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1. Introduction

This document is the Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) for the Lucan to City Centre Core Bus Corridor Scheme (referred to as the Proposed Scheme throughout this NTS). The Proposed Scheme will support integrated sustainable transport use 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 9.7km and commences at Junction 3 on the N4 Lucan Road / Lucan bypass. From the R136 Ballyowen Road junction with the R835 Lucan Road the Proposed Scheme will run east down the R835 Lucan Road to the roundabout serving the Lucan Retail Park and the N4 Lucan Road eastbound slip. The Proposed Scheme will continue via the N4 (passing the Liffey Valley Shopping Centre at Junction 2) as far as the M50 Junction 7 and then via the R148 along Palmerstown bypass, Chapelizod bypass, Con Colbert Road, St. John's Road West, ending at Frank Sherwin Bridge, where it will join the prevailing traffic management regime on the South Quays. 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.

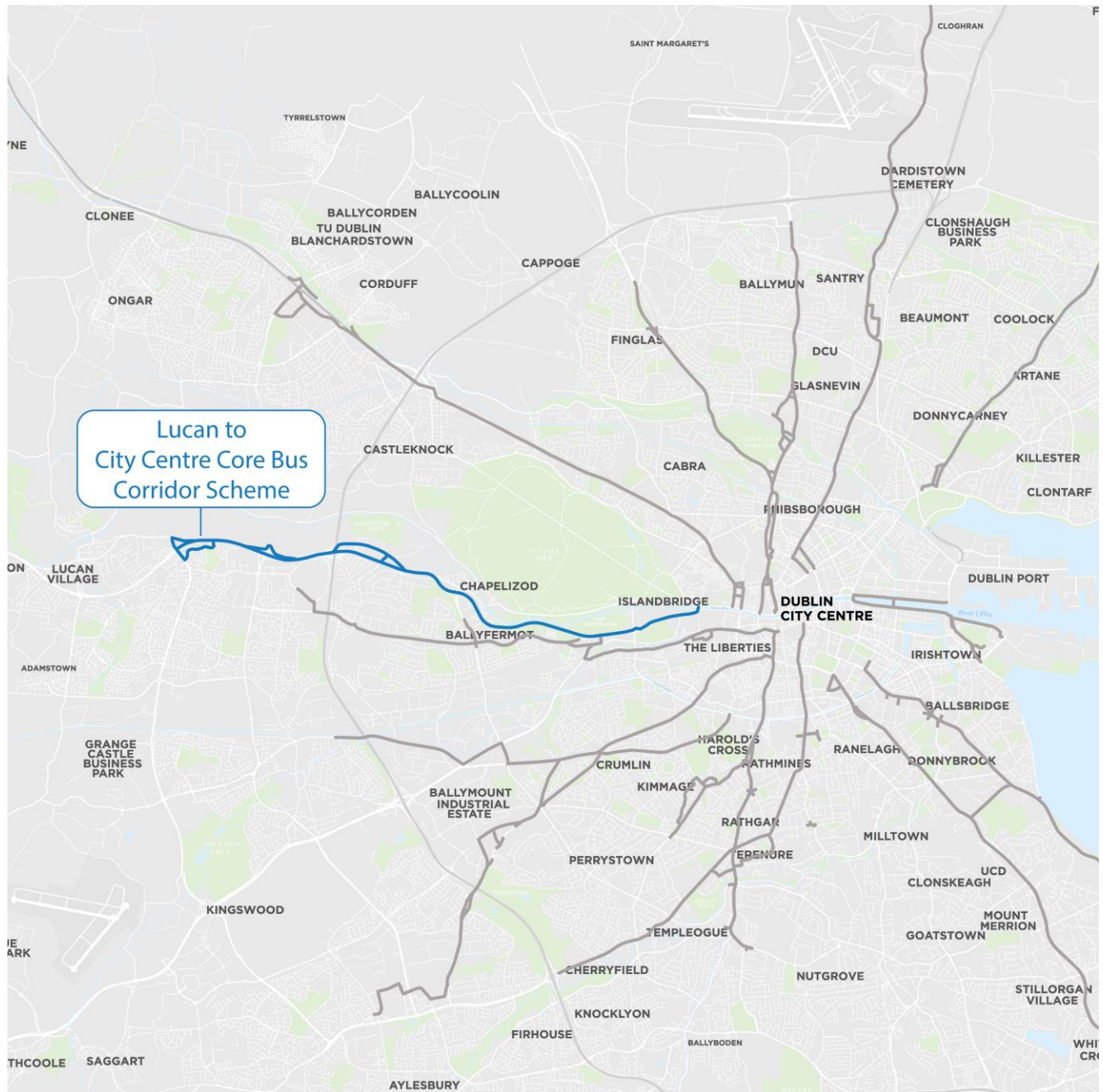


Image 1.1 Route of the Proposed Scheme

The Proposed Scheme will significantly enhance travel by public transport by providing a substantial increase in bus priority as well as improved pedestrian and cycling infrastructure on the N4 and R148 to/from the City Centre. Currently this key access corridor is characterised by traffic congestion and discontinuous bus and cycling infrastructure, meaning that for most of the journey, buses and cyclists are competing for space with the general traffic, impacting on the attractiveness of these sustainable modes.

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 (hereinafter 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.

Urban realm upgrades, including widened footpaths, high quality hard and soft landscaping and street furniture would 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 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 (hereinafter 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**.

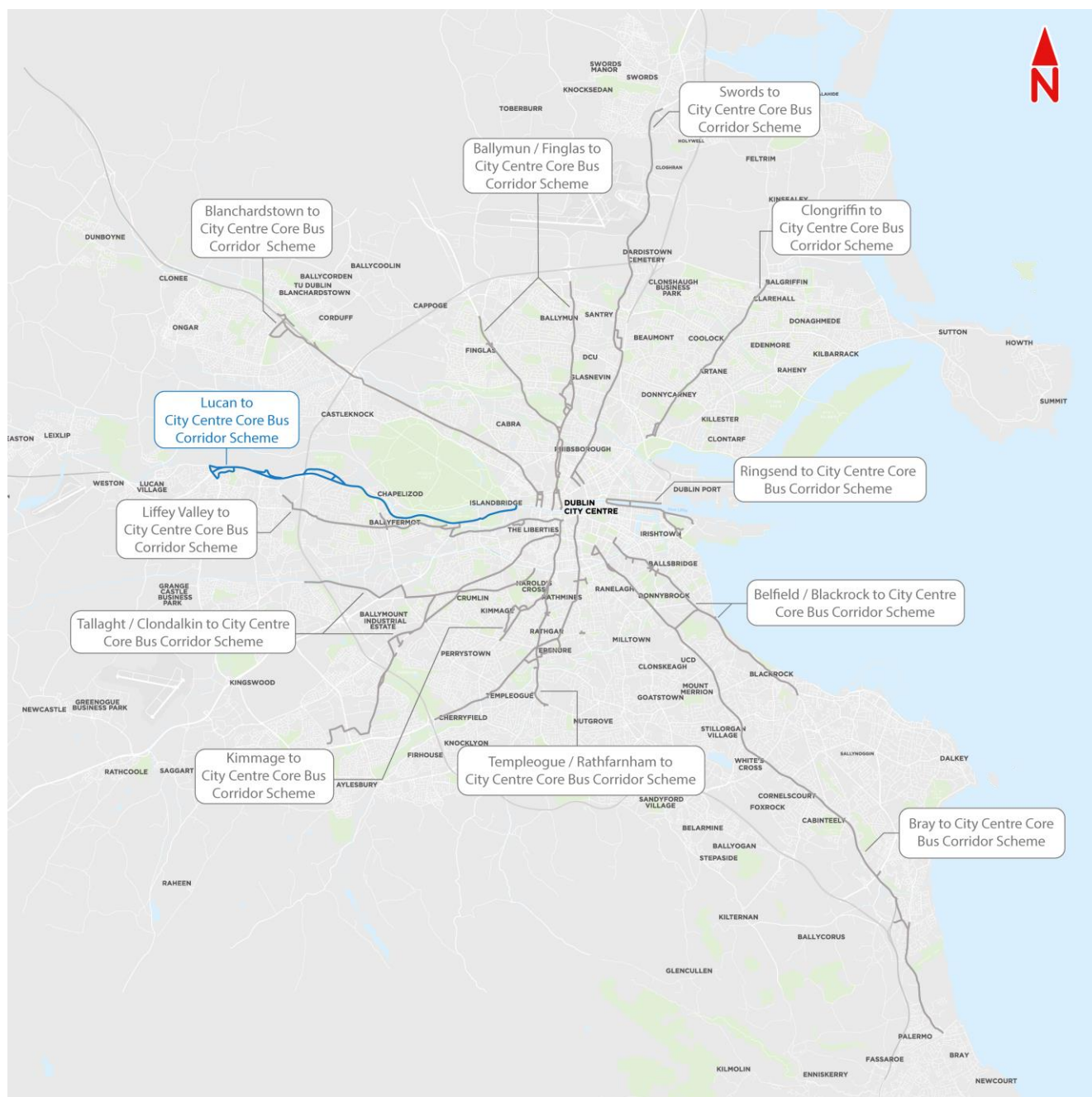


Image 1.2 Core Bus Corridor Infrastructure Works

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 public 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 (NTA)

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 Bord Pleanála, and constructing the Proposed Scheme (if approved).

2. Environmental Impacts Assessment Process

2.1 EIA Process

Environmental Impact Assessment is a systematic and an iterative process 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 effects 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 effects 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 do not currently 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 provide a move more quickly than cars along these routes.

The Proposed Scheme is needed to support by 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 Lucan to City Centre corridor currently has a high portion of inbound and outbound bus infrastructure. Currently there is bus infrastructure provision along 77% and 67% of the corridor (inbound and outbound respectively). There are shared cycle/bus lanes along parts of the route where no dedicated cycling infrastructure

is available. While there is a high level of bus service provision along this corridor, despite the relatively good provision of bus lanes along the road links they are regularly delayed in congestion arising from the lack of bus priority at key locations, such as the M50 interchange, Kennelsfort Road junction and the South Circular Road junction. This leads to journey time unreliability being experienced along the corridor.

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 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 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 robust 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 round of public consultation carried out was based on the EPR and this ran from 14 November 2018 to 29 March 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 17 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 BusConnects Infrastructure team undertook consultation during the preparation/ development of the EIAR with 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, 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 2019 through to the Summer of 2021. This engagement has overlapped with the public consultations (in March 2020 and December 2020). One-to-one meetings were offered on a face-to-face basis pre-COVID-19, and via Zoom or over the phone since March 2020, for those who wished to discuss the proposals further in relation to their own property with the minutes being recorded as part of the consultation process. Over the three rounds of consultation 44 letters of this kind were issued.

