# Chapter 05
# Construction

## Contents

# 5. Construction

## 5.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the construction activities associated with the Belfield / Blackrock to City Centre Core Bus Corridor Scheme, hereafter referred to as the Proposed Scheme.

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

The NTA (the Employer for the construction works) shall set out the Employer's Requirements in the Construction Contract 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 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.

In order to allow an assessment of the construction stage impacts associated with the Proposed Scheme, this Chapter describes the construction phasing and programme as well as the construction activities necessary to undertake the works, including information on the Construction Compound, construction plant and equipment. This Chapter includes the following information:

- An overview of how the Proposed Scheme has been divided into sections is presented in Section 5.2;
- An overview of the construction activities proposed at each section along the Proposed Scheme (i.e., a description of what is proposed to be constructed) is presented in Section 5.3;
- A programme for the Proposed Scheme (i.e., when the sections will be constructed) is presented in Section 5.4;
- A general description of the construction methodology to be carried out at each section (i.e., how the Proposed Scheme will be built) is presented in Section 5.5;
- Information on the plant and equipment (i.e., what machinery will be used to construct the Proposed Scheme) is presented in Section 5.6;
- Information on the Construction Compound is presented in Section 5.7;
- The temporary traffic management measures, including the staging measures to be carried out (i.e., how the vehicles, cyclists and pedestrians will be impacted and safely catered for, during the works) are presented in Section 5.8; and
- Infrastructure projects and developments which are expected to interface with the construction of the Proposed Scheme are referenced in Section 5.9.

Details of mitigation measures proposed to address potential impacts arising from construction activities are described in Chapter 6 (Traffic & Transport) to Chapter 21 (Cumulative Impacts & Environmental Interactions) as appropriate and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

A Construction Environmental Management Plan (CEMP) has also been prepared and is included as Appendix A5.1 in Volume 4 of this EIAR. The CEMP will be updated by the NTA 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 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).

All of the measures set out in the CEMP appended to this EIAR will be implemented in full.

## 5.2 Construction Phasing

The Proposed Scheme has been divided into five primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 16 sub-sections, according to the types of construction works required. The sections / sub-sections are:

- **Section 1:** Stradbrook Road to Booterstown Avenue:
  - **Section 1a:** Stradbrook Road to Carysfort Avenue;
  - **Section 1b:** Carysfort Avenue to Phoenix Terrace; and
  - **Section 1c:** Phoenix Terrace to Booterstown Avenue.
- **Section 2:** Booterstown Avenue to Nutley Lane:
  - **Section 2a:** Booterstown Avenue to Elmpark Green Development; and
  - **Section 2b:** Elmpark Green Development to Nutley Lane.
- **Section 3:** Nutley Lane to Ballsbridge:
  - **Section 3a:** Nutley Lane to Shrewsbury Road;
  - **Section 3b:** Shrewsbury Road to Ballsbridge Park; and
  - **Section 3c:** Ballsbridge Park Junction.
- **Section 4:** Ballsbridge to Merrion Square:
  - **Section 4a:** Ballsbridge Park to Shelbourne Road;
  - **Section 4b:** Shelbourne Road Junction;
  - **Section 4c:** Shelbourne Road to Lansdowne Road;
  - **Section 4d:** Lansdowne Road Junction;
  - **Section 4e:** Lansdowne Road to Haddington Road;
  - **Section 4f:** Haddington Road to Fitzwilliam Street Lower; and
  - **Section 4g:** Fitzwilliam Street Lower.
- **Section 5:** Nutley Lane.

The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR. The construction activities to be carried out at each section / sub-section are described in Section 5.3.

## 5.3 Overview of Construction Works

The construction activities to be undertaken, and the anticipated duration of the works, in each section / sub-section are described in Section 5.3.1 to Section 5.3.5. The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR. This section should be read in conjunction with the drawings listed in Table 5.1. These drawings are contained in Volume 3 of this EIAR.

**Table 5.1: List of Relevant Drawings**

| Drawing Series Number | Description |
|---|---|
| BCIDC-ARP-GEO_HV-1415_ML_00-DR-CR-9001 | Mainline, Side Roads, Plan and Profile |
| BCIDC-ARP-LHT_RL-1415_XX_00-DR-EO-9001 | Street Lighting |
| BCIDC-ARP-DNG_RD-1415_XX_00-DR-CD-9001 | Proposed Surface Water Drainage Works |
| BCIDC-ARP-ENV_LA-1415_XX_00-DR-LL-9001 | Landscaping General Arrangement |
| BCIDC-ARP-STR_GA-1415_RW_01-DR-CB-9001 | Bridges and Major Retaining Structures |
| BCIDC-ARP-UTL_UD-1415_XX_00-DR-CU-9001 | IW Foul Sewer Asset Alterations |
| BCIDC-ARP-UTL_UE-1415_XX_00-DR-CU-9001 | ESB Asset Alterations |
| BCIDC-ARP-UTL_UT-1415_XX_00-DR-CU-9001 | Telecommunications Asset Alterations |
| BCIDC-ARP-UTL_UG-1415_XX_00-DR-CU-9001 | GNI Asset Alterations |
| BCIDC-ARP-UTL_UW-1415_XX_00-DR-CU-9001 | IW Water Asset Alterations |
| BCIDC-ARP-SPW_BW-1415_XX_00-DR-CR-9001 | Fencing and Boundary Treatment |

| Drawing Series Number | Description |
|---|---|
| BCIDC-ARP-TSM_SJ-1415_XX_00-DR-TR-9001 | Junction System Design Drawings |
| BCIDC-ARP-TSM_GA-1415_XX_00-DR-CR-9001 | Traffic Signs and Road Markings |
| BCIDC-ARP-PAV-PV-1415_XX_00-DR-CR-9001 | Proposed Pavement Construction |
| BCIDC-ARP-GEO_GA-1415_XX_01-DR-CR-9001 | General Arrangement |
| BCIDC-ARP-SPW_ZZ-1415_XX_00-DR-CR-9001 | Site Location Plan |
| BCIDC-ARP-GEO_CS-1415_XX_01-DR-CR-9001 | Typical Cross Sections |
| BCIDC-ARP-UTL_UC-1415_XX_00-DR-CU-9001 | Combined Existing Utility Records |

Further details on the design specifications, with regards to matters such as parking and loading bay widths, signalised junctions, priority junctions, bus stops, accessibility, traffic signals, lighting, utilities, drainage, pavement, and landscape design, can be found in the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors, contained in Appendix A4.1 in Volume 4 of this EIAR.

### 5.3.1 Section 1: Stradbrook Road to Booterstown Avenue

#### 5.3.1.1 Section 1a: Stradbrook Road to Carysfort Avenue

Section 1a encompasses a length of approximately 850m (metres) along Temple Hill, Temple Road, and Frascati Road, between Stradbrook Road and Carysfort Avenue. The construction activities at Section 1a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Some minor utility diversions and / or protections will be required. The expected construction duration will be approximately 11 months.

#### 5.3.1.2 Section 1b: Carysfort Avenue to Phoenix Terrace

Section 1b encompasses a length of approximately 725m along Frascati Road and Rock Road, between Carysfort Avenue and Phoenix Terrace. The construction activities at Section 1b will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The existing boundary wall approximately 200m in length at Blackrock Park will be demolished and a new boundary wall will be constructed. A portion of the new boundary wall will be a reinforced concrete retaining wall (RW01), approximately 97m in length and maximum 4m in retained height will be constructed. Further information on the retaining wall construction methodology is provided in Section 5.5.4.1.1. A fence will be erected, and a gate will be relocated adjacent to Blackrock Park. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed along Rock Road, particularly within Blackrock Park. The expected construction duration will be approximately 11 months.

#### 5.3.1.3 Section 1c: Phoenix Terrace to Booterstown Avenue

Section 1c encompasses a length of approximately 825m along Rock Road, between Phoenix Terrace and Booterstown Avenue. The construction activities at Section 1c will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A minor retaining wall (MRW1) approximately 30m in length and maximum 0.8m in retained height will be constructed at Section 1c. Boundary walls will be constructed along Glenalla, Castledawson Avenue, adjacent to Blackrock Clinic. The archway, gates, piers, boundary walls and railings at Blackrock College (DLR RPS 99, NIAH 2484) will be relocated. Further information on the Blackrock College Archway relocation methodology is provided in Section 5.5.4.2.1.1. The Construction Compound (BB1) will be located at Section 1c. A boundary wall, and gates along the Blackrock Park boundary will be relocated within the site of the Construction Compound (BB1). Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed at Blackrock Clinic and Blackrock College. The expected construction duration will be approximately 13 months.

## 5.3.2 Section 2: Booterstown Avenue to Nutley Lane

### 5.3.2.1 Section 2a: Booterstown Avenue to Elmpark Green Development

Section 2a encompasses a length of approximately 700m along Rock Road, and Merrion Road, between Booterstown Avenue and Elmpark Green Development. The construction activities at Section 2a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A new boundary wall will be constructed at the proposed Natural Heritage Areas (pNHA) associated with the Booterstown Marsh. Further information on the boundary wall relocation methodology is provided in Section 5.5.4.2.4. Gates and boundary walls will be relocated along the coastal side of Rock Road and Merrion Road. A protected Milestone on Rock Road (DLR RPS 8) abutting the existing wall of Booterstown Marsh will be preserved, with no footway reconstruction works proposed to be carried out on the coastal side of the Milestone. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed between Trimleston Avenue and Elmpark Green Development, on the coastal side of the carriageway. The expected construction duration will be approximately nine months.

### 5.3.2.2 Section 2b: Elmpark Green Development to Nutley Lane

Section 2b encompasses a length of approximately 900m along Merrion Road, between Elmpark Green Development and Nutley Lane. The construction activities at Section 2b will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A new boundary wall will be constructed at St Mary's Nursing Home on the Rock Road. A portion of the new boundary wall will be a miscellaneous retaining wall (MRW2) approximately 24m in length and maximum 0.9m in retained height. An archway and gate (referred to as the Merrion Gates Archway) associated with this boundary wall will be relocated, and a heritage plaque will be preserved and relocated. Further information on the Merrion Gates Archway relocation methodology is provided in Section 5.5.4.2.1.2. Boundary walls and gates will be relocated at 153 to 157 Merrion Road. An archway and gate (referred to as the Bloomfield Gates Archway) located outside the Gas Networks Ireland (GNI) operated Above Ground Installation (AGI) between the former Gowan Motors site (143 Merrion Road) and St Vincent's University Hospital will be relocated to the Nutley Lane, Merrion Road junction, along the boundary of St. Vincent's University Hospital. Further information on the Bloomfield Gate Archway relocation methodology is provided in Section 5.5.4.2.1.3. Fencing and gates will be erected at this location. A 10kV ESB substation, 3m deep and 4m wide, located between the former Gowan Motors (143 Merrion Road) and St. Vincent's University Hospital will be de-commissioned, and moved approximately 2m within the hospital lands. Trees will be removed along Section 2b, and hedgerows will be removed at St Vincent's University Hospital. The expected construction duration for Section 2b will be approximately 12 months.

## 5.3.3 Section 3: Nutley Lane to Ballsbridge

### 5.3.3.1 Section 3a: Nutley Lane to Shrewsbury Road

Section 3a encompasses a length of approximately 875m along Merrion Road, between Nutley Lane and Shrewsbury Road. The construction activities at Section 3a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A boundary wall approximately 40m in length will be relocated at Merrion Shopping Centre, and a boundary wall approximately 50m in length, and a gate will be relocated at 85 Merrion Road and along the Merrion View Avenue laneway. Some minor utility diversions and / or protections will be required. Trees will be removed along Section 3a, and vegetation will be removed at Merrion Court Apartments. The expected construction duration will be approximately eight months.

#### 5.3.3.2 Section 3b: Shrewsbury Road to Ballsbridge Park

Section 3b encompasses a length of approximately 750m along Merrion Road, between Shrewsbury Road and Ballsbridge Park. The construction activities at Section 3b will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Entry to Ballsbridge Avenue from Ballsbridge Park is proposed to be located at the current exit, while a new exit to the north is proposed through the existing hedgerow. A boundary wall and railings will be set back at Clayton Hotel Ballsbridge. Some minor utility diversions and / or protections will be required. Trees will be removed along Section 3b. The expected construction duration will be approximately 10 months.

#### 5.3.3.3 Section 3c: Ballsbridge Park Junction

Section 3c is located at the Ballsbridge Park, Merrion Road junction, including Anglesea Road. The construction activities at Section 3c will comprise realignment of the Ballsbridge Park junction, pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The vehicular access at the City of Dublin Educational Training Board (CDETB) will be relocated, and the internal roadway will be reconfigured. Further information on the CDETB accommodation works methodology is provided in Section 5.5.5.1. Trees and vegetation will be removed along Ballsbridge Park. The expected construction duration will be approximately three months.

