notable industries such as the adjacent Guinness Brewery. The Harbour continued to serve commercial traffic into the 1960s.

James's Street contains many 18th and 19th century terraced houses, many of which have been converted to shops or apartments. The street is however dominated by those associated with the Guinness Brewery, located on both sides of the street and linked by a tunnel which runs beneath the street. Because of its depth, the tunnel will not be directly impacted by the Proposed Scheme. Other prominent structures on the street include Saint James's Church of Ireland Church. Prominent Street furniture on James Street includes the Obelisk Fountain erected in 1790, Rathmines type lamp posts and granite kerbs and paving. Adjacent to the church is Echlin Buildings, the first purpose-built block of flats constructed in Dublin. Significant 20th century features include Mary Aikenhead House, a c.1940 Local Authority apartment scheme designed by Herbert Simms.

From James's Street the Proposed Scheme continues on to Thomas Street, much of which is within the Thomas Street and Environs Architectural Conservation Area. Thomas Street contains many buildings of 17th, early 18th, 18th and 19th century date. These include St Catherine's Church of Ireland Church. It is of national importance, partly due to its association with Robert Emmet, leader of the 1803 Rebellion who was executed outside the church. There are two memorials to him within the curtilage of the church.

Thomas Street is also associated with brewing and distilling as indicated by the former distillery sites at the Saint Patrick's Tower, and the National College of Art, formerly the Powers Distillery. Street furniture includes Rathmines type lamp posts and granite kerbs and paving. Thomas Street terminates in Cornmarket which also lies within the Thomas Street ACA. Cornmarket was one of the most important trading locations or markets in the medieval town. With the widening of Bridge Street and High Street, many 18th and 19th century houses in Bridge street, High Street and Cornmarket were demolished. Highly significant buildings and structures remain however and include an upstanding section of the medieval city walls which is a National Monument along with a number of commercial buildings. Street furniture includes Scotch standards lamp posts which were erected c.1905 for the Pigeon House electric lighting scheme.

Bridge Street Upper, like Bridge Street Lower was 'street of the great bridge', the bridge in question being Father Matthew Bridge which replaced an earlier bridge 'Ostmans Bridge' the earliest bridge over the River Liffey.

High Street was the main thoroughfare in medieval Dublin. In the 16th and 17th century a High cross stood at the junction of Skinner's Row. The road was widened in the 20th century but it still contains a large number of highly significant buildings including the mid-19th century St. Audeon's Catholic Church, the c.1190 St. Audeon's Church of Ireland Church (a National Monument), Taylor's Hall built c.1705, Synod Hall built c.1875 and Christchurch Cathedral built in 1172 and largely rebuilt in the 19th century.

The main potential impacts on architectural heritage during the Construction Phase will include:

- Direct impacts to the boundaries (walls, railings etc.) and entrance gates of protected structures and other architectural heritage features where road widening is required;
- Direct impacts to street furniture (i.e. lamp posts, post boxes, statues etc.) due to land acquisition, construction works to pavements, changes in the layout of footpaths and landscaping works;
- Indirect impacts as a result of the potential for damage to sensitive structures in areas where the construction works for the Proposed Scheme come into close contact with these structures;
- Indirect impacts as a result of the potential for damage to protected structures due to increased vibration from construction vehicles; and
- Visual impacts on the setting of protected structures or buildings or structures of architectural heritage interest, historic streetscapes and views which will temporarily impact on their settings during the Construction Phase.

The measures proposed to avoid or reduce negative impacts on architectural heritage during the Construction Phase include:

- Appropriate recording, protection, removal, storage and reinstatement of boundaries and street furniture;
- The retention or replacement of trees along the Proposed Scheme; and
- Careful consideration of shelter bus stops to avoid impacting on the settings of important architectural heritage features, where possible.

The main potential impacts on architectural heritage during the Operational Phase will be:

- Impacts associated with visual changes on architectural heritage resources (including from the proposed locations of bus shelters), as well as impacts on the setting of these resources due to traffic changes. New paving, new tree planting and landscaping will generally have a positive impact on the historic environment and character of streets along the Proposed Scheme; and
- Impacts where the Proposed Scheme requires physical changes to, or the repositioning of, heritage features.