A letter drop was also carried out in July 2020 to request access to properties to undertake more detailed surveys. Additional letters were sent to affected landowners in June 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.

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 February 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 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 Lucan to City Centre Core Bus Corridor Scheme aligns generally with Corridor C in the GDA Transport Strategy which extends from the core City Centre area along the N4 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 Maynooth town, 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 in the wider Dublin area 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. A **Feasibility and Options Report** which is associated with the Proposed Scheme (Lucan to City Centre Core Bus Corridor Options Study – Feasibility and Options Assessment) was prepared in December 2016 which identified and assessed feasible options along the corridors and ultimately arrived at an Emerging Preferred Route (EPR);
2. A first round of non-statutory **Public Consultation** was undertaken on the Emerging Preferred Route from 14 November 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 engagement and the availability of additional design information, the design of the EPR evolved with further alternatives considered;
4. A second round of non-statutory **Public Consultation** was undertaken on the Draft PRO 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 PRO** was undertaken after 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 PRO from 04 November 2020 to 16 December 2020; and
7. Finalisation of **PRO**. Informed by feedback from the overall public consultation process, continuing stakeholder engagement and the availability of additional design information, the PRO, being the Proposed Scheme, was finalised.

The initial route alternatives considered covered a wide network of roads between:

- N4 Junction 5 (Celbridge/Leixlip) to N4 Junction 3 (Ballyowen/Lucan);
- N4 Junction 3 (Ballyowen/Lucan) to Kennelsfort Road Upper;
- Kennelsfort Road Upper to Con Colbert Road; and
- Con Colbert Road to 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 route options were then evaluated under the following criteria:

- Economy;
- Safety;
- Integration;
- Accessibility & 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 CBC commences at the Junction 5 (Celbridge/Leixlip) on the N4 by way of the on and off-ramps. The route then joins the N4. Buses would divert off the N4 via the on and off-ramps at Junction 4 (Lucan/Adamstown) and travel through said junction before re-joining the N4. Inbound buses would divert off the N4 again at Junction 3 (Ballyowen/Lucan) before turning left on to the R136 (Ballyowen Road) and right onto the R835 (Lucan Road) before re-joining the N4 again. Outbound buses would travel straight through the R136 junction via the on and off-ramps.

From there, the route travels along the N4 to Junction 2 (Fonthill/Liffey Valley), where inbound buses would divert via the off-ramp, through the roundabout and back onto the N4 at the on-ramp. Outbound buses would continue through this junction on the N4 with no diversion. From there the route stays on the N4, travelling straight through the M50/N4 free-flow junction on the R148 (Chapelizod Bypass). The proposed route then follows the R148 (Chapelizod Bypass/St. John's Road West) all the way from the M50 to the Quays area in the City Centre, travelling through junctions with Kennelsfort Road Upper, The Oval and South Circular Road (R111). From here, inbound buses would travel over Frank Sherwin Bridge before turning right onto Wolfe Tone Quay while outbound buses would use Victoria Quay before turning left on the R148 (St. John's Road West). Buses would then travel along the north and south quays to access the City Centre.'

5.3 Design Alternatives

- Following the completion of the public consultation process in relation to the Emerging Preferred Route, various amendments were made to the scheme proposals to address some of the issues raised in submissions, including incorporating suggestions and recommendations from local residents, community groups business, 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:
- Provision of a two-way cycle track from the Lucan Road at N4 Junction 3 inside the boundary of the Hermitage Golf Club and Hermitage Medical Clinic, then along the Old Lucan Road in Palmerstown where it connects to existing facilities leading to Chapelizod village, with this two-way cycle track forming part of Primary Cycle Route 06 included in the GDA Cycle Network;
- Relocation of the existing bus stops at Liffey Valley Shopping Centre some 200m further west to provide more weaving length for the buses to negotiate the M50 interchange more safely, improved segregation from the existing carriageway, and a new bridge over the N4 that links with the proposed bus interchange within Liffey Valley Shopping Centre, to provide higher quality pedestrian facilities;
- Introduction of a westbound, bus only, right turn lane at the Oval junction to facilitate buses turning into Palmerstown village;
- Provision of an eastbound right turn lane at Memorial Road to facilitate movements that are being impacted by the revised traffic management measures associated with the Liffey Valley CBC in Inchicore;
- The introduction of a northbound right turn lane at the South Circular Road junction to allow vehicles to turn right from the South Circular Road to St John's Road West; and
- Removal and replacement of additional trees along St John's Road West so that facilities for both taxis and bicycles can be provided on the approach to the train station.

Furthermore, the Proposed Scheme includes other localised design changes which were made based on feedback received during the second and third rounds of public consultations and dialogue with stakeholders. No key changes have resulted from the second and third rounds of Non-Statutory Public Consultations.

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, which has an overall length of approximately 9.7 km, commences at Junction 3 of the N4 Lucan Road / Lucan Bypass and is directed east towards the City Centre. From the R136 Ballyowen Road junction with the R835 Lucan Road the route runs east along the R835 Lucan Road to the roundabout serving the Lucan Retail Park and also the N4 Lucan Road eastbound on-slip. It is then routed via the N4 (passing the Liffey Valley Shopping Centre) as far as Junction 7 (M50) and via the R148 along Palmerstown bypass, Chapelizod bypass, Con Colbert Road, St. John's Road West, ending at Frank Sherwin Bridge, where it will join the prevailing traffic management regime on the South Quays.

At Junction 3 of the N4, cycle facilities are provided along R136 Ballyowen Road between Hermitage Road and the R835 Lucan Road, and then along the length of the Core Bus Corridor to Junction 2 of the N4. From there cycle facilities are provided along the Old Lucan Road either side of the M50 and through Palmerstown village, to the start of the R148 Chapelizod bypass, at which point they will connect with other future cycle facilities through Chapelizod village. Cycle facilities are also provided on the R148 between Con Colbert Road and the end of the corridor at Heuston station on St. John's Road West. 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**.

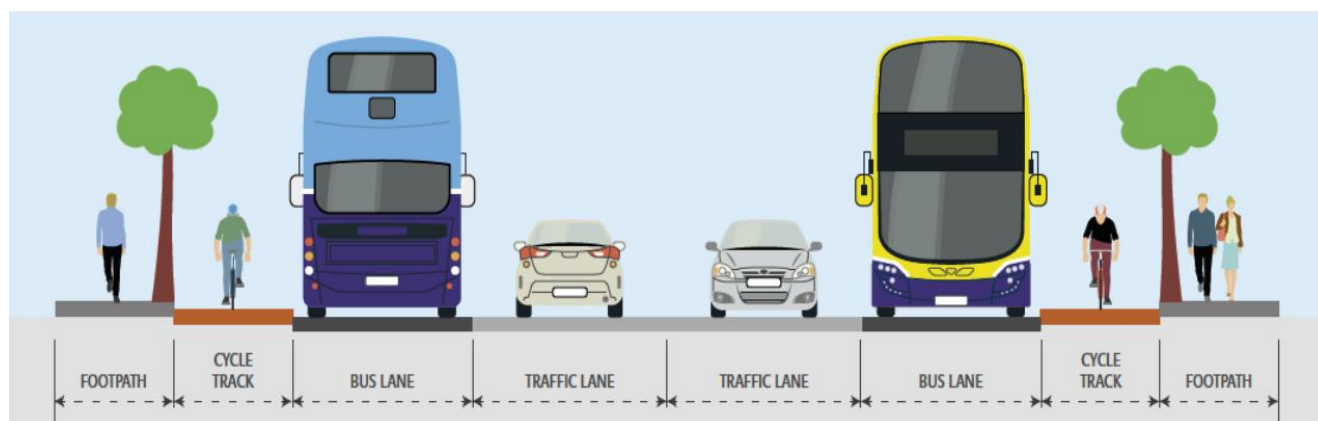


Image 6.1 Typical BusConnects Road Layout

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 40% from 20 to 28 as a result of the Proposed Scheme;
- The proportion of segregated cycle facilities will increase from 26% on the existing corridor to 95% on the Proposed Scheme;
- The proportion of the route having bus priority measures will increase from 72% on the existing corridor to 93% on the Proposed Scheme.

The Proposed Scheme is described in the following geographical sections:

- **Section 1:** N4 Junction 3 to M50 Junction 7 – N4 Lucan Road;
- **Section 2:** M50 Junction 7 to R148 Con Colbert Road – Palmerstown bypass and Chapelizod bypass; and

- **Section 3:** R148 Con Colbert Road to City Centre (Frank Sherwin Bridge) – Con Colbert Road and St. John's Road West.

6.1 Section 1: N4 Junction 3 to M50 Junction 7 – N4 Lucan Road

This section of the Proposed Scheme runs from Junction 3 on the N4 Lucan Road / Lucan bypass, as far as M50 Junction 7 and, as described below, will include upgrades to the following junctions to provide bus priority and enhanced pedestrian and cyclist facilities:

- R136 Ballyowen Road / R835 Lucan Road;
- R136 Ballyowen Road / N4 Junction 3;
- R136 Ballyowen Road / Hermitage Road;
- N4 Junction 2; and
- N4 / M50 Interchange (Junction 7).

At the start of the Proposed Scheme at Junction 3 on the N4 Lucan Road / Lucan bypass modifications are proposed to the signalised junction at the end of the N4 westbound off-slip, including the removal of the left-turn slip lane. In order to provide priority for buses and maintain adequate junction capacity for general traffic, the existing lane configuration is maintained on the bridge carrying the R136 Ballyowen Road over the N4. A two-way segregated cycle track is proposed on the east side of the R136 Ballyowen Road between R835 Lucan Road and Hermitage Road, including a new pedestrian and cycle bridge across the N4, which will replace the existing pedestrian only bridge at this location.

At the R136 Ballyowen Road junction with the R835 Lucan Road, it is proposed to remove the existing left-turn slip lanes. Additionally, the location of the existing east bound bus stop on the R835 Lucan Road will be moved closer to the junction and will also be increased in length. A continuous bus lane is proposed along the R835 Lucan Road to the roundabout serving the Lucan Retail Park and also on the N4 Lucan Road eastbound on-slip. A segregated two-way cycle track is proposed on the northern side of this section of the R835 Lucan Road which will require land acquisition from the adjacent green space.

On the N4 Lucan Road it is proposed to maintain the existing continuous eastbound and westbound bus lanes over this section of the route with no change to the number of existing general traffic lanes. In addition, the bus lane on the westbound service road Junction 3 will be extended to ensure bus priority is provided on the approach to the junction with R136 Ballyowen Road at the top of the slip road. A small area of land acquisition will be required from the site of the former Foxhunter public house to facilitate this extended bus lane.