### 5.3.4 Section 4: Ballsbridge to Merrion Square

#### 5.3.4.1 Section 4a: Ballsbridge Park to Shelbourne Road

Section 4a encompasses a length of approximately 175m along Pembroke Road, between the Ballsbridge Park and Shelbourne Road. The construction activities at Section 4a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The expected construction duration will be approximately three months.

#### 5.3.4.2 Section 4b: Shelbourne Road Junction

Section 4b is located at the Pembroke Road, Herbert Park, Shelbourne Road junction. The construction activities at Section 4b will comprise realignment of Shelbourne Road junction, pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Urban realm works will be carried out at this junction. The large variable message sign (VMS) will be relocated. Some minor utility diversions and / or protections will be required. A tree will be removed on Shelbourne Road, and trees and vegetation will be removed on Herbert Park. The expected construction duration will be approximately five months.

#### 5.3.4.3 Section 4c: Shelbourne Road to Lansdowne Road

Section 4c encompasses a length of approximately 400m along the Pembroke Road, between Shelbourne Road and Lansdowne Road. The construction activities at Section 4c will comprise pavement reconstruction, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. It is proposed to introduce a left turn only entry into Elgin Road from Ballsbridge resulting in improvements to the urban realm. The expected construction duration will be approximately five months.

#### 5.3.4.4 Section 4d: Lansdowne Road Junction

Section 4d is located at the Pembroke Road, Northumberland Road, Lansdowne Road junction. The construction activities at Section 4d will comprise realignment of Lansdowne Road junction, pavement reconstruction,

widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The kiosk located at the junction of Pembroke Road, Lansdowne Road and Northumberland Road will be carefully dismantled and re-erected at its new location at the same junction. The expected construction duration will be approximately five months.

#### 5.3.4.5 Section 4e: Lansdowne Road to Haddington Road

Section 4e encompasses a length of approximately 675m along Pembroke Road, and Baggot Street Upper, between Lansdowne Road and Haddington Road. Construction activities at Section 4e will also occur on side roads, such as Wellington Road, Waterloo Road and Eastmoreland Place. The construction activities at Section 4e will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Urban realm works will be carried out at Baggot Street Upper. Cellars, coal holes, and light wells along Baggot Street Upper will not be impacted. A vehicular access / egress at 1 to 11 Pembroke Road will be closed to vehicular traffic on Pembroke Road, and a new access / egress will be constructed on Waterloo Road. Further information on the vehicular access / egress modification works methodology is provided in Section 5.5.5.2. Some minor utility diversions and / or protections will be required. Trees and planters will be removed on Baggot Street Upper. The expected construction duration will be approximately five months.

#### 5.3.4.6 Section 4f: Haddington Road to Fitzwilliam Street Lower

Section 4f encompasses a length of approximately 455m along Baggot Street Lower, between Haddington Road and Fitzwilliam Street Lower, including the Macartney Bridge. The construction activities at Section 4f will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The existing granite kerbs will be retained, with the exception of a number of localised realignments where parking will be retained. The stepped access from the McCartney Bridge to the Grand Canal walkway, at the northwest corner of McCartney Bridge will be upgraded to a ramped access. As part of the upgrade works, a miscellaneous retaining wall (MRW3) approximately 42m in length and maximum 0.9m in retained height and railings will be constructed. Further information on the ramped access upgrade methodology is provided in Section 5.5.4.2.5. At 95 Baggot Street Lower an existing coal hole will be impacted. Other cellars along Baggot Street Lower will not be impacted. Some minor utility diversions and / or protections will be required. The expected construction duration will be approximately nine months.

#### 5.3.4.7 Section 4g: Fitzwilliam Street Lower

Section 4g encompasses a length of approximately 255m along Fitzwilliam Street Lower. The construction activities at Section 4g will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture. The existing granite kerbs will be retained, with the exception of a number of localised realignments. The expected construction duration will be approximately three months.

### 5.3.5 Section 5: Nutley Lane

Section 5 encompasses a length of approximately 830m along Nutley Lane, between Stillorgan Road and Merrion Road. The construction activities at Section 5 will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The existing boundary wall and access / egress gates at Eir Exchange and RTÉ Campus on Nutley Lane will be relocated. The existing hedgerow and fencing at St. Vincent's University Hospital will be relocated. The existing hedgerow and fencing at Elm Park Golf & Sports Club will be replaced with a reinforced concrete wall with climbing vegetation (e.g. ivy) planted on the road side, and a hedgerow reinstated on the golf course side. Various utility diversions and / or protections will be required; including a 280m diversion of a medium pressure

gas main. Trees and plantings will be removed along Nutley Lane. The expected construction duration will be approximately 10 months.

## 5.4 Construction Programme

A programme for the Proposed Scheme is provided in Table 5.2. The total Construction Phase duration for the overall Proposed Scheme is estimated at approximately 24 months. However, construction activities in individual sections will have shorter durations as outlined in Section 5.3. The programme identifies the approximate duration of works at each section. The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR.

**Table 5.2: Construction Programme**

| Section Ref. | Approximate Construction Duration | Approximate Length (m) | Year 1 | | | | Year 2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Section 1a | 11 months | 850 | | | | | | | | |
| Section 1b | 11 months | 725 | | | | | | | | |
| Section 1c | 13 months | 825 | | | | | | | | |
| Section 2a | 9 months | 700 | | | | | | | | |
| Section 2b | 12 months | 900 | | | | | | | | |
| Section 3a | 8 months | 875 | | | | | | | | |
| Section 3b | 10 months | 750 | | | | | | | | |
| Section 3c | 3 months | Junction | | | | | | | | |
| Section 4a | 3 months | 175 | | | | | | | | |
| Section 4b | 5 months | Junction | | | | | | | | |
| Section 4c | 5 months | 400 | | | | | | | | |
| Section 4d | 5 months | Junction | | | | | | | | |
| Section 4e | 5 months | 675 | | | | | | | | |
| Section 4f | 9 months | 455 | | | | | | | | |
| Section 4g | 3 months | 255 | | | | | | | | |
| Section 5 | 10 months | 830 | | | | | | | | |

In order to achieve the overall programme duration, it will for the most part, be necessary to work on more than one section / sub-section at any one time. The programme has been prepared with a view to providing as much separation as practicable between sections under construction at any given time. This has been done in order to minimise traffic disruption and facilitate the ease of movement of sustainable modes, bus services and goods along the Proposed Scheme.

## 5.5 Construction Methodology

This section provides an outline of how each element of the Proposed Scheme infrastructure will be constructed. It should be read in conjunction with the phasing set out in Section 5.3 and Section 5.4, and also with the traffic management stages set out in Section 5.8.

### 5.5.1 Pre-Construction

The NTA will prepare the Construction Contract documents, which will include all applicable mitigation measures identified in this EIAR, as well as any additional measures required in any conditions attached to An Bord Pleanála's decision, should they grant approval.

The preparations will also include the need for additional investigative survey works (such as ground investigation and slit trenching to confirm the location of existing utilities) to supplement the information in the Construction Contract documents. Any such additional investigative survey works that could be deemed to be construction activities will follow the requirements of the CEMP, where necessary.

The NTA will also serve notices on impacted landowners in accordance with the requirements of the Compulsory Purchase Order (CPO) process to ensure necessary lands are available for the construction works.

### 5.5.2 Preparatory and Site Clearance Works

Additional preparations will be required prior to commencing the road and street upgrade works, to confirm the construction methodology, such as additional investigative survey works (such as confirmatory invasive species surveys, ground investigation and slit trenching to confirm the location of existing utilities).

There will be elements of preparatory works, including establishing the Construction Compound, the installation of fencing and signage, vegetation clearance and treatment of non-native invasive species, demolition works (e.g., such as boundary walls) etc. required in preparation for the main construction activities.

#### 5.5.2.1 Land Acquisition and Boundary Treatment

Condition surveys of properties adjacent to the Proposed Scheme that the works have the potential to affect will be undertaken prior to works commencing. Liaison with impacted landowners will be carried out in advance of commencement of boundary works to properties.

Boundary works will be commenced where both permanent and temporary land acquisition is required to ensure that sufficient space is available to construct the Proposed Scheme. Boundary treatments will be carried out on a section-by-section basis (with sections / sub-sections defined in Section 5.2), and in line with the traffic management Stages set out in Section 5.8.3.

This will be a mixture of boundary walls / fencing along industrial / commercial land, railings along parks and temporary boundaries, as required. Any land temporarily acquired from a landowner will only be utilised for the purposes of undertaking boundary works or accommodation works related to the land in question.

Any lands acquired temporarily to facilitate construction work will be returned to landowners on completion of the works. Existing boundary walls or fencing being relocated will be constructed to match the existing conditions, unless otherwise agreed. The removal of trees, vegetation, lawns, paving etc. will be minimised in so far as practicable.

#### 5.5.2.2 Fencing

Fencing will be erected on a section-by-section basis (with sections / sub-sections defined in Section 5.2), and in line with the traffic management Stages set out in Section 5.8.3.

#### 5.5.2.3 Construction Traffic Management Measures and Signage

Prior to commencing the construction works described below within a sub-section of the Proposed Scheme, temporary traffic management measures will be installed. The temporary traffic management measures, including measures for pedestrians, cyclists, public transport users, general traffic, proposed lane closures, road closures and diversions are discussed in detail in Section 5.8 of this EIAR. Temporary traffic management signage will be put in place in accordance with the requirements of the Department of Transport's Traffic Signs Manual, Chapter 8, Temporary Traffic Measures and Signs for Roadworks (DTTS 2019), hereafter referred to as the Traffic Signs Manual. Further information is also provided in the Construction Traffic Management Plan (CTMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

#### 5.5.2.4 Tree Protection

Trees to be retained within and adjoining the works areas will be suitably protected as necessary as per 'British Standard (BS) 5837:2012 Trees in Relation to Design, Demolition, and Construction' (British Standards Institution (BSI) 2012). Trees identified for removal will be removed in accordance with 'BS 3998:2010 Tree Work. Recommendations' (BSI 2010). The location of trees to be retained, and trees to be removed is shown on the Landscaping General Arrangement drawings (BCIDC-ARP-ENV_LA-1415_XX_00-DR-LL-9001).

A suitably qualified arborist will be appointed by the contractor to monitor tree protection, and tree removal related activities. The design has been developed to ensure removal of trees has been minimised in so far as practicable. Where necessary, protective fencing will be erected, and mitigation measures will be put in place, prior to construction works commencing in the immediate vicinity.

Works required within the root protection area of trees to be retained will follow the arboricultural methodology included in Appendix A17.1 Arboricultural Method Statement in Volume 4 of this EIAR. Further information on mitigation measures with regards to the removal, and protection of trees is provided in Chapter 12 (Biodiversity)Chapter 12 (Biodiversity) and further information on the assessment of tree removal with regards to landscape and visual impact is provided in Chapter 17 (Landscape (Townscape) & Visual) of this EIAR.

#### 5.5.2.5 Vegetation Clearance and Treatment of Non-Native Invasive Species

Vegetation (e.g., hedgerows, scrub, grassland) clearance and treatment of non-native invasive species (e.g., Japanese knotweed, Himalayan balsam, Giant hogweed) will be undertaken within the Proposed Scheme boundary, where necessary.

A suitably qualified specialist will be appointed by the contractor to monitor vegetation clearance, and treatment of non-native invasive species. Prior to construction, confirmatory invasive species surveys will be undertaken by the specialist to re-confirm the presence and / or extent of species within the footprint of the Proposed Scheme. Further information with regards to pre-construction ecological surveys and restrictions are provided in Chapter 12 (Biodiversity) of this EIAR. Vegetation identified for removal will be removed in accordance with 'BS 3998:2010 Tree Work. Recommendations' (BSI 2010) and best arboricultural practices as detailed and monitored by the specialist. The Invasive Species Management Plan (ISMP) for the control of invasive plant species on the site Proposed Scheme is included in Appendix A5.1 CEMP in Volume 4 of this EIAR.

#### 5.5.2.6 Archaeological Investigations

The NTA will procure the services of a suitably qualified archaeologist as part of its Employer's Representative team administering and monitoring the works. In addition, a suitably qualified archaeologist will be appointed by the contractor to monitor archaeological and cultural heritage matters during construction; to acquire any licenses / consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Scheme in accordance with the Employer's Requirements. In the event of archaeological features or material being uncovered during the Construction Phase, all machine work will cease in the immediate area to allow the archaeologist time to inspect and record any such material. Further information on archaeological management is included in Section 15.5 in Chapter 15 (Archaeological & Cultural Heritage) of this EIAR.