With the implementation of the proposed mitigation measures, it is expected that there will be no residual negative impacts on architectural heritage.

8.12 Landscape (Townscape) & Visual

The landscape (townscape) and visual assessment included a desk-based review of available information including aerial photography and mapping of the Proposed Scheme. Route walkovers were carried out to verify desk-based findings and this included field surveys and the preparation of photomontages.

Along the section of the scheme comprising Liffey Valley to Le Fanu Road the townscape is predominantly traditional two-storey residential estates with minor open spaces with young street trees to either side of the established mixed use street. There is a major retail park at Liffey Valley and some large scale industrial / institutional lands west of Ballyfermot. Amenity areas include Cold Cut Club, Palmers Residential Estate, in narrow areas along Ballyfermot Road, at Blackditch estate and Ballyfermot Community Civic Centre.

From Le Fanu Road to Sarsfield Road the townscape is primarily outer-city residential suburbs, centred around a major suburban road corridor, interspersed with tree-lined grounds of educational facilities (e.g. Kylemore College, Ballyfermot College of Further Education, St. Michael's National School, St. Gabriel's National School, Ballyfermot Family Resource Centre, the former De La Salle school, Mount La Salle). Amenity areas include Ballyfermot College of Further Education, Ballyfermot Road / Kylemore Road roundabout, and most notably, Markievicz Park.

From Sarsfield Road to City Centre the townscape is made up of inner city suburbs transitioning into the historic core of the city centre. Key features include historic streetscape alignments and the attractive historic residential estate of Mount Brown. There are mature tree-lined streets at Grattan Crescent / Grattan Crescent Park. There are a number of conservation areas and amenity areas at Liffey Gaels GAA grounds, Grattan Crescent Park, Cammock River Corridor and St. Audoen's Park, as well as a major open space at Longmeadows Park.

The main potential landscape (townscape) and visual impacts during the Construction Phase will include:

- Site mobilisation and establishment, fencing and hoarding of Construction Compounds and works areas, including within private areas / gardens;
- Site demolition, including removal of boundaries, kerbs, verges, surfaces, landscape areas, trees and plantings – including boundary fences, walls and plantings within private areas / gardens;
- Site activity and visual disturbance from general construction works and the operation of construction machinery both within the site and at the Construction Compound;
- Construction works involving diversion of existing underground / overground services and utilities, provision of new services and utilities, drainage features and connections etc.;
- Site activity and construction works involved in the construction of new carriageways, kerbings, footpaths and cycleways, bus stops and signage, reinstatement of boundaries / provision of new boundaries and landscape reinstatement works / provision of new landscape, etc.; and
- Decommissioning of works areas and Construction Compounds.

Construction of the Proposed Scheme will require land acquisition (temporary and / or permanent) from several properties. Temporary fencing / hoarding will be erected and access to property for the owners / occupiers will be maintained as far as reasonably practicable. Works will require removal of existing and reinstatement of existing roadside boundary walls, railings, entrance gates together with areas of existing garden plantings, garden accesses and garden features.

Appropriate measures to avoid or reduce negative landscape (townscape) and visual impacts during the Construction Phase will be implemented, including ensuring that trees and vegetation to be retained within and adjoining the works area will be protected. Works required within the root protection area (RPA) of trees to be retained will follow a project specific arboricultural methodology for such works.

While mitigation for the Construction Phase is focused on protecting any landscape features that are to be kept and providing as much visual screening from construction works as possible, it will not be possible or practical to mitigate against impacts on landscape (townscape) and visual characteristics resulting from the removal of mature trees to facilitate construction.

With the implementation of the proposed mitigation measures, it is expected that there will be Very Significant, Negative, Temporary / Short-Term Construction Phase impacts on the townscape from Le Fanu Road to Sarsfield Road, and Significant, Negative, Temporary / Short-Term impacts on the townscape from Liffey Valley to Le Fanu Road and Sarsfield Road to City Centre.