The proposed design provides a significant improvement to the bus stop provision in the vicinity of the Liffey Valley Shopping Centre (LVSC). The bus stops themselves will be moved some 150m further west, increased in length and bus laybys are proposed, segregated from the adjacent N4 Lucan Road carriageway. A small strip of land acquisition is required on the southern side of the N4 adjacent to the car park of the Liffey Valley Office Campus to facilitate the new westbound bus stop arrangement. A retaining wall is proposed for the new boundary at this location.

To better serve the increased bus stop capacity a new pedestrian only bridge is proposed adjacent to the new bus stop locations, some 200m further west from the existing foot / cycle bridge, which will be retained. The position of this new bridge aligns with the new public transport interchange within the LVSC site which is under construction. A small piece of land acquisition is required from the green area adjacent to the shopping centre for the provision of the ramps leading to the new footbridge. Additionally, the speed limit for the bus lanes between N4 junction 2 and the M50 will be reduced from 60km/hr to 50km/hr in the vicinity of the new bus stops.

Between N4 Junction 2 and the M50 on the eastbound approach a change to the lane designation is proposed to separate earlier the general traffic heading towards the M50 northbound and the R148 Palmerstown bypass and provide a continuous bus lane. A new portal gantry is proposed to provide additional lane destination signage. The relocation of the bus stops for LVSC will allow for an increased length for the buses to accelerate and weave with eastbound traffic approaching the M50 interchange, and also an increased weaving length for all westbound traffic exiting the M50 interchange. On the M50 interchange itself it is proposed to provide two general traffic lanes and a continuous bus lane in both directions through the junction.

To provide a continuous facility for the Primary Cycle Route 6 as identified in the GDA Cycle Network Plan, from the roundabout serving the Lucan Retail Park, facilities for cyclists will initially comprise a Quiet Street along the public road providing access to the Hermitage Golf Club.

On the northern side of the N4 between the entrance to the Hermitage Golf Club and Junction 2 of the N4 a segregated two-way cycle track is included in the Proposed Scheme. Land acquisition will be required from the Hermitage Golf Club to provide this cycle track which will connect with the existing foot / cycle bridge over the N4 adjacent to the Mount Andrew estate / St Loman's Hospital access. A piled retaining wall is proposed for the new boundary and 15m high sports netting is proposed adjacent to the relocated boundary for a 130m length opposite Ballyowen Lane, as well as infill planting to the road side boundary and southern edge of the fairway. Eastwards of this location the two-way cycle track continues on the north side of the N4 and will require land acquisition from the Hermitage Medical Clinic. A retaining wall is proposed for the new boundary. The two-way cycle track will then run along the north side of the eastbound off-slip at Junction 2.

From Junction 2 of the N4 the segregated two-way cycle track will be located along the south side of the Old Lucan Road before connecting to the foot / cycle bridge that crosses the M50. The cycle track will be accommodated within the existing road space on the Old Lucan Road, with the lanes for general traffic being narrowed, and traffic calmed to reflect a proposed 30km/hr speed limit.

On the south side of the N4 a pedestrian priority zone is provided between Ballyowen Lane and the existing foot / cycle bridge over the N4 adjacent to the Mount Andrew estate. From Ballyowen Lane a Quiet Street is proposed along Hermitage Road to the R136 Ballyowen Road. The provision of the two-way segregated cycle track along the northern side of the N4 and the Quiet Street along Hermitage Road avoids the need for a segregated one-way cycle track on the southern side of the N4, as well as along the westbound service road and off-slip at Junction 3.

6.2 Section 2: M50 Junction 7 to R148 Con Colbert Road – R148 Palmerstown bypass and Chapelizod bypass

On this section between M50 Junction 7 and R148 Con Colbert Road – R148 Palmerstown bypass Chapelizod bypass junctions, as described below, it is proposed to upgrade the following junctions to provide bus priority and enhanced pedestrian and cyclist facilities:

- R148 Palmerstown bypass / Kennelsfort Road;
- Old Lucan Road / Kennelsfort Road Lower; and
- R148 Palmerstown bypass / The Oval.

Between the M50 junction and Kennelsfort Road junction, it is proposed to provide a continuous bus lane and two general traffic lanes in the eastbound direction. In the westbound direction, a bus lane and two general traffic lanes are proposed, with the lane designation amended to separate earlier the general traffic heading toward the M50 and the N4 Lucan Road westbound. This arrangement will allow for a continuous westbound bus lane from the Kennelsfort Road junction and through the M50 interchange.

On the R148 Palmerstown bypass modifications are proposed to both the Kennelsfort Road and the Old Lucan Road / The Oval junctions to remove the existing left turn slip lanes. In addition, the left turn movement from Kennelsfort Road Lower to the R148 Palmerstown bypass eastbound is to be prohibited to facilitate new signalised crossings on the east side of the Kennelsfort Road junction to serve the enhanced bus stops, the pedestrian demand and to cater for the proposed two-way cycle track that crosses the R148 Palmerstown bypass at this location. Traffic in Palmerstown village wishing to travel east on the R148 towards the city centre will be able to do so by travelling east along the Old Lucan Road to the junction with the Oval.

In addition, at the signalised junction of the R148 with the Old Lucan Road / The Oval a new westbound, bus only, right turn lane is proposed on the R148 Palmerstown bypass to facilitate new bus services through Palmerstown village. A small area of land acquisition will be required from the western edge of the petrol filling station at this location to accommodate this new bus movement. The existing R148 westbound u-turn facility located some 40m east of the junction with the Oval will be closed.

The existing bus stops on the R148 Palmerstown bypass at Kennelsfort Road and The Oval are to be lengthened and relocated to allow the provision of a bus layby in all cases. In addition, it is proposed to rationalise the bus stops within Palmerstown village with new bus stops provided on the Old Lucan Road immediately west of the junction with Mill Lane.

Between the junction with The Oval and the R833 Con Colbert Road junction, it is proposed to maintain a continuous bus lane and two general traffic lanes in each direction, as per the existing arrangement. The existing bus lane and public transport signals on the westbound on-slip from the R112 Kylemore Road will be retained. New bus stops with laybys are proposed where the R148 Chapelizod bypass crosses Chapelizod Hill Road. These will be connected to Chapelizod Hill Road via a combination of steps and ramps. The existing bridge carrying the R148 Chapelizod Bypass over Chapelizod Hill Road will be widened to accommodate the eastbound bus layby and retaining walls are proposed to support the road widening, steps and ramps. Additionally, the speed limit for the bus lanes along the full length of the R148 Chapelizod bypass will be reduced from 80km/hr to 60km/hr.

A segregated two-way cycle track is proposed to run along the north side of the Old Lucan Road from the foot / cycle bridge crossing the M50, all the way through Palmerstown village connecting to the existing pedestrian priority zone at the start of the R148 Chapelizod bypass. A new Toucan crossing is also proposed on the R112 Lucan Road on the approach to Chapelizod village. The cycle track will be accommodated within the existing road space on the Old Lucan Road, with the lanes for general traffic being narrowed and traffic calmed to reflect the existing 30km/hr speed limit. Informal parking will be removed at certain locations along the northern side of the Old Lucan Road between the M50 and Kennelsfort Road Lower where the two-way cycle track is provided.

Along the Old Lucan Road between Kennelsfort Road Lower and the Oval, the existing pay and display parking on the northern side of the road will be removed to accommodate the two-way cycle track. To offset this loss of parking spaces, the existing parallel pay and display parking spaces on the southern side of Old Lucan Road will be replaced with a higher number of perpendicular parking spaces.

In addition, a new segregated two-way cycle track is proposed along the east side of Kennelsfort Road Lower resulting in the loss of a small number of pay and display parking spaces and resulting in the need for a small area of land acquisition from the frontage of the numbers 20 and 22 (the Palmerstown Lodge hotel). The proposed two-way cycle track crosses the R148 Palmerstown bypass via the new signalised cycle crossing on the east side of the junction described above and ends at a new Toucan Crossing on Kennelsfort Road Upper to provide a connection to the existing cycle lanes.

6.3 Section 3: R148 Con Colbert Road to City Centre – St. John's Road West

On this section between R148 Con Colbert Road – Chapelizod bypass and Frank Sherwin Bridge – St. John's Road West junctions, as described below, it is proposed to upgrade the following junctions to provide bus priority and enhanced pedestrian and cyclist facilities:

- R148 Chapelizod bypass / R148 Con Colbert Road
- R148 Con Colbert Road / R839 Memorial Road;
- R148 Con Colbert Road / R111 South Circular Road;
- R148 St. John's Road West / R111 South Circular Road;
- R148 St. John's Road West / Heuston South Quarter;
- R148 St. John's Road West / Military Road;
- R148 St. John's Road West / Heuston Station; and
- R148 St. John's Road West / Victoria Quay (Frank Sherwin Bridge).

At the R833 Con Colbert Road junction with the R148 Chapelizod bypass the existing left turn slip lane from R833 Con Colbert Road is removed and a segregated cycle track is proposed in each direction. Between the R833 Con Colbert Road junction and the R111 South Circular Road junction the existing continuous bus lanes and two general traffic lanes are maintained and narrowed slightly to facilitate the introduction of a segregated cycle track in each direction.

At the junction between the R148 Con Colbert Road and Memorial Road, the pedestrian crossing will be moved to the east side of the junction to be on the same side of the junction as the bus stops. In addition, while the junction has been designed to tie-in to the existing one-way layout of Memorial Road, consideration has been given to the tie-in with the proposals contained in the Liffey Valley to City Centre Core Bus Corridor, which proposes making Memorial Road two-way. To facilitate this a new eastbound right-turning lane on the R148 Con Colbert Road could be accommodated within the proposed junction layout.

At the R111 South Circular Road junction, there are a number of changes to existing traffic lanes. On the eastbound and westbound approaches to the junction the existing left turn slip lanes will be removed. On the R111 South Circular Road northbound a short right turn lane is provided to facilitate future bus movements and compensate for restricted turns included in the Liffey Valley to City Centre Core Bus Corridor Scheme. In order to improve the standard of pedestrian and cyclist facilities at this junction, the number of general traffic lanes through the junction will be reduced in the eastbound, northbound and southbound directions and the R111 South Circular Road will be widened along the western edge through the junction to facilitate the inclusion of segregated cycle tracks in each direction.

At the R148 St. John's Road West / HSQ junction and the R148 St. John's Road West / Military Road junction, existing left-turn slip lanes are removed and improved pedestrian and cyclist facilities will be provided, including Toucan crossings of the R148.

On the R148 St. John's Road West between the R111 South Circular Road junction and Heuston Station the existing eastbound lane configuration of one bus lane and one single general traffic lane is proposed to be maintained.