#### 5.5.2.7 Ground Investigations

Prior to construction, localised confirmatory ground investigations will be undertaken to verify the results of the assessments, undertaken and reported in this EIAR.

Information on the specific ground investigations conducted along the Proposed Scheme have been outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) of this EIAR.

#### 5.5.2.8 Construction Compound

As part of preparatory works, the Construction Compound will be set up which will include installation of the necessary facilities including the site office, welfare facilities, etc. Controlled access to the Construction Compounds will be implemented, fencing will be erected, and lighting will be installed. The Construction Compound will be secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment. Temporary fencing will be erected, and site security will be employed. Further information on the Construction Compound is included in Section 5.7.

#### 5.5.2.9 Lighting

The majority of the Proposed Scheme route is already artificially lit, however temporary lighting will be required at times along the Proposed Scheme at certain locations during the Construction Phase, as necessary. Where it is necessary to disconnect public lighting during the construction works or to undertake works outside of daylight hours where existing lighting is low, appropriate temporary lighting will be provided. Temporary lighting will also be installed at the Construction Compound for the duration of the Construction Phase.

The standard of temporary lighting installed during the Construction Phase will meet the standard of the existing carriageway and will be appropriate to the speed and volume of traffic during construction. Temporary construction lighting will generally be provided by tower mounted floodlights, which will be cowled and angled downwards to minimise spillage of light from the site.

New permanent lighting and upgrades to the existing lighting infrastructure are also proposed as part of the Proposed Scheme's lighting strategy, the details of which are addressed in Section 4.6 (Key Infrastructure Elements) in Chapter 4 (Proposed Scheme Description) of this EIAR.

#### 5.5.2.10 Demolition

In some locations along the Proposed Scheme, items, such as walls, gates, fencing, lighting poles, bus stops, etc., will need to be removed or demolished. The impacts of materials arising from the Proposed Scheme demolitions are assessed in Chapter 18 (Waste & Resources) of this EIAR. Measures for managing demolition materials are included in the Construction Demolition Resource Waste Management Plan (CDRWMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

### 5.5.3 Road and Street Upgrades

#### 5.5.3.1 General

The Proposed Scheme will be constructed in a manner which will minimise, as much as practicable, any disturbance to residents, businesses and road users. Road and street upgrade works will be completed in a staged manner, as described in Section 5.8.3, whereby traffic of all modes will be managed to ensure construction can continue while ensuring the safety of all road users, and personnel, and maintaining flow of all modes of traffic wherever practicable.

#### 5.5.3.2 Parking and Access

When roads and streets are being upgraded, there will be some temporary disruption / alterations to on-street and off-street parking provision, and access to premises in certain locations along the Proposed Scheme. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with homes and businesses prior to construction starting in the area. The duration of the works will vary from property to property, but access and egress will be maintained at all times. The location of temporary land acquisition, proposed gates, and the relocation of existing gates are shown in the Fencing and Boundary Treatment Drawings (BCIDC-ARP-SPW_BW-1415_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

Access will be maintained for emergency vehicle along the Proposed Scheme, throughout the Construction Phase.

#### 5.5.3.3 Earthworks

Topsoil and subsoil will be excavated as part of the Proposed Scheme; for foundations, bus stop shelters, signs, public lights, traffic signal poles, tree pits etc. This topsoil and subsoil may be temporarily stored at the Construction Compound for reuse where practicable, in line with the principles of circular economy. The Proposed Scheme will aim to minimise the amount of materials brought onto the Proposed Scheme in so far as practicable. The acceptability of earthworks material for reuse will be determined, by testing and analysis, to determine if materials meet the specific engineering standards for their proposed end-use.

All earthworks will be managed having regard to the Transport Infrastructure Ireland (TII) Guidelines for the Management of Waste from National Road Construction Projects (TII 2017), and the Waste Management Act, 1996, as amended. The management of materials is discussed in Chapter 18 (Waste & Resources) of this EIAR. The overall estimated quantities of demolition, excavation, imported, and recycled fill for the Proposed Scheme are outlined respectively in Table 18.7, Table 18.8, Table 18.9, Table 18.13 in Chapter 18 (Waste & Resources) of this EIAR.

#### 5.5.3.4 Cellars

Excavations within the City Centre will be minimal thereby reducing the risk of interference with existing cellars along the Proposed Scheme. At certain locations cellars extend outwards from buildings into adjoining footpaths or streets. Cellars, coal holes and light wells have been identified at Section 4e, Section 4f and Section 4g. Cycle track construction works Section at 4f will impact one coal chute to a cellar on Baggot Street Lower, involving the lowering of the access chamber to the coal chute. Building condition surveys will be completed immediately prior to any works by the appointed contractor, and proposed works will be subject to discussion with identified property owners. Remedial and preventative measures may need to be undertaken to facilitate construction of the Proposed Scheme.

In the unlikely event that works are required to a cellar works would comprise of lowering the cellar roof, blocking up and backfilling a portion of the cellar or blocking up and backfilling the entire extent of the cellar. Such cellar works would generally commence with the excavation of the footpath. A concrete block wall would then be constructed within the cellar at the location of what is to be the new external wall of the cellar, before infilling.

#### 5.5.3.5 Drainage

Adjustment or upgrade works will be required to service chambers and manholes, gullies, etc. Access manholes located in the footways will be lowered or raised to match the proposed carriageway levels, where the carriageway will be widened into the existing footways.

Specific controls and mitigation measures will be put in place to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase of the Proposed Scheme. Further information with regards to drainage, and drainage design is included in Chapter 4 (Proposed Scheme Description), Chapter 13 (Water), Chapter 19 (Material Assets) and the Surface Water Management Plan (SWMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

#### 5.5.3.6 Utility Works

Realignment, upgrade or replacement of utilities and services will be required in conjunction with, or to accommodate the Proposed Scheme. Any such works to utilities and services will be along or immediately adjacent to the Proposed Scheme. A list of utility and service works along the Proposed Scheme is provided in Chapter 19 (Material Assets) of this EIAR.

Utilities and services, including overhead and underground, comprise amongst others:

- Water mains;
- Storm water and foul sewers;
- Fuel pipelines;

- Electricity ducts and cabling;
- Gas mains;
- Telecommunications and TV ducting and cabling; and
- Traffic signalling ducting and cabling.

The existing overhead utilities and services will be located and recorded prior to the commencement of works. Any relocation of existing overhead lines will be coordinated to ensure interruption to the existing network is minimised.

Proposed utility works are based on available records, and preliminary site investigations. Prior to excavation works being commenced, localised confirmatory surveys will be undertaken by the appointed contractor to verify the results of the pre-construction assessments undertaken and reported in this EIAR.

Areas to be excavated for utility trenches will first be traced for live services using established scanning techniques. Where necessary, trenches excavated for utility diversions will be supported to ensure that the sides of the excavation are secure. Each of the different utilities will be re-laid at a location, depth and spacing in accordance with the appropriate standards, and the trench then backfilled.

#### 5.5.3.7 Pavement and Carriageway Works

This section describes the pavement and carriageway works to be completed along the Proposed Scheme, including construction, or alterations to the carriageway, kerbs, parking and loading bays, footpaths, cycle tracks, cycle lanes, bus stops (island, shared landing area, inline, layby) etc. The following options outline the pavement construction / reconstruction scenarios required along the Proposed Scheme:

- Where the existing road surfacing is showing signs of deterioration, the existing pavement will be replaced (i.e., road pavement and surfacing will be removed and replaced to similar levels as existing);
- Where the quality of the existing road pavement is poor or where the existing road will be widened, full depth road foundation and pavement reconstruction will be carried out; and
- In some instances, road overlay (i.e., the addition of new pavement / road surfacing material), with no excavation, will be provided.

The proposed pavement treatment along the Proposed Scheme is provided in the Proposed Pavement Construction Drawings (BCIDC-ARP-PAV-PV-1415_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

Existing asphalt / bituminous layers will be removed using road planers, with planings being recycled where possible, as is common practice. Following this, existing lower courses of road make-up or ground will be excavated in layers using mechanical excavators in order to segregate materials for reuse, recycling, or disposal as appropriate, with materials being transported using lorries. The new or rehabilitated pavement will then be constructed from formation level, in coordination with the installation of street furniture assets. Plant used in construction of the new road make-up will be excavators, rollers, dumpers, and lorries, as detailed in Section 5.6. Specialist road paving machines will be used to lay bituminous layers. Road markings and reflective road studs will also be installed.

The choice of materials will include unbound or hydraulically bound granular materials for the foundation, hydraulically bound materials, hot or cold bituminous mixtures for base and binder layers and natural stone or concrete paving units, bituminous mixtures or concrete materials for the surface. Specialist products such as high friction surfacing treatments will also be applied to the surface of the pavement where appropriate.

#### 5.5.3.8 Traffic Signal Junctions

During the works, the existing traffic signals will remain in operation, supplemented as necessary by temporary traffic signals, until such time as the new signals become operational.

The existing signalised junctions along the Proposed Scheme will be upgraded to provide bus priority, enhanced pedestrian crossings and segregated cycling facilities. In general, traffic signals will be replaced, and additional dedicated signals will be provided for buses, cyclists and pedestrians. Underground works will be required to provide additional ducts for traffic signal electrical and telecommunication cables, as described in Section 5.5.3.6, with associated chambers and control boxes above ground. Additional traffic monitoring equipment will be provided, including CCTV cameras and other detectors.

#### 5.5.3.9 Ancillary Road Furnishings

The appointed contractor will install street furniture such as rubbish bins, signage, seats, lighting, benches, planters, bollards, cycle racks and bus stops (including shelters and information displays etc.).

#### 5.5.3.10 Landscaping

Where vegetation, grassed areas and hedgerows are disturbed during the works, these will be reinstated, and replaced, where practicable. New trees will be planted, in suitable tree pits where necessary, at various locations as shown in the Landscaping General Arrangement Drawing (BCIDC-ARP-ENV_LA-1415_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

### 5.5.4 Structural Works

#### 5.5.4.1 Principal Structures

5.5.4.1.1 Retaining Wall (RW01)

Retaining walls with a retained height greater than 1.5m are classed as principal structures. There is one principal retaining wall along the Proposed Scheme, as detailed in Table 5.3.

**Table 5.3: Retaining Walls along the Proposed Scheme**

| Structure Reference | Structure Type | Details | Chainage (m) | Length (m) | Max Retained Height (m) | Structure Reference |
|---|---|---|---|---|---|---|
| RW01 | Reinforced Concrete Retaining Wall | Supports the road embankment at Blackrock Park | A1360 to A1450 | 97.5 | 4.0 | Section 1b |

Along with the removal and reconstruction of the existing boundary wall at Blackrock Park, the existing retaining wall will be demolished, and a new retaining wall (RW01) will be constructed to facilitate carriageway widening on Rock Road. This wall will support the road embankment on Rock Road, which borders Blackrock Park.

The retaining wall will be constructed from the roadside, with temporary land acquisition within Blackrock Park of maximum 4m beyond the proposed new boundary. However, where minor works at the toe of the wall is required, small plant (e.g. a mini digger) will be brought through Blackrock Park via the existing concrete paving.

The retaining wall will be constructed of reinforced concrete, clad with rubble, and capped with Leinster granite. Construction will commence with firstly isolating the site of the retaining wall using fencing, as appropriate, to the location. The existing ground will then be stripped to formation level. Existing services will be diverted as required to enable wall construction. A side slope will be battered back to enable construction. Blinding will be installed at formation level. Reinforcing steel for the wall will be fixed in place. Then concrete will be poured in sections. After a curing period the area behind the wall will be in-filled.

#### 5.5.4.2 Miscellaneous Structural Works

The miscellaneous structural works which form part of the Proposed Scheme are summarised in Table 5.4. Further details are provided in Section 5.5.4.2.1 to Section 5.5.4.2.5.

**Table 5.4: Miscellaneous Structures**

| Structure Name | Structure Reference | Section Reference |
|---|---|---|
| Archways | Blackrock College Archway | Section 1c |
| | Merrion Gates Archway | Section 2b |
| | Bloomfield Gate Archway | Section 2b |
| Retaining Walls | MRW1 | Section 1c |
| | MRW2 | Section 2b |
| | MRW3 | Section 4f |
| Pembroke Kiosk | N/A | Section 4d |
| Booterstown Marsh pNHA Boundary Wall | N/A | Section 2a |
| Grand Canal Walkway | N/A | Section 4f |

5.5.4.2.1 Archways

5.5.4.2.1.1 Blackrock College Archway

The existing railings and boundary wall to Blackrock College (DLR RPS 99, NIAH 2484) on Rock Road will be carefully dismantled and re-erected at the back of the proposed footpath. The gates, railings, and piers forming the existing entrance to Blackrock College (DLR RPS 99, NIAH 2484) are to be rotated on the westernmost pier to accommodate the realignment of the adjacent boundary while preserving the symmetry of the protected entrance. Refer to Chapter 16 (Architectural Heritage) for further detail. The railings, granite plinths, granite piers and ironwork will be recorded in detail, labelled, and carefully taken down. The materials will be stored in a secure location during the Construction Phase. The railings, plinths, gate piers and ironwork will be reinstated along the new alignment as per the detailed survey.