There will be Significant / Very Significant, Negative, Temporary / Short-Term impacts on residential property in temporary acquisition. There will be Very Significant, Negative, Temporary / Short-Term impacts on non-residential properties included in temporary acquisition, amenity designations and trees and vegetation. There will be Significant, Negative, Temporary / Short-Term impacts on properties overlooking the scheme but not included in temporary acquisition or with minimal direct contact, and a Moderate / Significant, Negative, Temporary / Short-Term impact on Conservation Areas, Residential Conservation Areas and Protected Structures. There will be a Moderate, Negative, Temporary / Short-Term impact on Architectural Conservation Areas.

The main potential landscape (townscape) and visual impacts during the Operational Phase will include:

- Alterations in the corridor of the existing road / street;
- Changes in traffic, pedestrian and cycle movements;
- Modifications of areas of private property / gardens / boundaries; and
- Adjustments to other areas / boundaries.

The permanent loss of property / garden areas will result in a permanently adjusted arrangement and reduced area. The measures proposed to avoid or reduce negative landscape (townscape) and visual impacts during the Operational Phase will include:

- Where existing trees, hedges, and / or plants are to be removed from temporary land take areas, new planting and paving will be provided in replacement of those that are removed;
- The Proposed Scheme will provide for the planting of new street trees, both to mitigate the removal of trees and provide an overall improvement of the streetscape environment;
- All impacted property boundaries will be reinstated to their original condition.

With the implementation of the proposed mitigation measures, it is expected that, during operation, there will be Moderate Positive effects on the townscape areas from Liffey Valley to Sarsfield Road.

There will be a Moderate Negative effect on residential and non-residential properties in permanent acquisition. There will be a Moderate but Neutral effect on trees and vegetation.

8.13 Waste & Resources

This waste and resources assessment included identifying the types of waste that could be generated by the Proposed Scheme, as well as the potential for reuse of materials. The assessment included a desk-based review of relevant policy and legislation, and data on waste generation and waste and resources management.

Sustainable waste and resource management principles have been incorporated into the design of the Proposed Scheme and these principles will also be applied in line with the Circular Economy Model (see Image 8.2) throughout the Construction and Operational Phases. This will ensure that waste generation will be minimised.