In the westbound direction of R148 St. John's Road West a continuous bus lane is to be provided instead of one of the two existing general traffic lanes. A segregated cycle track is proposed in each direction along this section. The existing taxi queuing lane on the eastbound direction will be maintained between the Heuston South Quarter junction and Heuston Station, along with the existing taxi rank at the station.

Along the section of the R148 St. John's Road West between the Heuston South Quarter junction and Heuston Station some trees will need to be removed and replaced so that the facilities for both taxis and cycles described above can be provided. An urban realm landscaping improvement is therefore proposed along this section of the road. This includes the removal of the pedestrian guard railing and new planting, which will result in a net increase in the number of trees along the road.

In the immediate vicinity of Heuston Station continuous bus lanes and segregated cycle tracks are provided in both directions as far as Frank Sherwin Bridge, which the Proposed Scheme will tie into the existing arrangement at the Victoria Quay junction. It is proposed to upgrade the bus stop provision on R148 St. John's Road West outside the southern façade of the station, with lengthened bus stops and bus laybys provided in both directions. On the southern side of the road this will require some land acquisition from the Health Service Executive's Dr Steevens' Hospital. The extents of this land acquisition have been minimised by the removal of the central kerbed median between the two signalised crossings of the R148 St. John's Road West, which will be upgraded to raised Toucan crossings. A detailed urban realm and landscaping proposal has been developed at this location.

A speed limit of 30km/hr is proposed on the R148 St. John's Road West between the junction with Military Road and the end of the Proposed Scheme at the junction with Frank Sherwin bridge. This is in recognition of the high amount of pedestrian activity associated with the public transport interchange at Heuston station. While no changes are proposed to the signalised crossing of the Luas Red Line or the platforms for the Luas stop, a minor reduction in height is proposed to the southern end of the rear wall of the eastern Luas platform to provided clearance to the proposed inbound cycle track.

7. Construction

The Construction Phase for the Proposed Scheme is anticipated to take approximately 24 months to complete. It will be constructed based on individual sectional completions that will individually have shorter durations typically ranging between three and twelve 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;
 - Demolition of, protection or removal to store items such as walls, gates, fencing, lighting poles and bus stops; and
- Road and street upgrades, including:
 - Excavation of the road surface;
 - Implementation of pedestrian and cyclist safety measures;
 - Implementation of any road closures or diversions;
 - Topsoil and subsoil excavation
 - Works to cellars, if required;
 - Adjustment or upgrades to drainage;
 - Realignment, upgrades, replacement or protection of utilities and services;
 - Construction of pavement, including general traffic carriageways, bus lanes, cycle tracks, bus stops, bus terminals, traffic islands, off-line parking and loading bays;
 - Upgrades to Traffic Signal Junctions;
 - Upgrades of road furnishings (including street furniture, signage, lighting, bus stops (shelters, CCTV and information displays) and communication systems) etc.;
- Structural Works, including:
 - Chapelizod Hill Road Bridge Widening;
 - Construction of Embankment: Placement and Compaction of Fill Material;
 - Construction of Foundations;
 - Construction of Substructure;
 - Construction of the Superstructure; and
 - Finishing Works.
 - Construction of Ballydowd Pedestrian and Cycle Bridge;
 - Demolition of Existing Pedestrian Bridge;
 - Excavation for Bridge Supports;
 - Construction of the New Pedestrian and Cycle Bridge; and
 - Finishing Works.
- Construction site decommissioning, including the removal of all construction facilities and equipment.

Construction Compounds will be located northeast of the N4 Junction 2, with access / egress from Old Lucan Road, north of the N4 opposite Liffey Valley Shopping Centre, north of Palmerstown Bypass and east of Kennelsfort Road and at Liffey Gaels Park, south of Chapelizod Bypass. These Construction Compounds will be used to store materials, plant, and equipment, to manage the activities from and to provide welfare facilities for construction personnel. Limited car parking will also be provided at these Construction Compounds. The layouts for the Construction Compounds are shown in **Image 7.1**, **Image 7.2**, **Image 7.3** and **Image 7.4** respectively.