5.5.4.2.1.2 Merrion Gates Archway

The existing cut stone masonry archway located outside the Telford Nursing Home on the Merrion Road at the Merrion Gates junction will be carefully dismantled and re-erected at the back of the proposed footpath, along with the adjacent retaining wall (MRW2), boundary wall and railings. An existing heritage plaque within the existing wall will also be preserved and relocated within the relocated wall. Refer to Chapter 16 (Architectural Heritage) for further detail. The archway will be recorded in detail, labelled, and carefully taken down. The materials will be stored in a secure location during the Construction Phase. Samples of render and mortar will be taken for replication. Any necessary conservation works, or repairs to the ironwork and stone name plaques, will be carried out at this stage. The gateway will then be reinstated along the new alignment as per the detailed survey.

5.5.4.2.1.3 Bloomfield Gate Archway

The existing cut stone masonry archway (referred to as the Bloomfield Gate) located outside the Gas Networks Ireland (GNI) Above Ground Installation (AGI), between 143 Merrion Road (former Gowan Motors site) and St. Vincent's University Hospital will be carefully dismantled and re-erected in an adjacent area along the northern boundary of St. Vincent's University Hospital, sited within the existing hedge fronting onto the plaza at the junction of Merrion Road and Nutley Lane. Refer to Chapter 16 (Architectural Heritage) for further detail. The archway will be recorded in detail, labelled, and carefully taken down. The materials will be stored in a secure location during the Construction Phase. The archway will be reinstated along the new alignment as per the detailed survey. Access arrangement and parking at the GNI AGI will be amended as part of the works, however protective measures will be carried out while works are carried out in the vicinity of the GNI AGI. A new gateway and boundary treatment will be constructed at the GNI AGI location.

5.5.4.2.2 Retaining Walls

Retaining walls with a retained height less than 1.5m are classed as minor structures. There are three minor retaining walls along the Proposed Scheme, as detailed in Table 5.5. Retaining walls are typically installed to cater for level differences between the road and adjoining lands. Retaining walls will be constructed as described in Section 5.5.4.1.1.

**Table 5.5: (Minor) Retaining Walls along the Proposed Scheme**

| Structure Reference | Chainage (m) | Length (m) | Max Retained Height (m) | Section Reference |
|---|---|---|---|---|
| MRW1 | A1685 to A1715 | 30 | 0.8 | Section 1c |
| MRW2 | A3410 to A3435 | 24 | 0.9 | Section 2b |
| MRW3 | A6925 | 42.3 | 0.9 | Section 4f |

5.5.4.2.3 Pembroke Kiosk

As mentioned previously, the kiosk located at the junction of Pembroke Road, Lansdowne Road and Northumberland Road will be carefully dismantled and re-erected at its new location at the same junction. The kiosk will be set back, to facilitate a new junction layout at this location, and the new kiosk will be sited within the proposed urban realm landscaped area, alongside the junction. Refer to Chapter 16 (Architectural Heritage) for further information on the mitigation measures to be implemented for the dismantling and re-erection of the kiosk.

5.5.4.2.4 Booterstown Marsh pNHA Boundary Wall

The carriageway will be widened on Rock Road between Trimleston Avenue to Elmpark Green Development on the coastal side of the carriageway, and as such a new boundary wall will be constructed along the proposed carriageway. Construction of the new boundary wall will require limited works to be carried out within the Booterstown Nature Reserve. Booterstown Marsh and the nearby Booterstown Stream are located within a pNHA (Booterstown Marsh) and a Special Protection Area (SPA) (the South Dublin Bay and River Tolka Estuary SPA).

The proposed works will partially occur within the Booterstown Marsh pNHA; however no works will be carried out beyond the hardstanding surface areas within the South Dublin Bay and River Tolka Estuary SPA. Booterstown Marsh and Booterstown Stream will not be impacted by the works. At this location the Booterstown Stream is not an open stream but is enclosed within a concrete culvert.

Encroachment into the pNHA at this location has been minimised through removal of the existing dedicated right turn lane into St. Helen's Road, south of Trimleston Avenue (noting the right turn movement is still to be permitted from the general traffic lane), thus reducing the proposed cross section width.

Permanent land acquisition as part of the works at this location will be required within the pNHA of approximately 1,020m$^2$ of which approximately 982m$^2$ is of pre-existing hard surface area. Temporary land acquisition to enable construction at this section of 80m$^2$ is proposed, which corresponds to a 2m setback along the permanent boundary along the pNHA. This is a reduced construction area setback immediately adjacent to the pNHA from the 5m proposed elsewhere.

The boundary wall will be constructed from the roadside, in order to minimise encroachment. During initial construction works, plant will likely track along the area between the proposed new boundary wall and the temporary fence-line for the purpose of installing the fence, however, during construction of the carriageway widening and new boundary wall, working within the temporary land area will be minimised to construction workers and hand tools. This area will be reinstated with topsoil when the temporary fence is removed.

Information on drainage mitigation measures to be put in place at Booterstown Marsh is provided in Chapter 13 (Water) and in the CEMP in Volume 4 of this EIAR.

5.5.4.2.5 Grand Canal Walkway

The stepped and steep access from the McCartney Bridge to the Grand Canal walkway, at the northwest corner of Macartney Bridge will be upgraded, to a ramped access, to improve accessibility at the existing access, which is currently in disrepair. This upgrade works will facilitate safe access for all pathway users, particularly for the mobility impaired.

As part of the upgrade works, a minor retaining wall (MRW3) approximately 42m in length and maximum 0.9m in retained height and railings will be constructed. The top of the proposed retaining wall will protrude 150mm above the ramp surface, to act as a continuous upstand (upward projection). The upstand will form the southern edge of the walkway and will accommodate a handrail approximately 1.2m in height. The retaining wall will facilitate the

ramp being raised above the existing canal bank and mitigate against extensive regrading of the bank towards the canal.

Temporary land acquisition of 2m beyond the proposed tie-in to the existing walkway and extending to the bottom of the existing embankment will be required. The ramp and retaining wall will be constructed from the landside, rather than in-stream or from the canal side i.e., no works are envisaged along the embankment. It is considered prudent to include such temporary land acquisition to allow for ongoing structural assessment of the existing Macartney Bridge wingwall during construction, or in the case that protective works are required to the existing wingwall or embankment.

The existing wingwall of McCartney Bridge will be retained, and the retaining wall will be constructed along the southern edge of the proposed ramp, abutting the existing wingwall at a localised pinch point. Fencing, to prevent any potential run-off from the construction area into the canal will be installed. Formation materials and concrete will be delivered from the Baggot Street end.

The retaining wall will be constructed of poured in-situ concrete. The retaining wall will be constructed by first isolating the site of the wall using fencing. The existing ground will then be stripped to formation level. An existing 220kV oil filled underground electricity cable will be protected during the wall construction. The side slope will be battered back to enable construction. Blinding will be installed at formation level. Steel for the wall will be fixed in place. Then concrete will be poured in sections. After a curing period, the area behind the wall will be in-filled using structural fill material. The ramped walkway will then be constructed, with only small plant of mini-excavators and dumpers utilised. The base plates and fixings of the handrail will then be affixed, and the handrail installed.

### 5.5.5 Vehicular Access Modifications

#### 5.5.5.1 City of Dublin Educational Training Board

The existing vehicular access / egress at the City of Dublin Educational Training Board (CDETB) will be relocated from the junction of Merrion Road and Anglesea Road to Anglesea Road. The existing vehicular access / egress will be retained for pedestrian and cyclists only. The internal roadway arrangement, including the parking and footpath will be reconfigured.

The proposed vehicular access will be located at an existing pedestrian gate. A railing, approximately 6m in length and an existing pedestrian gate and pier will be removed, to facilitate the proposed vehicular access / egress. The new internal roadway will require full depth construction of new pavement along with construction of new kerbs throughout the existing grassed area within the property.

The proposed configuration requires the relocation of three parking spaces. These parking spaces will be provided within the existing grassed area, requiring excavation of the grassed area and construction of parking bays and kerbs. The proposed alternative access arrangement would retain the second pedestrian gate and will provide a new path internally, as well as retaining the path along the building edge. Plant to be used for the works will include a mini-excavator, asphalt paver and roller, and a dumper.

#### 5.5.5.2 1 to 11 Pembroke Road

The existing vehicular access / egress at 1 to 11 Pembroke Road will be relocated from Pembroke Road to Waterloo Road. The existing vehicular access / egress will be retained for pedestrian and cyclists only. The existing vehicular access / egress will not be altered and the entrance road along the eastern boundary of the site will remain as it is presently. A new bollard will be installed at the existing access / egress to prevent vehicles from using the access / egress. The garden area and driveways will remain unchanged. At the location of the new access / egress, the stone plinth will be removed on either side of the existing pedestrian gate and the existing railing will be amended to facilitate the new vehicular access / egress. Local excavation to facilitate the installation of a new control system for the gates will be required. Plant to be used for the works will include a mini-excavator and a dumper.

### 5.5.6 Construction Site Decommissioning

On completion of construction, all construction facilities and equipment such as plant, materials, temporary signage, and laydown areas, and the Construction Compound etc. will be removed. The area which was occupied by the Construction Compound will be reinstated – refer to the Landscaping General Arrangement drawings (BCIDC-ARP-ENV_LA-1415_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

## 5.6 Construction Plant and Equipment

In order to assess a reasonable worst case Construction Phase impact scenario, with regards to air quality, noise and vibration, an estimate of construction plant and equipment that will be necessary to construct the Proposed Scheme has been prepared. The estimated peak daily numbers of principal items of plant and equipment working within a section is indicated in Table 5.6. It should be noted that these are peak daily numbers.

The appointed contractor will select and utilise plant and equipment in a manner that ensures Construction Noise Thresholds, as defined in Chapter 9 (Noise & Vibration) of this EIAR, are not exceeded. Refer to Chapter 7 (Air Quality) and Chapter 9 (Noise & Vibration) of this EIAR for the Construction Phase air quality and noise and vibration assessments, and associated mitigation measures.

**Table 5.6: Estimated Peak Daily Plant and Equipment Numbers**

| Plant / Equipment | Plant and Equipment Numbers per Section | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | **1a** | **1b** | **1c** | **2a** | **2b** | **3a** | **3b** | **3c** | **4a** | **4b** | **4c** | **4d** | **4e** | **4f** | **4g** | **5** |
| Lorry | 12 | 10 | 10 | 10 | 12 | 10 | 10 | 6 | 8 | 6 | 12 | 6 | 14 | 10 | 6 | 14 |
| Backhoe Mounted Hydraulic Breaker | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 2 |
| 8t Excavator | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 4 | 2 | 3 | 4 | 2 | 3 |
| 13t (Rubber Wheeled) Excavator | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 3 | 4 |
| 16t (Rubber Wheeled) Excavator | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| 6t Dumper | 6 | 4 | 4 | 6 | 6 | 4 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 4 | 2 | 4 |
| Road Planer | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| Road Sweeper | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 2 |
| Asphalt Paver | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Asphalt Roller | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 3 |
| 3t Roller | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 2 |
| 50t Crane | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

## 5.7 Construction Compound

In order to construct the Proposed Scheme, the appointed contractor will require a Construction Compound from which they can manage the delivery of the Proposed Scheme.

### 5.7.1 Construction Compound Location

The location of the Construction Compound in relation to the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR. The Construction Compound (BB1) will be located in Booterstown Car Park, within Blackrock Park, along the R118, opposite Willow Terrace, as shown in Image 5.1.