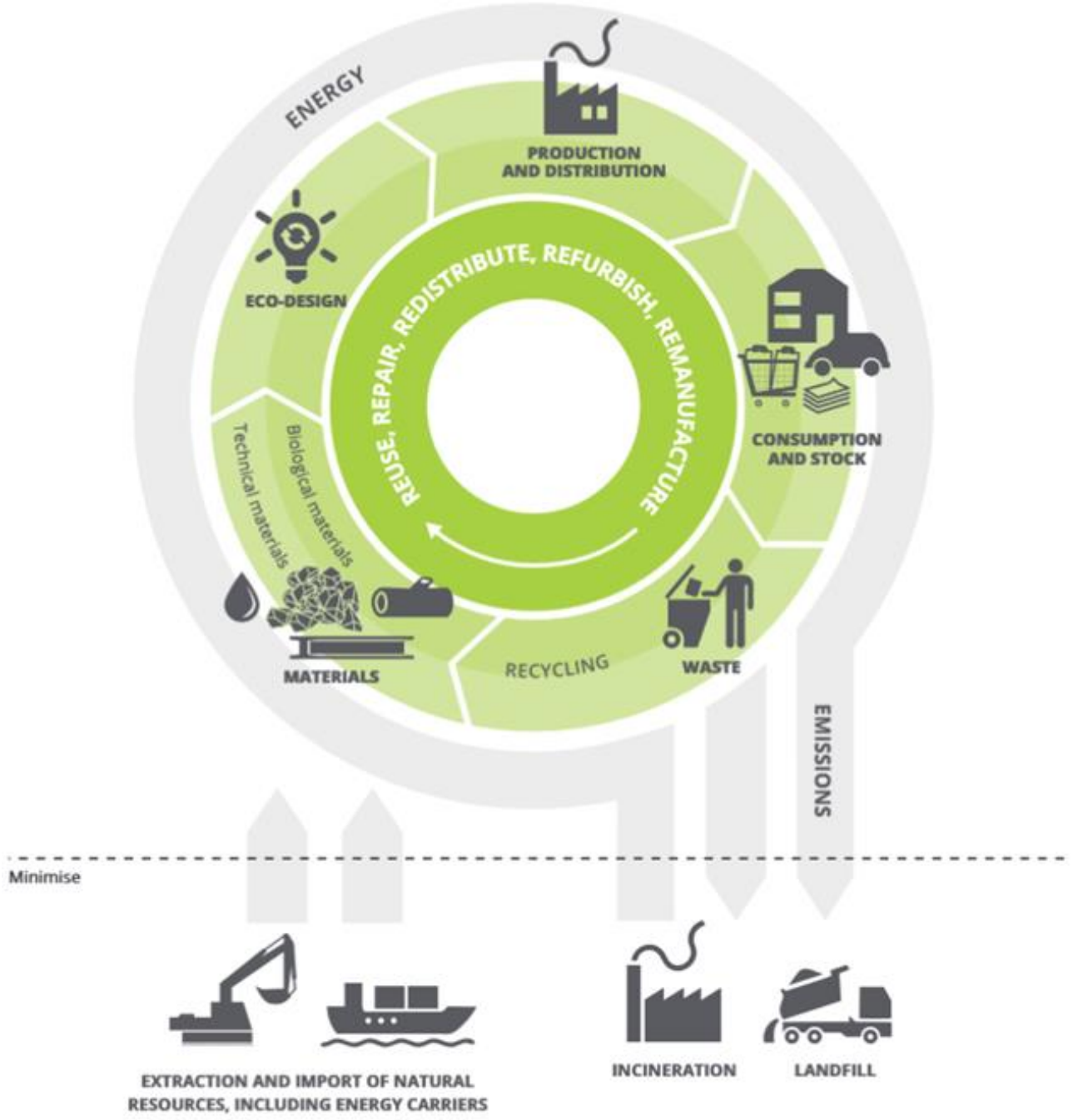

Image 8.2: The Circular Economy Model (Source: Circular Economy in Europe: Developing the knowledge base (European Environment Agency (EEA) 2016)

In Ireland, the most recently available published data records that 8.8 million tonnes of construction and demolition waste was generated in 2019. This represented an increase of 2.6 million tonnes from 2018. Of this waste, 7.5 million tonnes was comprised of soil and stones and these make up 85% of the current construction and demolition waste stream.

In Ireland, municipal waste (i.e. typical household waste types) is made up of household waste as well as commercial and other waste that, because of its type, is similar to household waste. According to the Environmental Protection Agency, Ireland generated 3.1 million tonnes of municipal waste and recycled 37% of this waste in 2019.

The main construction elements that are likely to result in potential impacts on waste and resources will include:

- Construction and reconstitution of cycleways, pathways, road widening and urban realm improvements;
- Removal of trees, concrete kerbs, walls, fences and gates;
- Removal of retaining walls;
- Removal of street furniture, including traffic lights and bus stops, and landscaping works;
- Boundary walls, fences and gates as required;
- Minor utility diversions and / or protections as required; and
- Excavation of pavements and carriageways.

A range of mitigation measures will be implemented to avoid or reduce negative impacts on waste and resources during the Construction Phase, including minimising waste disposal. Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Scheme. This will be managed through the Construction Phase by implementing a Construction and Demolition Resource and Waste Management Plan.

Approximately 2,230 tonnes of demolition waste will be generated as a result of the Proposed Scheme, which is equivalent to 0.02% of the C&D waste management baseline in the Eastern-Midlands Waste Region. The predicted impact of Demolition Waste during the Construction Phase, is Adverse, Not Significant, and Short-Term. The total forecast of surplus excavation material from the Proposed Scheme will be approximately 101,000 tonnes. and is equivalent to 0.95% of the C&D waste management baseline for the Eastern-Midlands Waste Region. There is potential for incorporating reused aggregates in the Proposed Scheme, and this will be done where practicable. In addition, where practicable the remaining material will be reused. The predicted impact of excavation waste during the Construction Phase, is Adverse, Slight, and Short-Term.