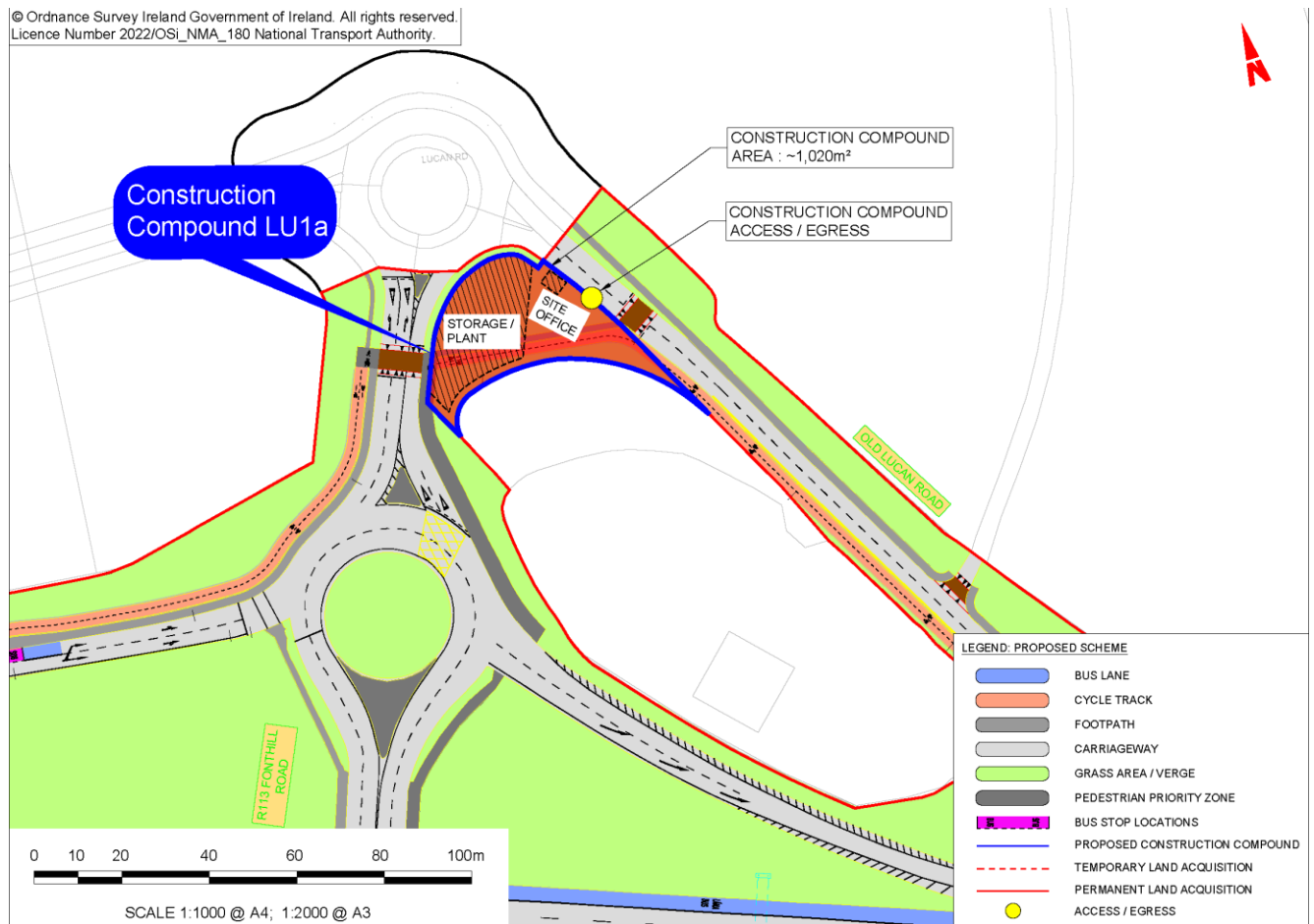


Image 7.1 Location and Extent of Construction Compound LU1a

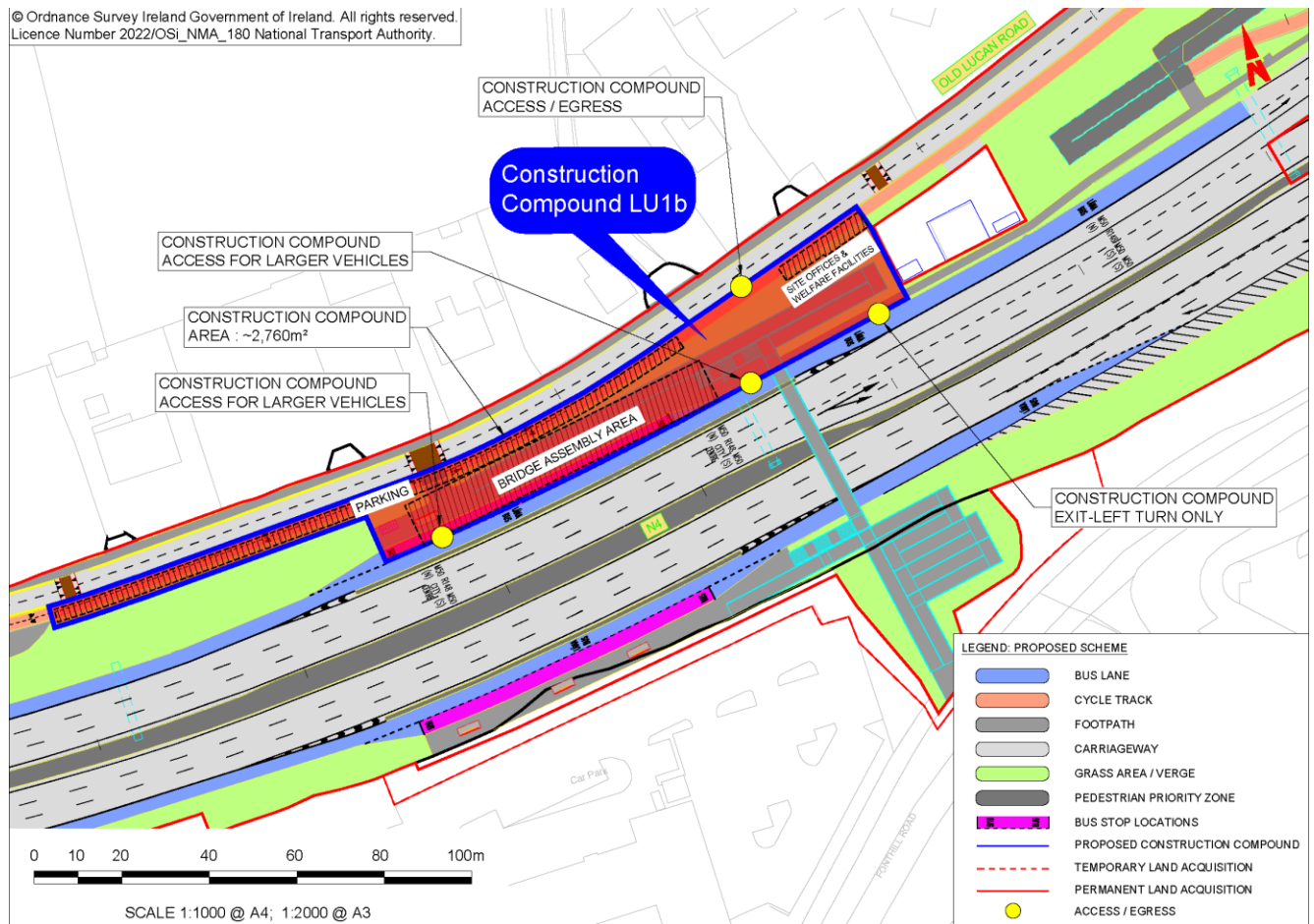


Image 7.2 Location and Extent of Construction Compound LU1b

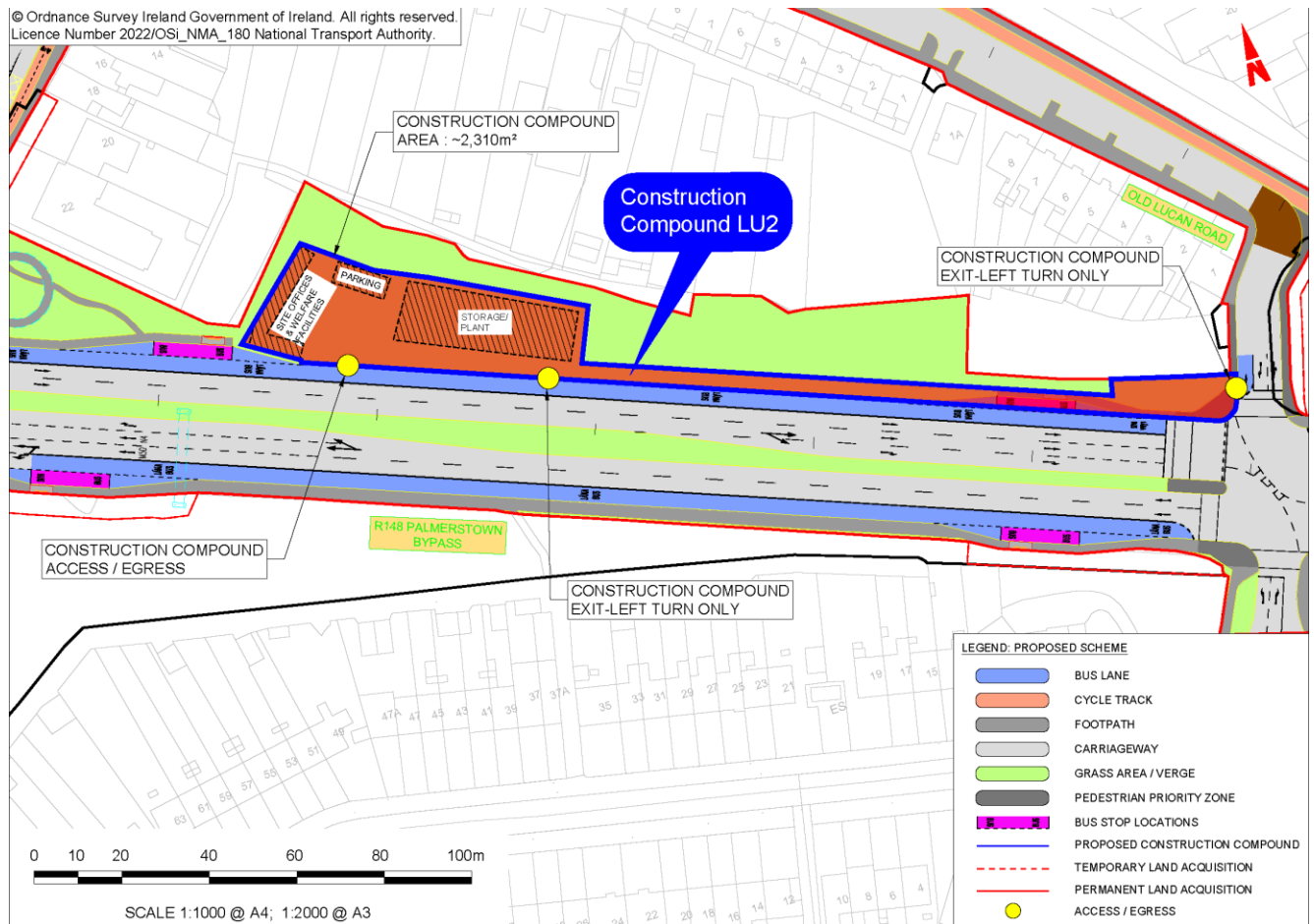


Image 7.3 Location and Extent of Construction Compound LU2

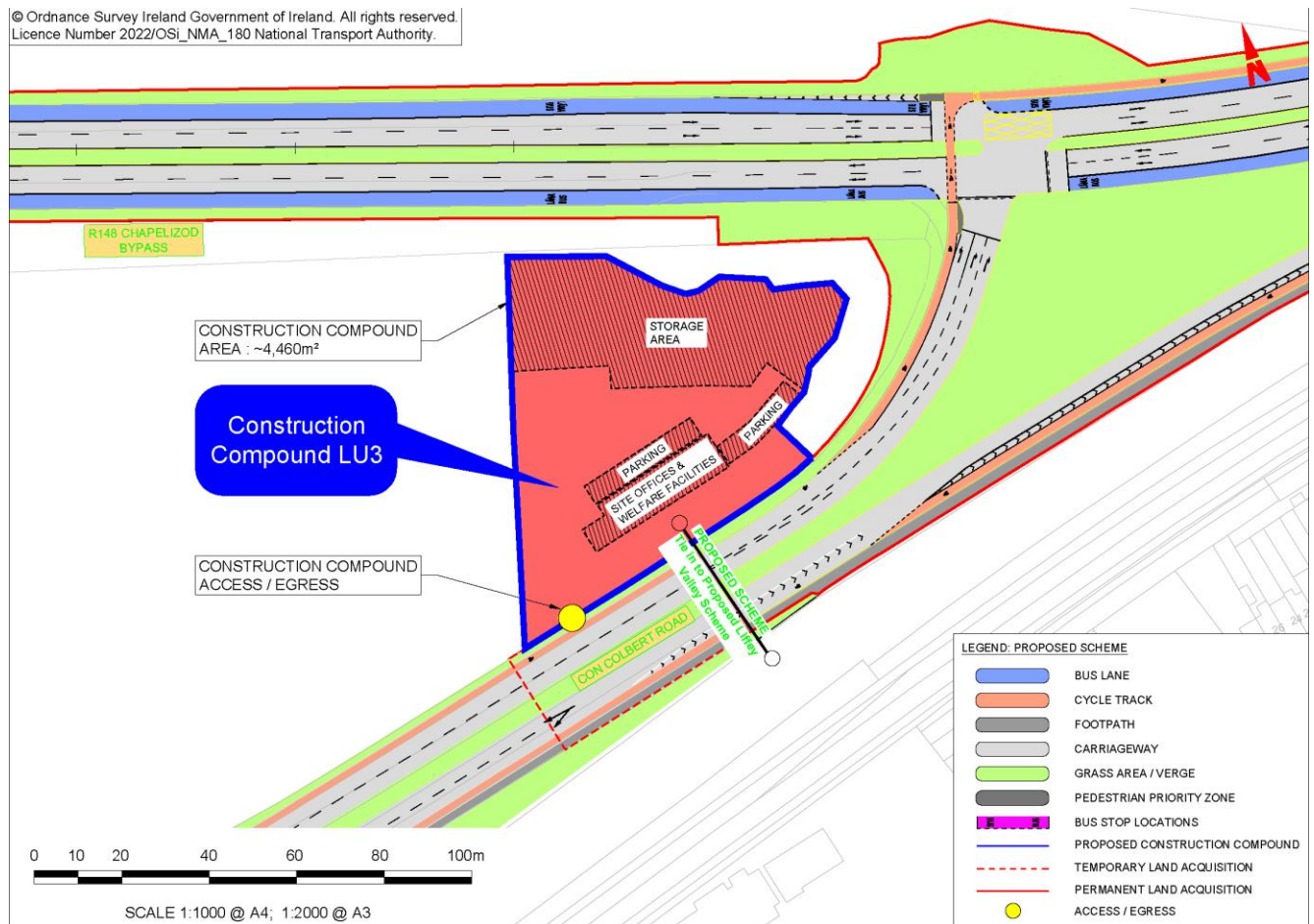


Image 7.4 Location and Extent of Construction Compound LU3

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 has been prepared, to demonstrate how 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, for example Chapelizod Hill Road will be closed to vehicular through traffic at the worksite to facilitate the works.

Access to properties of owners/occupiers will be maintained as far as reasonably practicable. While there may 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 also be maintained.

Cycle and pedestrian routes will also 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 24-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 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. As outlined in **Section 7.1**, the NTA (the Employer for the construction works) 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. 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 contractor will be required to plan and construct the Proposed Scheme construction 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.

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 & 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 network, and traffic modelling.

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

- The qualitative assessments are as follows:
 - **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 addresses:
 - **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 that will occur for the general traffic conditions on 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, slight to moderate, and temporary in nature, and with the application of the proposed mitigation measures, 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 be positive, moderate and long-term in Section 2 and positive, significant and long-term in Section 1 and 3 of the Proposed Scheme.
- **Cycling Infrastructure:** Given the quality of the existing cycling infrastructure along the Proposed Scheme, the effects of the improvements will be positive, moderate and long-term in Sections 1, 2 and 3
- **Bus Infrastructure:** The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will be positive, very significant and long-term in Section 1 and 2, and positive, profound and long-term in Section 3 of the Proposed Scheme;
- **Parking and Loading:** Given the nature of the loss in parking (i.e. predominately low use informal parking on sections of road where properties and businesses have off road parking) and the availability of alternative spaces in the indirect study area, the effects are expected to

be negative, moderate and long-term in Section 1 and negative, slight and long-term in Section 2 and Section 3.

- **People Movement:** Overall, it is anticipated that the increases to the total number of people travelling along the Proposed Scheme will have a positive, significant and long-term effect;
- **Bus Network Performance:** Overall it is anticipated that the improvements to the network performance for bus users along the Proposed Scheme will have a positive, very significant and long-term effect; and
- **General Traffic Network Performance:** Overall, it has been determined that the impact of the reduction in general traffic flows along the Proposed Scheme will be a positive, slight and long term effect whilst the impact of the redistributed general traffic along the surrounding road network will have a negligible effect. Thus overall, there will be no significant deterioration in the general traffic environment in the area.