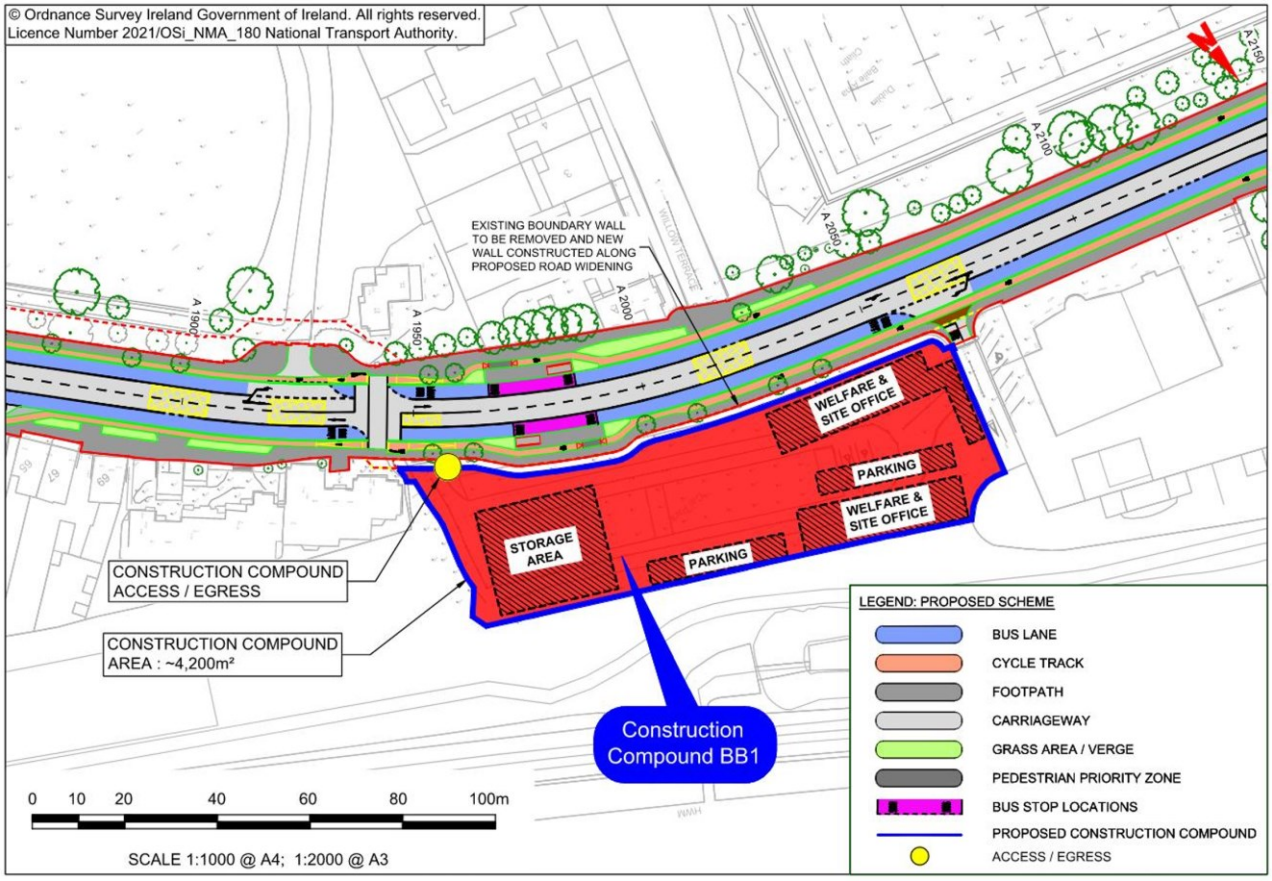


**Image 5.1: Location, Extent and Layout of Construction Compound BB1**

The Construction Compound location has been selected due to the amount of available space at this location, its location near the majority of the Proposed Scheme major works and its access to the National and Regional Road network. Refer to Chapter 6 (Traffic & Transport) of this EIAR for an assessment of the construction traffic.

The area of Construction Compound is approximately 4,200m$^2$.

### 5.7.2 Construction Compound Activities

As shown in 5.7.1, the Construction Compound will contain a site office, and welfare facilities for NTA personnel and contractor personnel. Limited car parking will be allowed at the Construction Compound, in line with the principles of the Construction Stage Mobility Management Plan (CSMMP), as described in Appendix A5.1 CEMP in Volume 4 of this EIAR, which will be prepared by the appointed contractor. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the Construction Compound for reuse as necessary. Items of plant and equipment, described in Section 5.6, will also be stored within the Construction Compound.

All necessary authorisations, under the Waste Management Act 1996, as amended, will be obtained prior to undertaking temporary storage. Further information on the reuse of material within the Proposed Scheme is included in Chapter 18 (Waste & Resources) of this EIAR. Further information on air quality, and noise and vibration assessments, and associated mitigation measures at the Construction Compound is included in Chapter 7 (Air Quality) and Chapter 9 (Noise & Vibration) of this EIAR.

### 5.7.3 Construction Compound Services

The Construction Compound will be fenced off, lit (during working hours) and secured with CCTV, as described in Section 5.5.2.8. Temporary lighting, including security lighting will be required at the Construction Compound,

as described in Section 5.5.2.9. Access to the Construction Compound will be restricted to site personnel and authorised visitors only.

The Construction Compound will be engineered with appropriate services. Water, wastewater, power, and communications connections will be organised by the appointed contractor. At work areas along the Proposed Scheme, where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary provisions will be made, including the use of generators if required. Temporary welfare facilities will need to be used, for example, portable toilets in the vicinity of works. Wastewater from temporary welfare facilities will be collected and disposed of to a suitably licenced facility.

Appropriate environmental management measures will be implemented at the Construction Compound for example, to minimise the risk of fuel spillage, and to ensure that the Construction Compound and the approaches to it are appropriately maintained. Further information on the air quality, noise and vibration, and water related mitigation measures that will be implemented are described in Chapter 7 (Air Quality), Chapter 9 (Noise & Vibration) and Chapter 13 (Water) of this EIAR.

Following completion of the construction works, the Construction Compound area will be cleared and reinstated to match pre-existing conditions.

## 5.8 Construction Traffic Management

The Construction Traffic Management Plan (CTMP) has been prepared to facilitate the assessment of the potential impacts on traffic and transport along the Proposed Scheme. The CTMP includes details of the temporary traffic management measures that will be implemented during the construction of the Proposed Scheme.

The staging of construction and associated temporary traffic management measures has considered the receiving environment when developing the schedule of works.

The CTMP has given due consideration to facilitate the maximum practicable movement of people during the construction period through implementing the following hierarchy of transport mode users:

- Pedestrians;
- Cyclists;
- Public Transport; and
- General Traffic.

Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

The construction traffic management measures have been developed in accordance with the Traffic Signs Manual. Construction traffic management measures are summarised in Section 5.8.1 to Section 5.8.3, with further details (such as routing of construction vehicles, timings of material deliveries, etc.) included in the CTMP in Appendix A5.1 CEMP in Volume 4 of this EIAR.

### 5.8.1 Pedestrian and Cyclist Provisions

The measures set out in Section 8.2.8 of the Traffic Signs Manual will be implemented, wherever practicable, to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users) and cyclists. Therefore, where footpaths or cycle facilities are affected by construction, a safe route will be provided past the works area, and where practicable, provisions for matching existing facilities for pedestrians and cyclists will be made.

### 5.8.2 Public Transport Provisions

Existing public transport routes will be maintained throughout the duration of the Construction Phase of the Proposed Scheme (notwithstanding potential for occasional road closures / diversions as discussed in Section 5.8.4). Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes will be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Scheme. Some existing bus stop locations will need to be temporarily relocated to accommodate the works. In such cases, bus stops will be safely accessible to all users and all temporary impacts on bus services will be determined in consultation with the NTA and the service providers.

### 5.8.3 General Traffic Provisions

The roads and streets along the Proposed Scheme, will remain open to general traffic wherever practicable during the Construction Phase; however lane closures, road closures and diversions will be necessary to facilitate construction.

Two-way traffic will generally be maintained along the Proposed Scheme, however in circumstances where there is not sufficient road width to allow two-way traffic (e.g. reduced lane width), single lane traffic controlled by a stop / go system of temporary traffic lights will be implemented with priority provided to traffic travelling towards the City Centre during the morning, and reversed during the afternoon where appropriate. Lane closures and route diversions will supplement this system if traffic volumes are heavy. Short delays may occur outside of the AM and PM peaks, for example as a result of vehicles accessing the works.

For most of the Proposed Scheme the existing carriageway width is sufficient to maintain full width two-way traffic throughout the works. However, where the carriageway width is restricted, at various sections throughout the Proposed Scheme, the construction works will be split into traffic management stages as described in Section 5.8.3.1 to Section 5.8.3.7.

#### 5.8.3.1 Section 1: Stradbrook Road to Booterstown Avenue

5.8.3.1.1 Section 1a: Stradbrook Road to Carysfort Avenue

The works at Section 1a will be undertaken in three traffic management stages:

- Stage 1 – Construction works at the central reservation, traffic reduced to single lane in each direction, and realigned to the verges, as shown in Image 5.2;
- Stage 2 – Construction works at the verges, traffic reduced to single lane in each direction, and realigned to the central reservation, as shown in Image 5.3; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

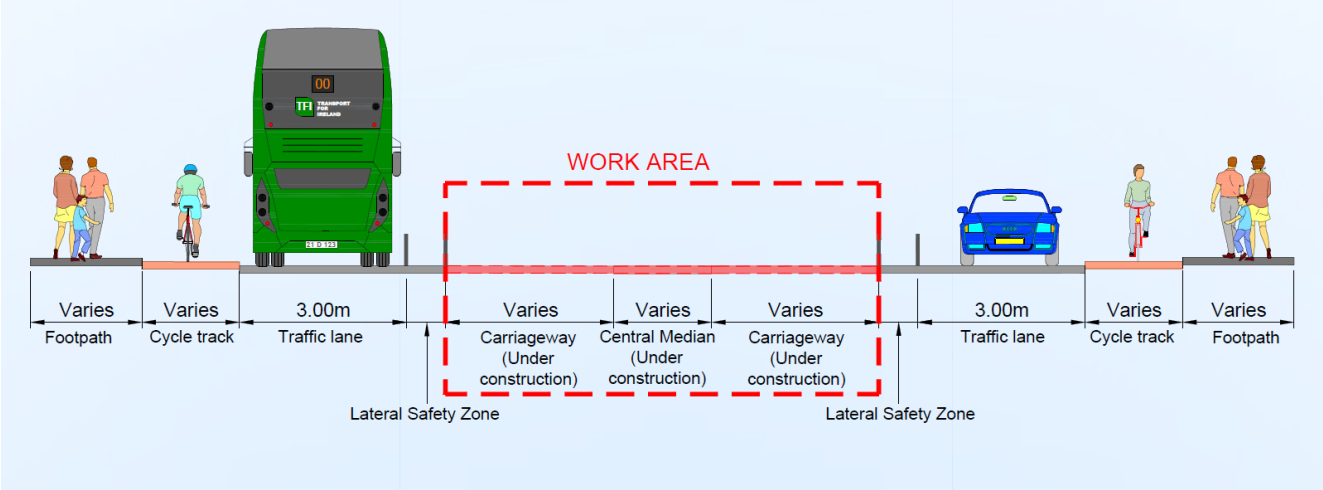


**Image 5.2: Traffic Management Cross Section, Section 1a – Stage 1**

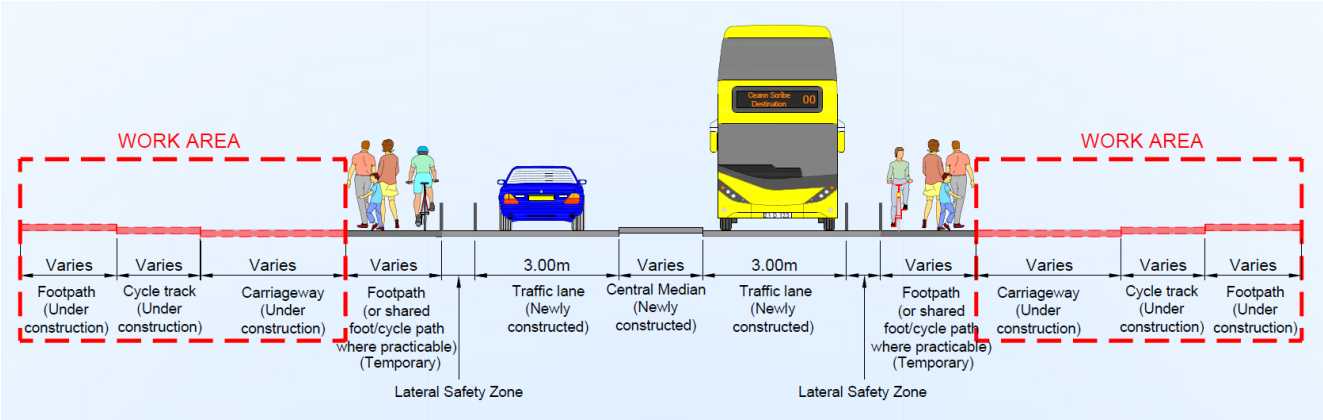


**Image 5.3: Traffic Management Cross Section, Section 1a – Stage 2**

### 5.8.3.2 Section 1b: Carysfort Avenue to Phoenix Terrace

The works at Section 1b will be undertaken in four traffic management stages:

- Stage 1 – Construction works at the central reservation, traffic reduced to single lane in each direction, and realigned to the verges, as shown in Image 5.4;
- Stage 2 – Construction works on eastbound verge, traffic reduced to single lane in each direction, and realigned in narrow lanes to the south, as shown in Image 5.5;
- Stage 3 – Construction works on westbound verge, traffic reduced to single lane in each direction, and realigned in narrow lanes to the north, as shown in Image 5.6; and
- Stage 4 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

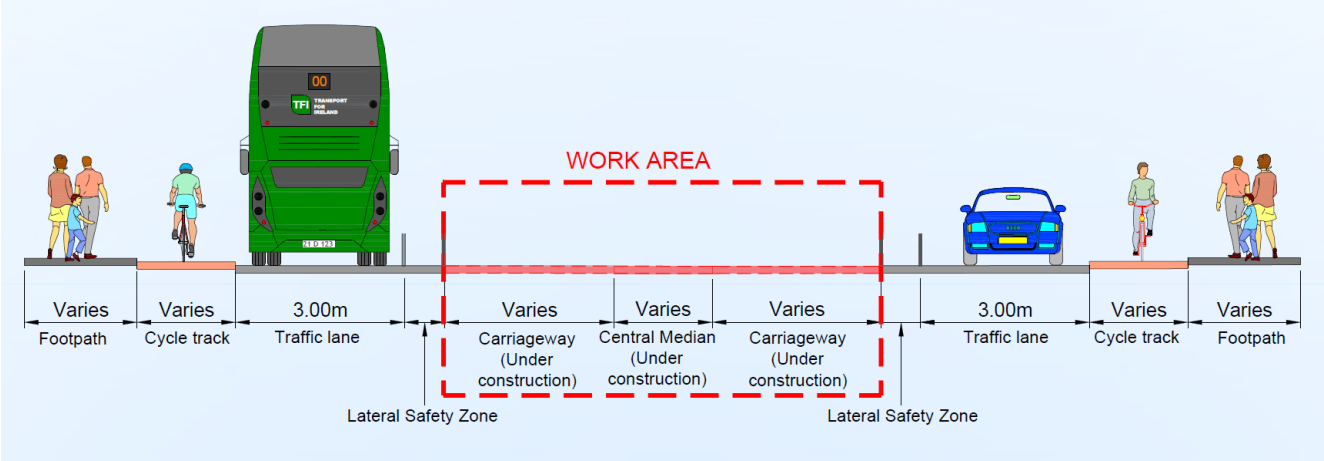


**Image 5.4: Traffic Management Cross Section, Section 1b – Stage 1**

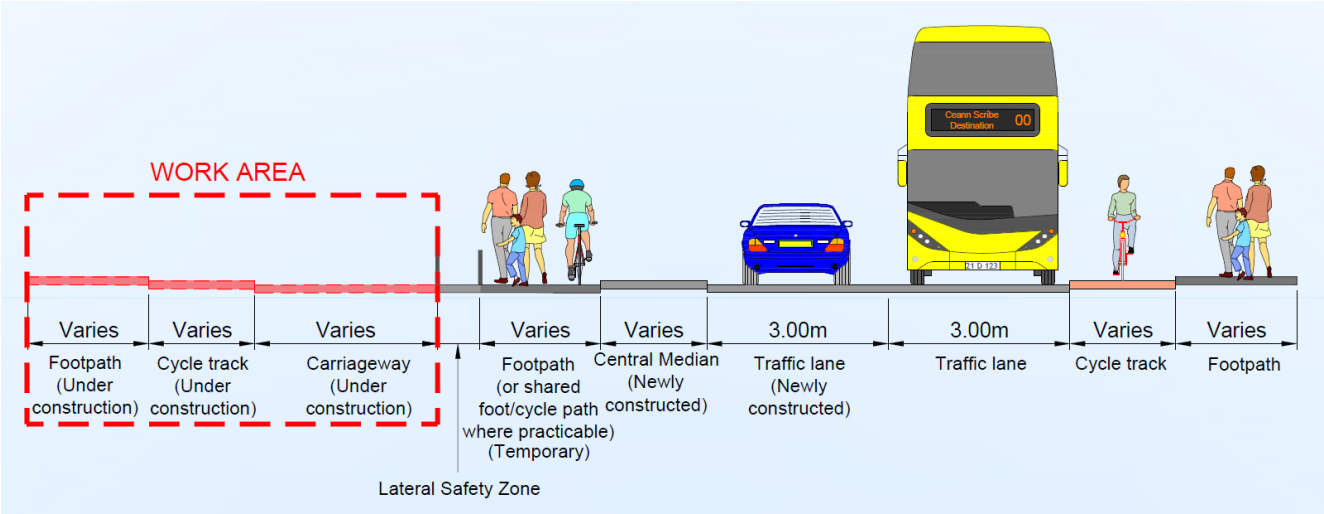


**Image 5.5: Traffic Management Cross Section, Section 1b – Stage 2**

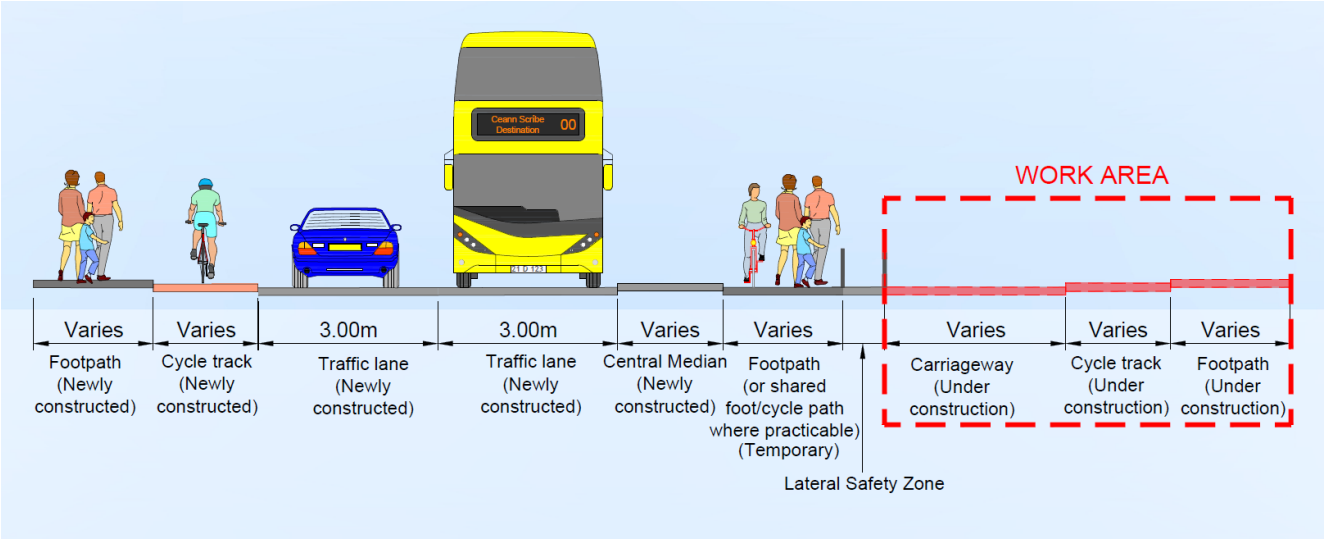


**Image 5.6: Traffic Management Cross Section, Section 1b – Stage 3**

#### 5.8.3.3 Section 1c: Phoenix Terrace to Booterstown Avenue

The works at Section 1c will be undertaken in four traffic management stages:

- Stage 1 – Construction works at the central reservation, traffic reduced to single lane in each direction and realigned to the verges, as shown in
- Image 5.7;
- Stage 2 – Construction works on eastbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the south, as shown in Image 5.8;
- Stage 3 – Construction works on westbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the north, as shown in Image 5.9; and
- Stage 4 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