The main potential impacts on waste and resources during the Operational Phase will be waste generated from road maintenance activities following completion of the Construction Phase. Maintenance operations will be undertaken under the jurisdiction of the Local Authority and in accordance with their waste management plans. No additional mitigation or monitoring measures are considered necessary. The quantity of bitumen containing material generated, during the Operational Phase, over the assumed lifetime of the Proposed Scheme (assumed to be 60 years), will decrease by approximately 11,500 tonnes. The predicted impact of operational construction and demolition waste will be Positive, Not Significant and Long-Term.

With the implementation of the proposed mitigation measures, it is expected that there will be no residual significant impacts on waste and resources.

8.14 Material Assets

The material assets assessment was considered in terms of:

- Major utilities (both underground and overground) such as gas, water pipelines (drinking water pipelines and sewers) and storm water networks, electricity transmission lines and telecommunications lines;
- Manmade transport infrastructure such as roads, rail and canals; and
- Raw materials that are required to be imported for the Proposed Scheme.

This assessment involved a desk based review of these material assets. Utility information was requested from relevant organisations and service providers.

Existing material assets within the Proposed Scheme include:

- Electricity Supply Board electricity lines (high, medium and low voltage) and associated infrastructure;
- Gas Networks Ireland gas mains (high, medium and low pressure) and associated infrastructure;
- Irish Water drinking water mains and associated infrastructure;

- Irish Water sewer lines (foul and combined sewers) and associated infrastructure;
- Local authority surface water drainage network and associated infrastructure;
- Eir, Enet and Virgin Media telecommunications lines and associated infrastructure;
- Local Authority traffic signal ducting;
- The M50 Motorway;
- Railway lines (the lining serving all routes west of Heuston Station and the South Western Commuter Line); and
- The Luas Red Line.

Within the site of the Proposed Scheme, material is only imported as part of regular maintenance activities which are undertaken on the existing roads, cycle lanes, footpaths, utilities and verges.

The main construction elements that are likely to result in potential impacts on material assets will include:

- Construction Compounds will require electricity to power temporary office and welfare facilities and for temporary lighting which will be required to be supplied via a connection to the grid network or a generator;
- Construction Compounds will require a water supply for welfare facilities and spraying to prevent dust;
- Construction Compounds will require telecommunications access;
- The diversion of electricity lines in areas where there will be interfaces with the Proposed Scheme works;
- The diversion of underground watermains where there will be interfaces with the Proposed Scheme works;
- Upgrade works required to the surface water drainage network to accommodate for new road layouts and increased hardstanding;
- The diversion of gas infrastructure where there will be interfaces with the Proposed Scheme works;
- The diversion of telecommunications infrastructure where there will be interfaces with the Proposed Scheme works;
- Importation of construction materials including concrete, metals, cement, road surface materials and landscaping materials. The amount of materials required for the Proposed Scheme will represent less than 1% of the Irish quantities manufactured per year.

The Proposed Scheme has been designed to minimise the impact on utility infrastructure. This includes avoiding interactions with major utility infrastructure, wherever possible. Where there are interfaces with existing utility infrastructure, these will be protected in place or diverted as necessary to prevent long-term disruption to services. Diversions and changes to the location or layout of any utility infrastructure have been accounted for in the overall design of the Proposed Scheme.

All possible precautions will be taken to avoid unplanned disruptions to any infrastructure or services during the Construction Phase. Proposed utility works are based on available records, and preliminary site investigations. Prior to excavation works being commenced, localised confirmatory surveys will be undertaken to verify the results the pre-construction assessments undertaken and reported in this EIAR.

Consultation has taken place with the major utility companies, and the appointed contractor will continue to consult these companies, in liaison with the NTA. Where diversions are required and service disruptions to the surrounding properties are unavoidable, this will be planned with prior notification given to the impacted property owners.

The Proposed Scheme has also been designed to minimise the amount of major construction works required. When sourcing materials for the Proposed Scheme, the appointed contractor will carefully consider the sustainability of materials. Aspects considered will include the source, the material specification, production and transport costs, and the availability of the material. Construction materials will be managed on-site appropriately to prevent over-ordering and waste.

With the implementation of the proposed mitigation measures there will be no significant residual impacts on material assets as a result of the construction of the Proposed Scheme.