The Proposed Scheme will deliver 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 an attractive alternative 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.

Although it is recognised that there will be some negative impacts for general traffic and parking / loading availability, the Proposed Scheme has been designed and outlined within the assessment to take cognisance of the relevant traffic and transport guidelines. The assessment demonstrates that there will be no significant deterioration in the general traffic environment in the study area as a consequence of meeting the scheme objectives of providing enhanced sustainable mode priority along the direct study area.

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 mitigation measures are incorporated into the Proposed Scheme and no further mitigation measures are considered to be required.

Additionally, 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 may 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 (NO₂) was exceeded at monitoring locations on N4 Lucan Road, the M50 south of the Chapelizod Bypass and the R148 Wolfe Tone Quay in 2018/ 2019.

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 neutral overall in the study area.

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.

No mitigation measures are required during the Operational Phase as the assessment identifies a generally negligible or beneficial impact on air quality in the vicinity of the Proposed Scheme. These impacts are predicted to reduce to negligible by 2043. The assessment concludes that the overall the impact on air quality along the Proposed Scheme will neutral and long-term.

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 in recent years have negatively impacted 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 minor utility diversions, road widening works, road excavation works (where required), road and junction reconfiguration and resurfacing works, public realm improvements including landscaping, as well as construction access routes including movement of machinery and materials within and to and from the construction compounds. 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 products or 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 practicable, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag, the reuse of materials, where practicable, within the extent of the Proposed Scheme and the local sourcing of material, where practicable, of materials to reduce the embodied emissions associated with transport.

The Proposed Scheme is estimated to result in total Construction Phase greenhouse gas emissions of approximately 8,498 tonnes embodied CO_{2eq} for materials over the approximate 24-month construction period, equivalent to an annualised total of 0.011% of Ireland's non-ETS 2020 target and 0.071% of the 2030 Transport Emission Ceiling.

Following the application of the mitigation measures, it is expected that there will be a Negative, Minor and Short-Term residual impact on climate as a result of the Construction Phase of the Proposed Scheme.

The maintenance greenhouse gas emissions associated with the Operational Phase of the Proposed Scheme is predicted to generate 440 tonnes CO_{2eq} over the predicted 60-year lifespan. Following the implementation of mitigation, this impact is predicted to be Negligible 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 greenhouse gas emissions, beyond those reported in the above assessment. The Proposed Scheme has the potential to reduce CO_{2e} emissions equivalent to the removal of approximately 18,540 and 19,740 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 2021 Climate Action Plan.

The operational traffic greenhouse gas emissions associated with the Operational Phase of the Proposed Scheme is predicted to be Positive, Minor and Permanent.

Overall, when the carbon emissions associated with the maintenance phase and the Operational Phase are combined, the net greenhouse gas emissions will be Positive, Minor and Permanent. Thus, the residual impact from Operational Phase traffic as a result of the Proposed Scheme will be Positive, Minor and Permanent.

The CBC Infrastructure Works will also support the delivery of government strategies outlined in the Climate Action Plan and the 2021 Climate Act by enabling sustainable mobility and delivering a sustainable transport system, aligning with the 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 (including the Proposed Scheme). 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 be perceptible to building occupants.

The potential impacts assessed for the Construction Phase included the generation of noise and vibration from utility diversions, road resurfacing and road widening works. Construction traffic routes were also assessed as part of the assessment.

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, 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 to reduce noise as well as noise monitoring at sensitive receptors close to the working areas. The monitoring of vibration at identified sensitive buildings, will be undertaken 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 noise impacts associated with the Construction Phase will be Negative, Not Significant to Moderate, and Temporary during all key construction phases during daytime periods. During evening periods, noise impacts associated with the Construction Phase will be Negative, Not Significant to Significant and Temporary within 20m of the works depending on the specific activities. With the adoption of best practice methodologies, vibration impacts at the most sensitive premises can be adequately mitigated to within acceptable levels relating to disturbance.

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 and the replacement of diesel fleet to electric and natural gas fleet.

Once operational, there will be a Positive to Neutral impact along the Proposed Scheme due to a reduction in traffic volumes during both the Opening Year (2028) and the Design Year (2043).

During the Opening Year (2028), an Indirect, Positive, Imperceptible, Short To Medium Term to, Negative, Slight, Short To Medium Term change in traffic noise levels will occur along the surrounding road network outside of the Proposed Scheme. Whilst an element of traffic re-distribution will occur during daytime periods, the resultant noise impacts are negative, slight and short to medium term.

During the Design Year (2043), an Indirect, Positive, Imperceptible, Long Term to Negative, Not Significant to Slight, Long Term change in traffic noise levels will occur along the surrounding road network outside of the Proposed Scheme. Whilst an element of traffic re-distribution will occur during daytime periods, the resultant noise impacts are Negative, Not Significant to Slight and Long Term. There are no significant residual Operational Phase noise or vibration impacts associated with the Proposed Scheme, whilst meeting the scheme objectives.

8.5 Population

The population assessment considered impacts on the local population, residents, communities and businesses within the study area. The Population study area comprised 10 community areas: Lucan, Rowlagh – Quarryvale, Palmerstown, Ballyfermot Upper, Chapelizod, Ballyfermot, Inchicore (Mary Immaculate), Inchicore (St Michael's), James's Street; and Halston Street.

Around the major transport corridors of the N4 National Road, the M50 Motorway and R148 Chapelizod Bypass residential areas within the communities of Lucan, Rowlagh – Quarryvale, Palmerstown and Ballyfermot have expanded. The highest number of community and recreational resources in the area are located in the community area of Lucan. Adjacent to the N4 National Road / M50 Motorway interchange, the Liffey Valley Shopping Centre forms a dominating feature in the area as a commercial hub, whilst key recreational resources include the Phoenix Park and the National War Memorial Park.

Towards the City Centre, in the James's Street community area, where a number of sites of archaeological, historical and cultural heritage interest are clustered, including the Royal Hospital Kilmainham, Dr Steevens' Hospital, the War Memorial Gardens, and Heuston Station and associated railway works, the community benefits from a considerable historic character. 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 businesses ability to operate successfully;
- Temporary and permanent land acquisition from residential properties, community facilities and commercial businesses including reduction of front gardens, 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 assessment concluded that there will be negative, not significant short-term impacts on the community facilities in the community areas of Lucan, Rowlagh – Quarryvale, Palmerstown, Chapelizod, Ballyfermot, Inchicore (Mary Immaculate) and James's Street during the Construction Phase. Neutral, not significant and short-term amenity impacts are expected in all other community areas (Ballyfermot Upper, Inchicore (St Michael's) and Halston Street) during the Construction Phase. Liffey Gaels GAA Club, located in Inchicore (Mary Immaculate), is expected to experience a negative, significant and short-term Construction Phase impact as it is adjacent to the location of Construction Compound LU3. The Hermitage Golf Club, located in Lucan community area, is

expected to experience a negative, moderate and short-term effect during construction due to land take required to undertake the works. Hermitage Park and Hermitage Medical Clinic, both also located in Lucan community area, are expected to experience a negative, slight and short-term effect during the construction phase. Overall, the impact of land take across the impacted community areas as a whole is considered negative, slight and short-term during the construction phase.

Positive, moderate to very significant and long-term impacts are expected on walkers, cyclists and bus users in the community areas of Lucan, Rowlagh – Quarryvale, Palmerstown, Ballyfermot Upper, Chapelizod, Inchicore (Mary Immaculate) and James's Street during the Operational Phase. Access to community facilities and commercial businesses via private vehicles along the Proposed Scheme is expected to be a positive, slight and long term impact in the community areas of Lucan, Rowlagh – Quarryvale, Palmerstown, Ballyfermot Upper, Chapelizod, Inchicore (Mary Immaculate) and James's Street. There will be negative, not significant and long-term commercial land take impacts in the community areas of Lucan, Palmerstown, James's Street and Rowlagh – Quarryvale. All other community areas are not expected to experience a change in access as the impact of redistributed traffic is neutral, not significant and long-term and is therefore not expected to change accessibility in the surrounding road network.

In achieving the aims and objectives of the Proposed Scheme, it will provide 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** Wider Determinants of Health (Source: Dahlgren and Whitehead 1991).

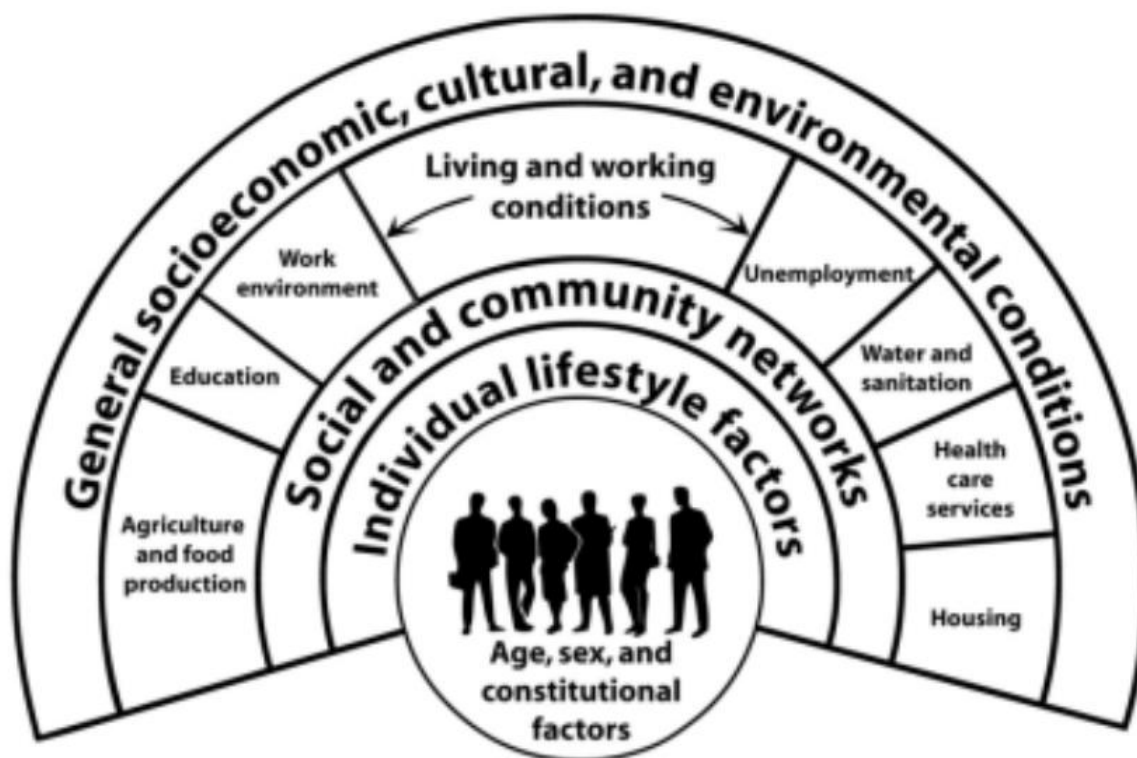


Image 8.1 Wider Determinants of Health (Source: Dahlgren and Whitehead 1991)

A related issue is that of the 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 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 Organisation 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 would 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 to the nearby residential population as a result of noise associated with the construction works. During the day there is risk of sleep disturbance due to construction noise for shift workers. 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. In addition, access to the Hermitage Medical Clinic will be maintained during the Construction Phase.