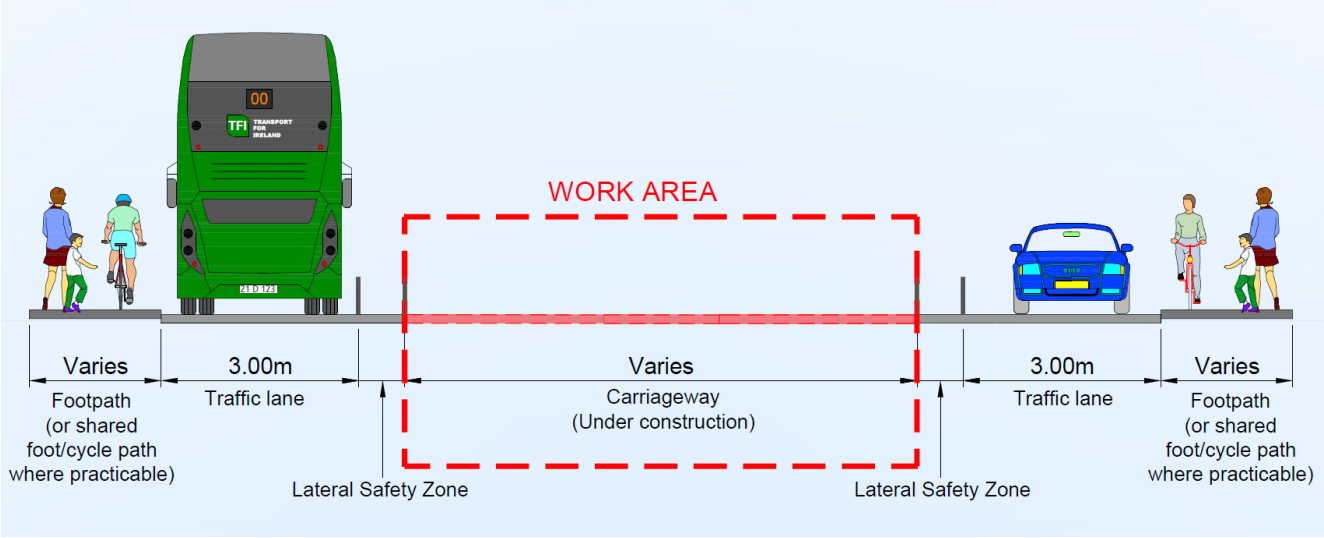


**Image 5.7: Traffic Management Cross Section, Section 1c – Stage 1**

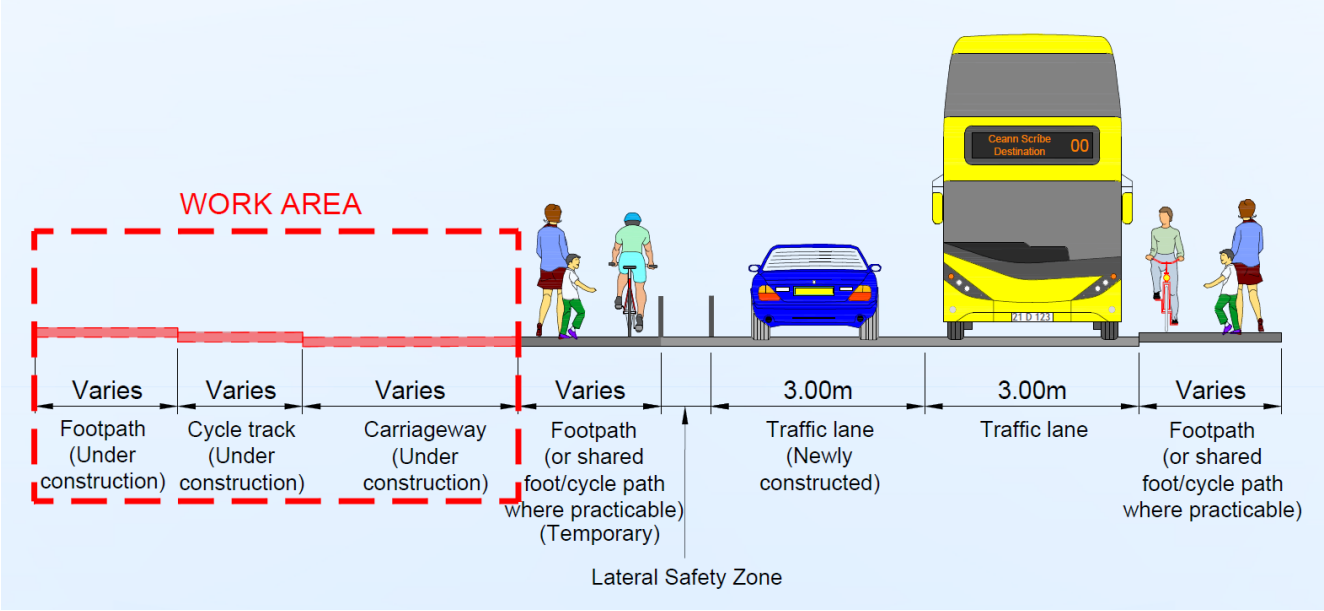


**Image 5.8: Traffic Management Cross Section, Section 1c – Stage 2**

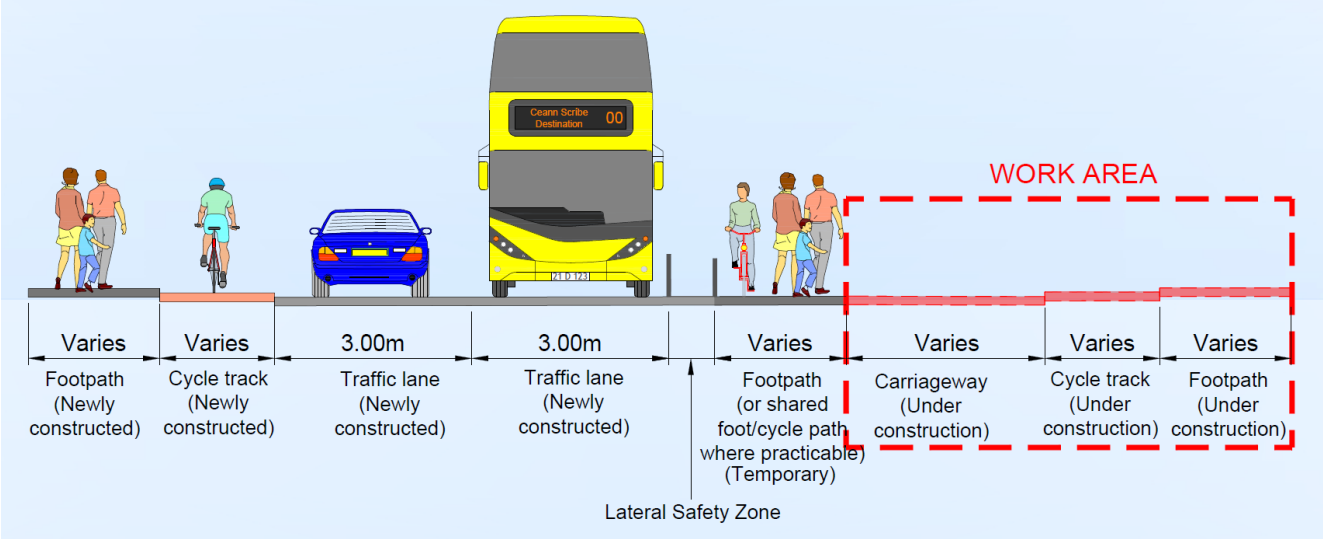


**Image 5.9: Traffic Management Cross Section, Section 1c – Stage 3**

### 5.8.3.4 Section 2: Booterstown Avenue to Nutley Lane

5.8.3.4.1 Section 2a: Booterstown Avenue to Elmpark Green Development

The works at Section 2a will be undertaken in four traffic management stages:

- Stage 1 – Construction works at the central reservation, traffic reduced to single lane in each direction and realigned to the verges, as shown in Image 5.10;
- Stage 2 – Construction works on westbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the north, as shown in Image 5.11;
- Stage 3 – Construction works on eastbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the south, as shown in Image 5.12; and
- Stage 4 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

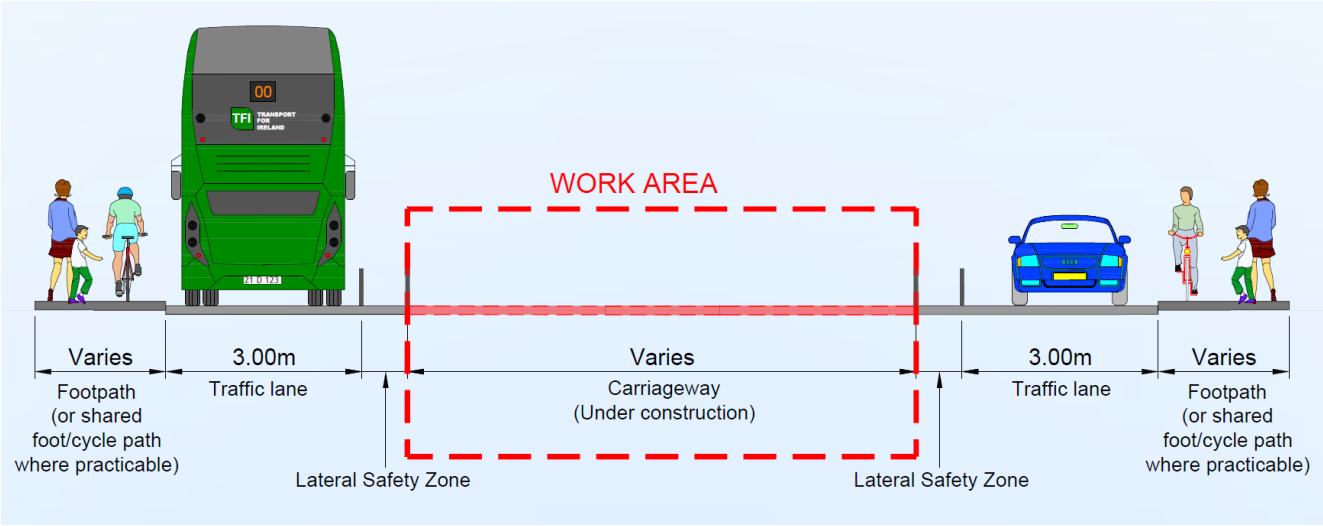


**Image 5.10: Traffic Management Cross Section, Section 2a, Section 2b – Stage 1**

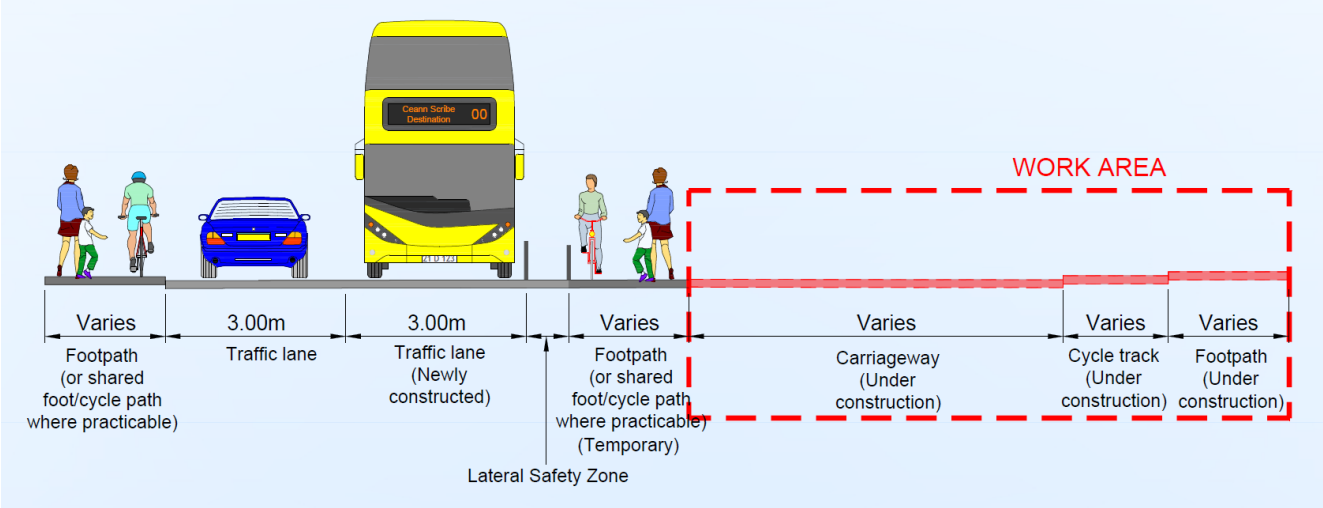


**Image 5.11: Traffic Management Cross Section, Section 2a, Section 2b – Stage 2**

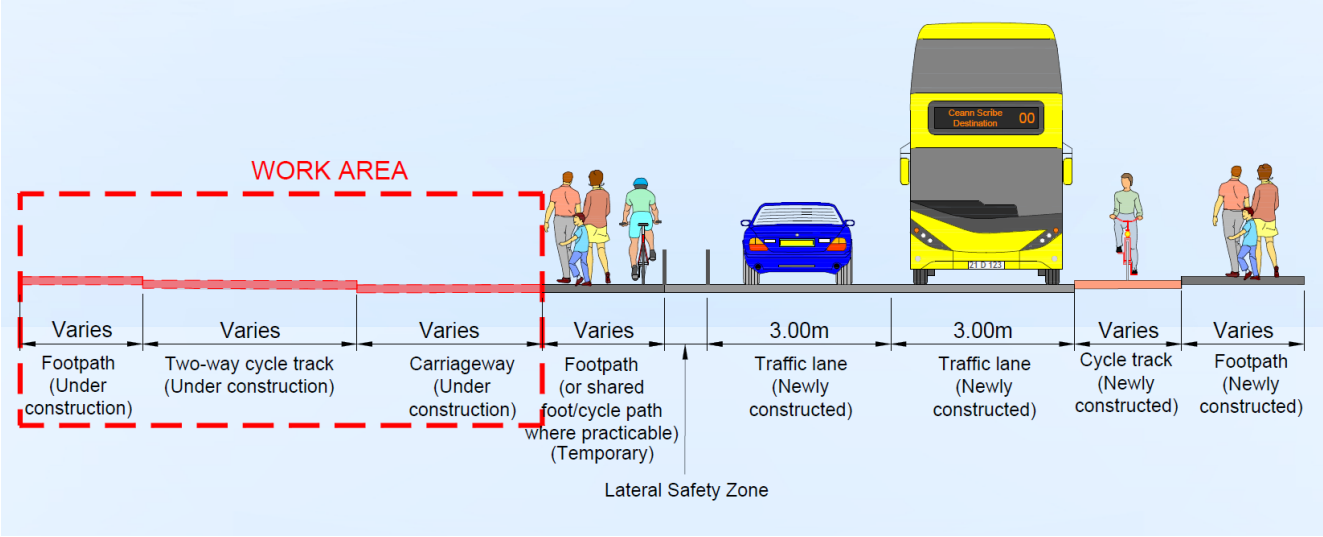


**Image 5.12: Traffic Management Cross Section, Section 2a, Section 2b – Stage 3**

5.8.3.4.2 Section 2b: Elmpark Green Development to Nutley Lane

The works at Section 2b will be undertaken in three traffic management stages, under the same traffic management measures as will be undertaken at Section 2a.

### 5.8.3.5 Section 3: Nutley Lane to Ballsbridge

5.8.3.5.1 Section 3a: Nutley Lane to Shrewsbury Road

The works at Section 3a will be undertaken in three traffic management stages:

- Stage 1 – Construction works on northbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the east, as shown in Image 5.13;
- Stage 2 – Construction works on southbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the west, as shown in Image 5.14; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

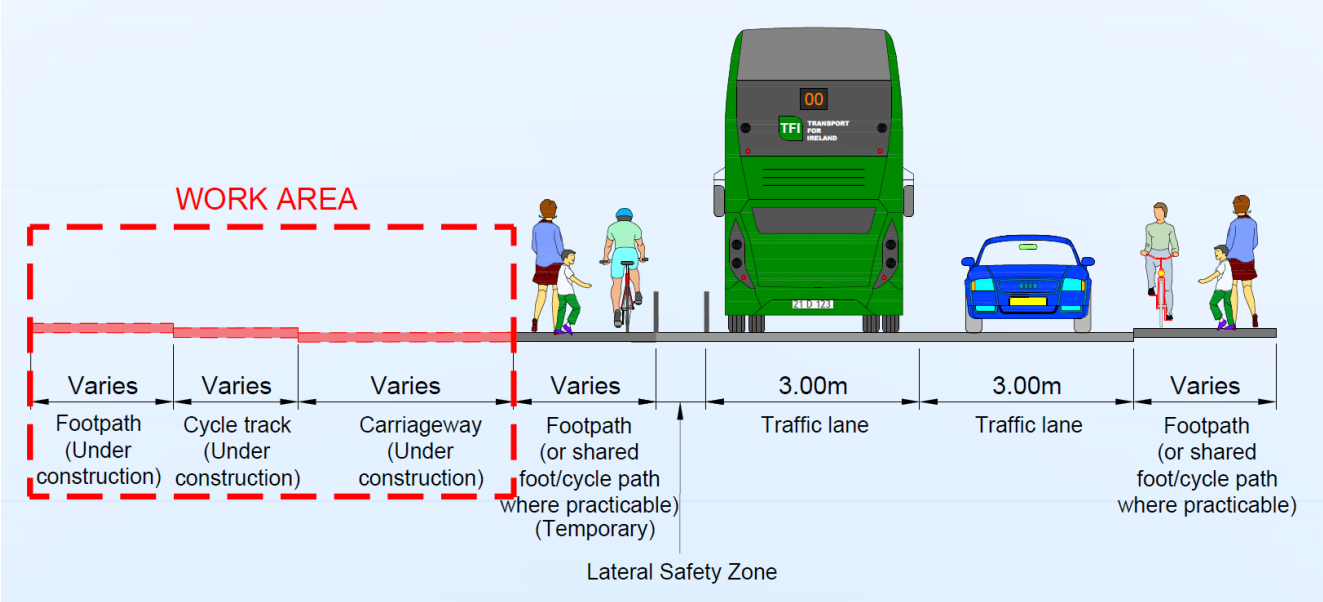


**Image 5.13: Traffic Management Cross Section, Section 3a, Section 3b, Section 3c, Section 4c, Section 4d, Section 4g, Section 5 – Stage 1**