The main operational elements that are likely to result in potential impacts on material assets will include:

- The requirement for electricity connections for new lighting, for bus stop information and for junction signalling; and
- The requirement for telecommunications connections at bus stops which contain real time passenger information, to allow the buses and the real time information to sync up with each other.

There will be no significant Operational Phase impacts on utility infrastructure. Due to the measures included in the design of the Proposed Scheme and the fact that there are minimal impacts predicted during the Operational Phase, no specific mitigation measures are required.

8.15 Risk of Major Accidents and / or Disasters

This assessment considered the potential significant impacts of the Proposed Scheme on the environment, resulting from its vulnerability to risks of major accidents and / or disasters during the Construction Phase and Operational Phase.

The risk assessment:

- Identified major accidents and / or disasters (i.e. unplanned incidents) that the Proposed Scheme may be vulnerable to; and
- Assessed the likely impacts and consequence of such incidents in relation to the environmental, social and economic receptors that may be affected.

A register of all potential risks and the associated potential impacts was developed for the Construction and Operational Phases of the Proposed Scheme. This register assumed a worst-case scenario, before any mitigation measures or emergency plans would be put in place to reduce the likelihood and potential impact of any major accidents and / or disasters.

Risks are rated by multiplying the likelihood rating (likelihood of a risk happening which ranges from extremely unlikely to very likely) with the consequence rating (level of consequences if a major accident and / or disaster occurred, which ranges from minor to catastrophic). This gives a risk score of low, medium or high. Low risk scores do not meet the definition of a major accident and / or disaster and high risk scores would be considered high risk and unacceptable for the development of the Proposed Scheme and would need to be designed out. Medium risk scores would require a level of mitigation that would reduce the level of impact.

For the Construction Phase, there were several risks that were deemed low and were not considered further. No high risks were identified and the following medium level risks were identified for the Construction Phase:

- Risk of gas explosion due to striking underground gas mains during excavation works;
- Risk of pollution occurring to a watercourse or groundwater, most notably associated with the release of fine sediments during construction works; and
- Risk of spread of non-native invasive species during construction works, particularly during site clearance.

The Proposed Scheme complies with relevant design standards, which include measures to reduce the likelihood of risk events occurring.

Appropriate mitigation measures will be implemented during the Construction Phase. Once these mitigation measures are applied, there are no remaining identified incidents or major accidents and / or disasters risk events that present a level of risk that would lead to significant impacts or environmental effects.

No significant risks were identified as likely to occur during the Operational Phase.

8.16 Cumulative Impacts and Impact Interactions

This assessment considers the potential cumulative impacts and impact interactions as a result of potential impacts from other schemes in combination with the predicted impacts of the Proposed Scheme, and interactions between environmental aspects. The assessment included a consideration of the potential effects of other BusConnects Core Bus Corridor Schemes as well as other projects.

Impact interactions between environmental aspects are generally addressed as part of the individual topic assessments, so for example the Population assessment included effects on community amenity, which relates to the interaction of impacts on air quality, visual amenity, traffic and transport, and noise and vibration.

The following sources were considered in identifying other relevant developments for the assessment of cumulative impacts:

- An Bord Pleanála website – for details of strategic infrastructure developments and strategic housing developments;
- Local Authority websites and the development plans – for details of allocations and areas for regeneration;
- National Planning Application Database – for downloadable list of planning applications sent from Local Authorities;
- National Transport Authority website – for details of major transport programmes. This included a review of the NTA's Transport Strategy for the Greater Dublin Area 2016 – 2035;
- Project Ireland 2040, which combines the National Development Plan and National Planning Framework. and its interactive mapper;
- Transport Infrastructure Ireland website – for details of major transport programmes;
- The EIA Portal maintained by the Department of Housing, Planning and Local Government – for applications for development consent accompanied by an EIAR; and
- Irish Water's website, which includes a page on its projects.