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 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 health outcomes have been identified as relevant for the Operational Phase of the Proposed Scheme.

8.7 Biodiversity

The biodiversity (ecology) assessment involved 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 will not overlap with any European site. The nearest European site to the Proposed Scheme is the Rye Water Valley/Carlton SAC, which is located approximately 4.3km west and upstream. The nearest European site with a direct hydrological connection to the Proposed Scheme is South Dublin Bay and River Tolka Estuary SPA, which is located approximately 4.4km downstream of the proposed crossing point on the River Camac, where habitats within these areas do not currently correspond to QI habitats, and / or habitats on which QI / SCI species of nearby habitats rely on for foraging, resting / roosting and / or commuting on.

The next nearest site is South Dublin Bay SAC, which is located approximately 5.4km downstream of the proposed crossing point on the River Camac.

The main habitats within the Proposed Scheme include tilled lands, flower beds and borders, buildings and artificial surfaces, tidal rivers, spoil and bare ground, recolonising bare ground, depositing/ lowland rivers, improved agricultural grasslands, amenity grassland (improved), dry meadows and grassy verges, residential, mixed broadleaved woodland, mixed broadleaf/conifer woodland, scattered trees and parkland, hedgerows, treelines, scrub, immature woodland and ornamental/ non-native shrub.

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

- Mixed broadleaved woodland, which is not common in the surrounding area and is relatively species-rich in the context of existing road corridor and surrounding built environment/habitats;
- Mixed broadleaved/conifer woodland, which is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats;
- Scattered trees and parkland, which is not common in the surrounding area and is relatively species-rich in the context of surrounding habitats;
- Hedgerows, which is not common in the surrounding area;
- Treelines, which is typically urban street planting along footpaths/ strips of amenity grassland and road edges;
- Scrub, due to single shrub species dominance and the relative lack of overall floristic diversity;
- Immature woodland, by virtue of its often monocultural planting and paucity of ground flora;
- Ornamental/ non-native shrub, due to its due to its anthropogenic nature and relative low species diversity;
- Three bat species (Leisler's bat, Common pipistrelle bat, Soprano pipistrelle bat);
- Potential Roost Features (locations where bats rest) in four trees which are located within the scheme boundary. All four trees will be retained in the Proposed Scheme;
- No evidence of badgers;
- No otter signs were found during survey;
- Common frog and smooth newt within 1km of the Proposed Scheme. This includes records of common frog at Palmerstown in 2020 and records of smooth newt at Dublin Castle;
- No evidence of reptiles; and
- A total of 115 breeding bird species and 15 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, bridge ramp, gantries and signage;
- Protection and/or diversion of buried services;
- Road widening, pavement reconstruction, and kerb improvements;
- Reconfiguration of traffic lanes throughout;

- Reconnection of existing and new drainage infrastructure into the existing surface water drainage infrastructure;
- Installation of new bus stops and junction modifications;
- Provision of new structures (bridges, retaining walls etc (e.g. replacement pedestrian and cyclist bridge over the N4 at Ballyowen Road; pedestrian bridge over the N4 at Liffey Valley Shopping Centre; widening of Chapelizod Hill Road bridge; and; retaining walls along the N4, including at Hermitage Golf Club and Hermitage Medical Clinic))
- Temporary and permanent land take at a number of key areas including;
 - Hermitage Golf Club- boundary wall and trees removed and relocated
 - The Hermitage Medical Clinic- boundary wall removed and relocated
 - SDCC Council compound at Junction 2 N4- temporary landtake here for provision of a construction compound
 - Amenity grassland at Palmerstown Bypass for provision of a construction compound
 - Amenity grassland at Liffey Gaels GAA Club for the provision of a construction compound
- Property boundary reinstatement, signage replacement; relocation of and/or 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 undertaking pre-construction surveys for bats and badgers, and providing replacement planting. 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 construction and operation will be not significant beyond the local level, with no significant adverse impacts predicted for any Special Conservation Interests of any European sites.

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 adversely affect the integrity of any European site.

Following the implementation of the mitigation measures, the Proposed Scheme will not result in any significant residual effects identified on its own, or cumulatively together with other proposed developments during the Operational Phase.

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_170; which rises to the south of the N7 in the vicinity of Crookshane and flows generally north to Rathcreedan, Blundelstown and Grange to Lucan. It is joined by several tributaries on the way and is approximately 16km long. It is within the Liffey Nutrient Sensitive Area.
- 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.
- 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; and
- Camac_040, which is approximately 14km long 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.

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

- Liffey_170: Good Ecological Status (GES) - At Risk of not maintaining GES;
- Liffey_180: Unassigned status - At Risk of not achieving GES;
- Liffey_190: Moderate Ecological status - At Risk of not achieving GES;
- Liffey Estuary Upper: Good Ecological Status - At Risk of not maintaining GES; and
- Camac_040: Poor status - At Risk of not achieving GES.

The surface water along the Proposed Scheme corridor currently drains into a surface water system which discharges into all of the waterbodies except Camac_040 and to 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 eastern (city centre) end of the Proposed Scheme will be in Flood Zone B where the probability of flooding from rivers and the sea is high.

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

During the Construction Phase, the water quality of all five 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, and the management of vehicles and plant. Additionally, site specific measures are proposed to avoid or reduce negative impacts related to the Construction Compounds, the works close to the Liffey_180 at the entrance to Hermitage Golf Club and the widening north of the N4 to accommodate the two-way cycleway and footway requiring the removal of trees at Hermitage Golf Club and Hermitage Medical Clinic.

Following the implementation of the mitigation measures no significant remaining 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 and geology and hydrogeology assessment involved 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 over 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) or 'Poor' (generally unproductive except for local zones), in terms of their ability to produce water.

As the Proposed Scheme is 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 with potential sources outlined and assessed.

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

- Loss or damage of topsoil;
- Excavation of potentially contaminated land;
- Loss of future quarry or pit reserve;
- Loss or damage/contamination of parts of an aquifer; and
- Change to groundwater regime.

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 Authorities 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 involved 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 eastwards from Ballyowen Road to the City Centre, along the N4 and R148 dual-carriageway roads, bypassing the historic village of Chapelizod. The proposed cycle track utilises parts of the old Lucan Road at Quarryvale and Palmerstown. The N4 road runs through the River Liffey valley, and though the modern urban and suburban landscape which now masks the original topography, the river and its catchment area played a significant role in attracting human activity and settlement from the prehistoric period onwards. The N4 road is said to follow an old routeway out of Dublin to the west (parts of the bypassed older road – the old Lucan Road – still survive in places), the *Slí Mór*, one of the five principal highways mentioned in the Annals of the Four Masters in the first century AD.

There are seven archaeological heritage features on the Records of Monuments and Places / Sites and Monuments Record, five on the Dublin City Industrial Heritage Record, and five cultural heritage assets 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;
- Piling; and
- Any excavations of soil, including landscaping works and ground disturbance for utility works, and grubbing up works.

There is the potential for the discovery of previously unknown below ground archaeological features, materials, and deposits along the Proposed Scheme.

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 during and prior to 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 impacts on archaeological and cultural heritage.

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.

The Liffey Valley attracted settlement from the earliest times, but remained largely rural in character, before the turn of the 20th century. Palmerstown, Chapelizod and Kilmainham were significant early settlements. Palmerstown and Chapelizod were ecclesiastical foundations, both relatively small, roadside villages with some early industrial expansion, supported by mills with mill races along the riverbanks. In the early nineteenth century there were two distinct settlement clusters which make up the modern Palmerstown. Along the Old Lucan Road, there was a small linear settlement with a chapel and school. Palmerstown takes its name from Ailred the Palmer. Between 1185 and 1188 Ailred the Palmer founded a priory and monastic hospital of Crutched Friars outside the West Gate of Dublin. Palmerston Demesne, later the Stewart Institute (NIAH 2273) and the associated townlands are known as Palmerston on Ordinance Survey maps, but the name of the village "Palmerstown Village" was formally approved at a Dublin City Council meeting in January 2015. Mill Lane followed the boundary of Palmerston Demesne linking this village to an older settlement at Palmerston Mills where there is a ruined medieval church (DU017-026001). The historic village of Chapelizod was also a medieval settlement, at an important crossing point on the Liffey. It was bypassed in the twentieth century and is largely outside the study area.

There was an early defensive structure which later developed into a country house with an associated demesne landscape. A demesne was land attached to a 'big house', retained by the landlord for their own use. It generally included woodlands, parklands and both formal and informal gardens. It was usually farmed, sometimes walled and always included gates and gate lodges linked to the main house by elaborate drives which were designed to impress, showing off the demesne and the house to best effect. The historic landscape character of the study area comprises a string of demesnes between the Old Lucan Road and the River Liffey including St. Edmondsbury, Woodville, Hermitage, Fonthill, Quarryvale, Brooklawn, Newtown Park (Riversdale), Palmerston, and Inchicore. The legacy of these landscapes is strongly felt in the modern streetscape, especially at Woodville which is retained as farmland, Hermitage which is in use as a golf course, Quarryvale, Brooklawn and Palmerston. All of these landscapes retain historic houses, boundary treatments and parkland. Inchicore House was demolished in the twentieth century, and its demesne disturbed for the construction of the Chapelizod Bypass and Con Colbert Road, but the parkland overlooking the river has been retained as open space, in use as a pitch and putt course and GAA pitches, and in part redeveloped as the Irish War Memorial Gardens.

Closer to the city at Kilmainham, the topography presented a strategic high point that led to the development of early defensive, military and medical buildings including the Royal Hospital, Dr Steevens' Hospital and Clancy Barracks.

The Royal Hospital is Dublin's earliest classical building. It was constructed as a hospital for veteran soldiers and is characteristic of military architecture in the late seventeenth century. It is the most architecturally significant building in the receiving environment. While the building is outside the study area boundary, its associated historic landscape and setting originally extended to the banks of the River Liffey, later curtailed by the construction of the Great Southern and Western Railway and Heuston Station, and then St. John's Road West. Its architectural interest is international.