A combined worst-case scenario was considered, with the simultaneous construction of all the BusConnects Core Bus Corridor Schemes. Traffic modelling of this scenario identified the potential for cumulative impacts on the wider road network, including local and residential roads. For this reason, it is not considered feasible or acceptable to construct all 12 schemes at the same time. Consequently, an alternative scenario was developed to identify a more realistic worst-case scenario for the traffic-related cumulative effects assessment. This scenario proposes a limitation on the number of schemes that can be constructed concurrently. This scenario was considered, in combination with the other identified major infrastructure project and major developments which could directly interface with the Proposed Scheme with regard to traffic and transport.

No likely significant cumulative effects relating to traffic and transport are predicted, over and above the effects of the Proposed Scheme assessed in isolation.

With regard to air quality, as the cumulative construction traffic effects will be broadly in line with those of the Proposed Scheme in isolation and the associated cumulative air quality effects will not be significant. Dust mitigation at the Construction Phase for the Proposed Scheme, with similar measures in place for other projects, will mean that overall cumulative effects of construction dust will be neutral.

The construction of a wide range of projects in Ireland over the construction period of BusConnects Dublin – Core Bus Corridors Infrastructure Works will result in the generation of embodied carbon. These developments include local planning applications, major projects, and strategic developments with a varying extent of embodied carbon generation. Any increase in carbon emissions is assessed as a significant negative impact. The climate impact assessment of road traffic emissions from the Construction Phase of the Proposed Scheme cumulatively with the 11 other Core Bus Corridor Schemes predicts a temporary overall increase of 2.6% of carbon dioxide-equivalent emissions compared to a scenario without the Core Bus Corridor Schemes. A series of embedded mitigation measures have been incorporated into the design of the Core Bus Corridor Schemes with the goal of reducing the embodied carbon and traffic emissions associated with the Construction Phase of all Core Bus Corridor

Schemes. For example, concrete containing Portland cement will be replaced with concrete containing ground granulated blast furnace slag which will save on embodied carbon across the 12 Core Bus Corridor Schemes.

On the basis that the more realistic worst-case scenario for construction traffic is predicted to result in traffic conditions which are broadly in line with the effect of implementing each of the Proposed Schemes in isolation, there would be no likely significant cumulative effect on traffic related noise over and above the effects of the Proposed Scheme assessed in isolation.

With regard to Biodiversity, the construction of the Proposed Scheme in combination with other projects, will not give rise to cumulative impacts higher than the predicted residual impacts identified for the Proposed Scheme on its own (significant at a local scale).

During construction, post-mitigation, the Human Health assessment identified six other projects as having the potential for in-combination impacts assessed to be Negative, Moderate and Temporary.

The Landscape (Townscape) and Visual assessment identified that where the construction of the Proposed Scheme coincides with other developments, or construction is successive, there remains potential for localised Significant, Temporary / Short-Term cumulative effects during construction on the townscape / streetscape.

Four roads (Manor Place, Oxmantown Road, St Joseph's Road and Cowper Street) will experience cumulative noise and vibration effects ranging over and above the effects of the Proposed Scheme in isolation which are reported in Chapter 9 (Noise & Vibration) due to cumulative construction traffic. These cumulative effects range from Negative, Moderate - Significant and Temporary to Negative, Moderate and Temporary.

No other significant construction related cumulative effects were identified from the Proposed Scheme in combination with other projects (including the other Core Bus Corridor Schemes) over and above those identified in the standalone assessments. For Operational Effects, the assessments assume all 12 proposed Bus Corridor Schemes would be operational, along with other identified projects and GDA Strategy projects included in the Do Minimum and Do Something scenarios. For traffic and transport, the assessment predicted that the Proposed Scheme and the other 11 Core Bus Corridor schemes are expected to facilitate a Long-Term, Profound Positive cumulative effect on People Movement by sustainable modes. The Core Bus Corridor schemes are seen to enable significant improvements in People Movement by sustainable modes along the direct Core Bus Corridor routes, particularly by bus and cycling, with reductions in car mode share due to the enhanced sustainable mode provision. The Proposed Scheme and the other 11 Core Bus Corridor schemes provide for enhanced integration and efficiencies for all public transport modes by facilitating substantial increases in public transport average network wide travel speeds.

The climate impact assessment predicts a Negative, Significant and Permanent cumulative impact on climate during the maintenance phase. A Significant and Positive impact is predicted on climate in 2028 with a Neutral impact in 2043 due to the predicted cumulative change in operational traffic and the significant mode shift from car to more sustainable modes (walking, cycling and public transport). Fewer climate benefits are seen in 2043 relative to 2028 due to the further electrification of the wider fleet in both the Do Minimum and Do Something scenarios.

The Core Bus Corridor Infrastructure Works will also support the delivery of government strategies outlined in the CAP (DCCAE 2019) and the 2021 Climate Act by enabling sustainable mobility and delivering a sustainable transport system. The Core Bus Corridor Infrastructure Works will provide connectivity and integration with other public transport services leading to more people availing of public transport, helping to further reduce GHG emissions.

Based on the analysis outlined above, it is concluded that the Core Bus Corridor Infrastructure Works achieves the project objectives in supporting the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets. The Core Bus Corridor Infrastructure Works has the potential to reduce GHG emissions equivalent to the removal of approximately 105,500 and 102,200 car trips per weekday from the road network in 2028 and 2043 respectively. This represents a very significant contribution towards the national target of 500,000 additional trips by walking, cycling and public transport per day by 2030 as outlined as a target in the 2021 Climate Action Plan (CAP) (DCCAE 2021). It is

concluded that, cumulatively, the Core Bus Corridor Infrastructure Works will make a significant contribution to carbon reduction.

The only other significant operational cumulative impacts identified over and above the standalone scheme relate to human health. The Human Health assessment identified three other projects, in combination with the Proposed Scheme, that were deemed to have potential for Positive Significant cumulative effects during the Operational Phase. The Human Health assessment identified Positive, Very Significant, Long-term cumulative effects with the other Core Bus Corridor Schemes. The Core Bus Corridor Schemes would be complementary to the Proposed Scheme and offer a greater choice of priority bus routes for bus passengers. It is considered likely that this would encourage greater uptake of bus services among the population surrounding the Proposed Scheme by offering a choice of efficient public transport journeys.

Significant environmental interactions occur between the topics of population, human health, air quality, noise and vibration and traffic and transport. The assessments made for each of those topics consider those interactions both directly and indirectly. As an environmental factor, landscape and visual considerations have natural relationships with all other environmental factors. Some are direct relationships, e.g. population and visual impacts; biodiversity and landscape; land, soils and water and landscape; or the setting around features of cultural heritage etc. Others may be indirect, e.g. human health, air quality and landscape, material assets and landscape and visual aspects. Wherever possible these potential interactions have been incorporated into the relevant assessments.

In brief, the Proposed Scheme will address sustainable mode transport infrastructure deficits while contributing to an overall integrated sustainable transport system as proposed in the GDA Strategy. It will increase the effectiveness and attractiveness of bus services operating along the corridor and will result in more people availing of public transport due to the faster journey times and reliability improvements which the Proposed Scheme provides. This in turn will support the potential to increase the bus network capacity of services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth.

9. What Happens Next?

The application for consent / approval, this EIAR and the Natura Impact Statement (NIS) may be viewed / downloaded on the following website: www.liffeyvalleyscheme.ie

The application may also be inspected in person free of charge or purchased on payment of a specified fee (this fee shall not exceed the reasonable cost of making such a copy) for a period of 8 weeks commencing on the date of publication of the Proposed Scheme. Further details of these arrangements can be found at www.liffeyvalleyscheme.ie.

Submissions or observations may be made to An Bord Pleanála (Strategic Infrastructure Division), 64 Marlborough Street, Dublin 1, D01 V902 for a period of 8 weeks commencing on the date of publication of the Proposed Scheme relating to:

- The likely effects on the environment of the Proposed Scheme;
- The implications of the Proposed Scheme for proper planning and sustainable development in the area in which it is proposed to situate the Proposed Scheme; and
- The likely adverse effects of the Proposed Scheme on a European Site.

The Board may, in relation to an application submitted for approval under Section 51 of the Roads Act 1993 (as amended), by order, approve the Proposed Scheme, with or without modifications and subject to whatever environmental conditions it considers appropriate, or may refuse to approve the Proposed Scheme.