The study area also is rich in industrial heritage, in the form of a 19th century Fonthill tram depot and power station which is the architectural legacy of the Dublin and Lucan Electric Railway that ran along the Lucan Road. Further identified industrial heritage sites are associated with the Great Southern and Western Railway which was constructed between 1844-9. These include railway bridges on Memorial Road, Inchicore and Con Colbert Road. Heuston Station is the most architecturally significant industrial heritage building in the study area. It was designed by Sancton Wood, also in the Classical Style, and completed c.1850. Its architectural interest is national.

The station is located opposite the Guinness Brewery which was established on James's Street in 1759 and expanded as far as Victoria Quay by 1901 when the St. James's Gate brewery was the largest in the world. There is an important vista down the River Liffey from Heuston Station with the quays, wharfs, and bridges of Victoria Quay and Wolfe Tone Quay also of architectural and industrial heritage value.

Most of the study area comprises six lane roads, and historic street furniture or surface finishes are rare. Features of note include three milestones on Old Lucan Road and three post boxes. There are some historic lamp standards at Heuston Station. 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 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 setting during the Construction Phase.

The mitigation 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; and
- The retention, protection where required, or replacement of trees along the Proposed Scheme.

Once the mitigation measures have been applied, there will be no significant residual impacts on the architectural heritage resource as a result of the Construction and Operational Phase of the Proposed Scheme.

8.12 Landscape (Townscape) & Visual

The landscape (townscape) and visual assessment included a desk-based review of publicly 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 of specific areas. Along the section of the Proposed Scheme from N4 Junction 3 to M50 Junction 7 the townscape is made up predominantly of two-storey residential suburbs, centred on outer-city village of Lucan and emerging town centre at Liffey Valley. There is a major river valley corridor along northern side of Proposed Scheme with large areas of open space and institutional land use. The road corridor is wide and is a key feature of the townscape. A number of open spaces, historic structures and Special Amenity Area Order (SAAO) areas add value but these are physically separated to an extent by adjacent areas of dense tree planting around the road corridor.

From the M50 Junction 7 to Con Colbert Road the townscape is characterised by outer city suburban areas and mixed residential, with local village character at Palmerstown, mixed use retail and services. The landscape of the area is classified as major river valley / open space. The R148 road corridor is wide and is a key feature of the townscape. A number of open spaces, historic structures, conservation areas and SAAO area add value but these are physically separated to an extent by adjacent areas of dense tree planting around the road corridor. There is some intervisibility with surrounding residential areas. (Old) Lucan Road passes through an area of suburban character but this is still influenced by the R148 corridor.

From Con Colbert Road to Frank Sherwin Bridge the area is characterised by inner city suburbs. There is a major open space to north, range of residential, modern multi-storey infill development and institutional uses throughout. The townscape has some elements and characteristics likely to be perceived as high value including high quality open spaces and historic structures.

Consideration of the potential landscape (townscape) and visual impacts have been important in defining the Proposed Scheme design. The scheme has undergone iterative design development with the aim of minimising potential negative impacts as far as practicable and this has also helped define suitable improvements to the urban realm.

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;
- Site demolition, including removal of boundaries, including boundary fences, walls and plantings within private areas. Removal of ramps, bridge structures, lighting, signage, gantries, kerbs, verges, surfaces, landscape areas, trees and plantings;
- Site activity and visual disturbance from general construction works and the operation of construction machinery both within the site and at the Construction Compounds;
- 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 construction of new carriageways, kerbings, bridges, footpaths and cycleways, bus stops, road gantries, lighting and signage, as well as 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 the temporary acquisition of land from 17 no. non-residential 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 and reinstatement of existing roadside boundary walls, railings, entrances 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 negative, moderate to significant, temporary/ short-term townscape/streetscape impacts on all sections of the Proposed Scheme during construction. There will also be neutral to very significant, negative, temporary/short-term townscape / visual impacts on features such as amenity designations, conservation areas, properties in temporary acquisition and trees and vegetation during the construction phase.

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

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

Alterations in the road corridor and changes in traffic, pedestrian and cycle movements are features of the Proposed Scheme, it is not anticipated that these aspects in themselves will give rise to significant landscape, townscape or visual effects. Changes in road corridors, including in traffic signalisation, signage, and in carriageway / parking allocation and traffic movements are a common and regular aspect of active road and traffic management for urban roads and streets. Therefore, these changes may be considered part of on-going or regular changes that may be expected to occur, and do occur, from time to time in any urban streetscape environment and such changes are considered as a low or negligible magnitude of change. The Proposed Scheme includes for replacement of disturbed boundaries, reinstatement of the Construction Compounds, return and reinstatement of temporary acquisition areas, and for additional tree and other planting where possible along the Proposed Scheme.

For conservation areas and protected structures, there will be neutral to positive, moderate and long-term streetscape and visual impacts during the Operational Phase (assessed at 15 years post construction). With regard to amenity designations (e.g., Hermitage Golf Club, Liffey Valley High Amenity Area, Dr. Steevens' Hospital, open space areas adjacent to Knockmaree Apartments and north of the R148 at Liffey Gaels), there will be townscape and visual impacts ranging from neutral, slight to moderate and long-term to positive, moderate and long-term (assessed at 15 years post construction).

The Proposed Scheme has been subject to an iterative design development process which has sought insofar as practicable to avoid or reduce negative impacts, including townscape and visual impacts.

In the Operational Phase localised residual impacts will remain for properties experiencing permanent land acquisition and in the loss of trees particularly at Chapelizod Hill Road, where there would be a negative moderate and long-term impact. There will be overall positive impacts for all sections of the scheme as the Proposed Scheme provides for improvements in the urban realm, which will provide positive long-term effects for the townscape and visual character, most notably along Old Lucan Road, along sections of the R148 and at the junction of Con Colbert Road and South Circular Road. The Proposed Scheme will represent a less car-centric urban realm providing for a significantly enhanced level of service for public transport and for pedestrian / cycle connectivity.

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. This 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 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 comprised 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;
- New street furniture, including traffic lights and bus stops, and landscaping works;
- Removal of boundary walls, fences and gate walls;
- Demolition of existing Ballyowen Road pedestrian bridge, construction of replacement Ballyowen Road combined pedestrian and cyclist bridge and new pedestrian bridge over the N4 to Liffey Valley Shopping Centre, widening Chapelizod Hill Road Bridge, and a number of significant and minor retaining walls;
- Minor utility diversions and / or protections 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, in so far as reasonably practicable. 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 the appointed contractor through the implementation of a Construction and Demolition Resource and Waste Management Plan. Approximately 2,000 tonnes of demolition waste will be generated as a result of the Proposed Scheme, which is equivalent to 0.02% of the construction and demolition 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 89,000, and is equivalent to 0.83% of the construction and demolition 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 Authorities 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 1,600 tonnes. The predicted impact of operational construction and demolition waste will be adverse, 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 potable 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 and associated infrastructure; bridges and gantry signage, and Road Authority traffic signal, street lighting, Intelligent Transport Systems (ITS) & CCTV ducting and associated infrastructure;
- The M50 motorway;
- Railway lines and associated infrastructure; and
- The Luas Red Line.

Within the site of the Proposed Scheme, material is currently 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:

- The 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;
- The Construction Compounds will require a water supply for welfare facilities and spraying to prevent dust, wherever necessary;
- The Construction Compounds will require telecommunications access;
- The diversion of electricity lines in areas where there will be interfaces with the Proposed Scheme works;
- Relocation of some traffic signals;
- 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 foul sewer lines where there will be interfaces with the Proposed Scheme works;
- The diversion of gas infrastructure where there will be an interface with the Proposed Scheme works;
- The diversion of telecommunications infrastructure where there will be interfaces with the Proposed Scheme works; and
- Importation of construction materials including concrete, metals, cement, road surface materials and landscaping materials. The amount of materials required for the Proposed Scheme will only represent less than one percent of the Irish quantities manufactured per year.

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

All possible precautions will be taken to avoid unplanned disruptions to any 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 in advance 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 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 Operational Phase impacts on gas and water 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. The following high risks were identified for the Construction Phase:

- Risk of pollution occurring to a watercourse or groundwater, most notably associated with the release of fine sediments during construction works; and
- Disruption to emergency response vehicles (fire, ambulance and guards).

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 structural damage / collapse of relocated structures;

- Risk of major road traffic accident resulting from a collision between construction traffic and public traffic, pedestrian and cyclist;
- Risk of accidents due to interface of construction works with other public transport infrastructure;
- Risk of spread of non-native invasive species during construction works, particularly during site clearance; and
- Risk of extreme weather events.

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, including the implementation of a Construction Environmental Response Plan and an Environmental Incident Response Plan. With the application of these mitigation measures, 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 Environmental 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 schemes. Traffic modelling of this scenario identified the potential for large cumulative impacts on local road traffic. 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.

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.

The Landscape (Townscape) and Visual assessment identified the potential for temporary indirect cumulative townscape and visual effects to occur as a result of other projects in conjunction with the Proposed Scheme should the construction periods either overlap or follow on within a short timeframe with the Proposed Scheme. Effects would be reduced or negligible if this is not the case. In most cases the potential impacts are likely to be localised and contained, due to the enclosing effect of the surrounding built form.

The Biodiversity assessment identified potential for significant residual cumulative effects with regards disturbance and displacement of non-SCI (Special Conservation Interest) breeding birds during construction and habitat loss for some projects in conjunction with the Proposed Scheme. However, these cumulative effects will be at the local geographical scale and short-term, as construction will be 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 Landscape (Townscape) and Visual assessment identified that while the implementation of the mitigation proposed in Chapter 17 of EIAR will assist in reducing cumulative effects and protecting retained features of value, there remains potential for slight / moderate short-term cumulative effects for five other Major Projects and the Liffey Valley to City Centre Core Bus Corridor scheme in conjunction with the Proposed Scheme. Medium and long-term cumulative effects are expected to be neutral or positive.

The only other significant operational cumulative impacts identified over and above the standalone scheme relate to human health. It was assessed that the proposals for the Lucan Luas, DART+ Programme South West, DART+ Tunnel Element (Kildare Line to Northern Line), Greater Dublin Area Cycle Network Plan, new bus interchange facility north of Liffey Valley Shopping Centre and the other Core Bus Corridor schemes are complementary and could have a cumulative beneficial effect by encouraging active travel and increased use of public transport through offering a choice of routes. Due to the substantial size of overall population with the opportunity to benefit from the proposals, the effect is assessed as positive, significant and long-term for health.

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.

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.lucanscheme.ie. This application may also be inspected 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.lucanscheme.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.