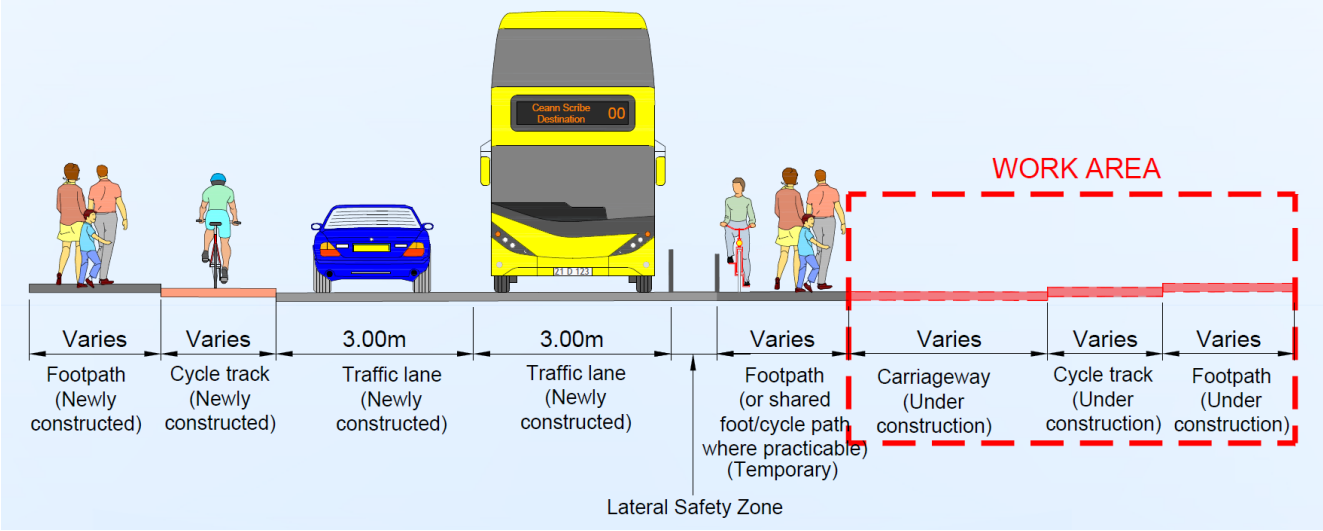


**Image 5.14: Traffic Management Cross Section, Section 3a, Section 3b, Section 3c, Section 4c, Section 4d, Section 4g, Section 5 – Stage 2**

5.8.3.5.2 Section 3b: Shrewsbury Road to Ballsbridge Park

The works at Section 3b will be undertaken in three traffic management stages, under the same traffic management measures as will be undertaken at Section 3a.

5.8.3.5.3 Section 3c: Ballsbridge Park Junction

The works at Section 3c will be undertaken in three traffic management stages, under the same traffic management measures as will be undertaken at Section 3a.

### 5.8.3.6 Section 4: Ballsbridge to Merrion Square

5.8.3.6.1 Section 4a: Ballsbridge Park to Shelbourne Road

The works at Section 4a will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the central reservation, traffic reduced to single lane in each direction and realigned in narrow lanes to the verges, as shown in Image 5.15;
- Stage 2 – Construction works on the verges, traffic reduced to single lane in each direction and realigned in narrow lanes to the central reservation, as shown in Image 5.16; and
- Stage 3 – Finishing works undertaken out-of-hours; traffic reduced to single lane shuttle working.

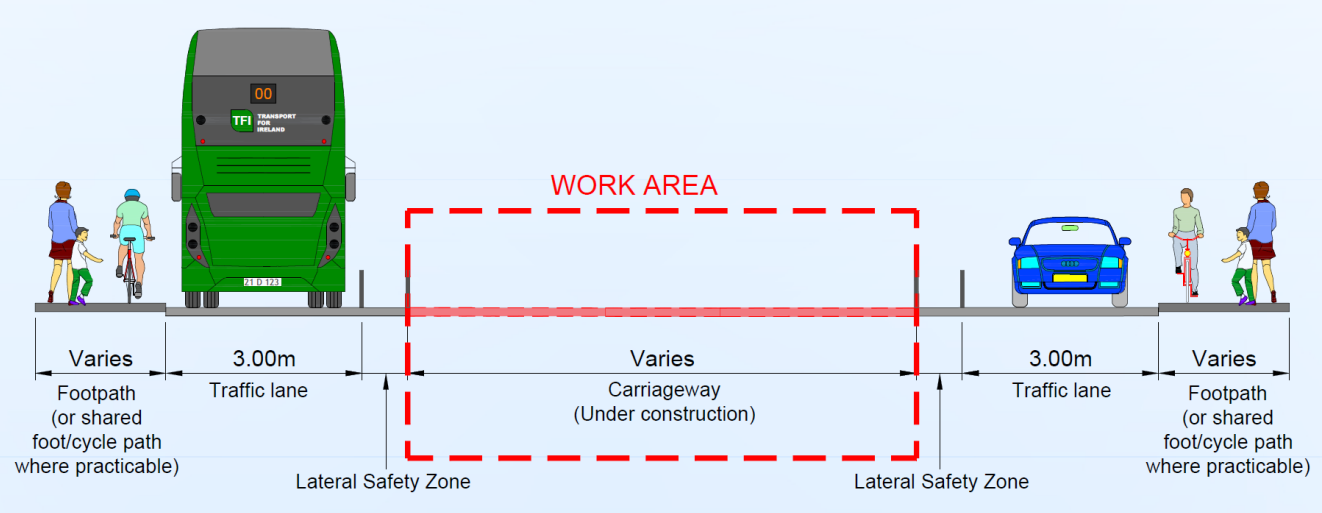


**Image 5.15: Traffic Management Cross Section, Section 4a, Section 4b – Stage 1**

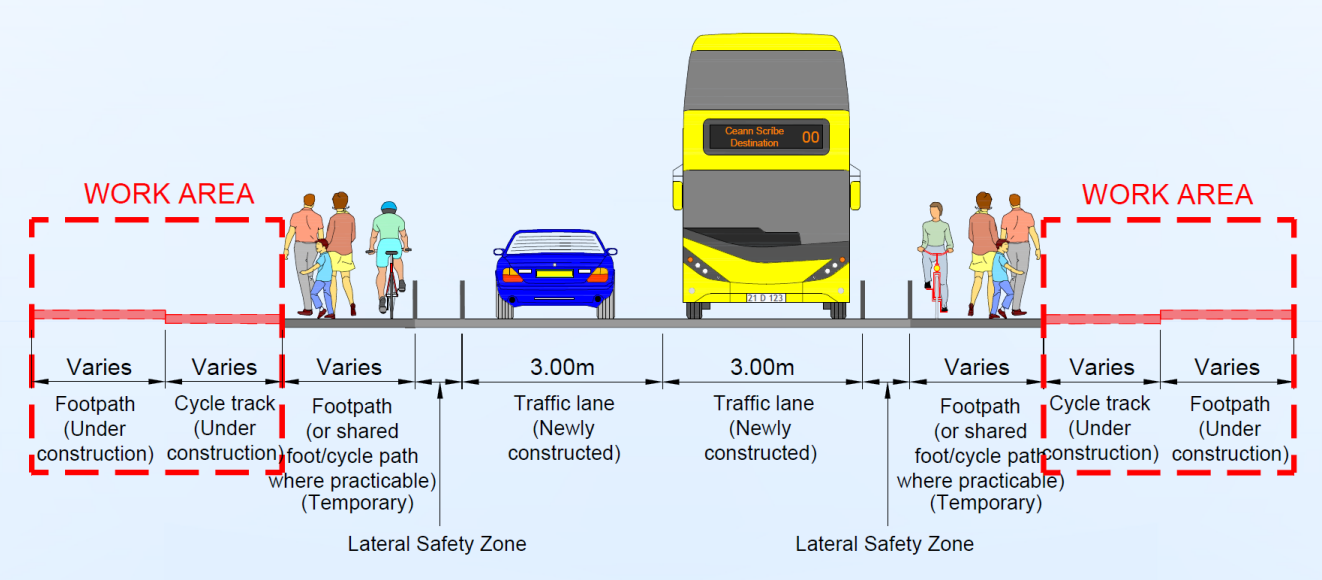


**Image 5.16: Traffic Management Cross Section, Section 4a, Section 4b – Stage 2**

5.8.3.6.2 Section 4b: Shelbourne Road Junction

The works at Section 4b will be undertaken in three traffic management stages, under the same traffic management measures as will be undertaken at Section 4a.

5.8.3.6.3 Section 4c: Shelbourne Road to Lansdowne Road

The works at Section 4c will be undertaken in three traffic management stages, under the same traffic management measures as will be undertaken at Section 3a.

5.8.3.6.4 Section 4d: Lansdowne Road Junction

The works at Section 4d will be undertaken in three traffic management stages, under the same traffic management measures as will be undertaken at Section 3a.

5.8.3.6.5 Section 4e: Lansdowne Road to Haddington Road

The works at Section 4e will be undertaken in three traffic management stages:

- Stage 1 – Construction works on westbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the north, as shown in Image 5.17;
- Stage 2 – Construction works on eastbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the south, as shown in Image 5.18; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

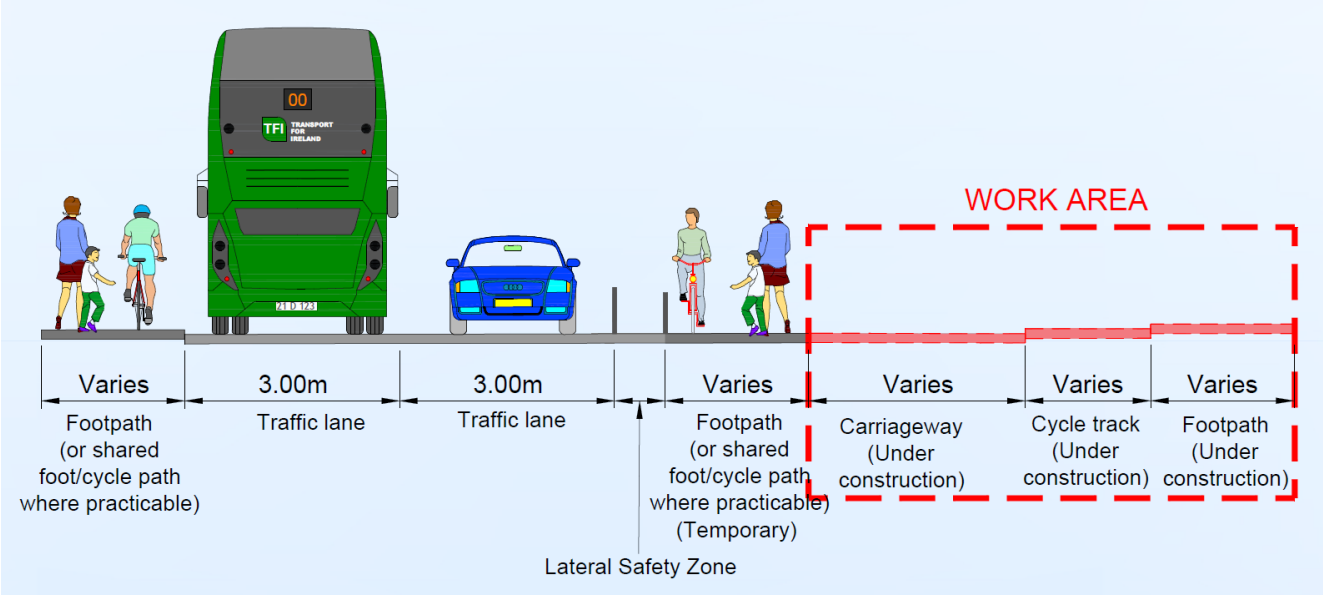


**Image 5.17: Traffic Management Cross Section, Section 4e – Stage 1**

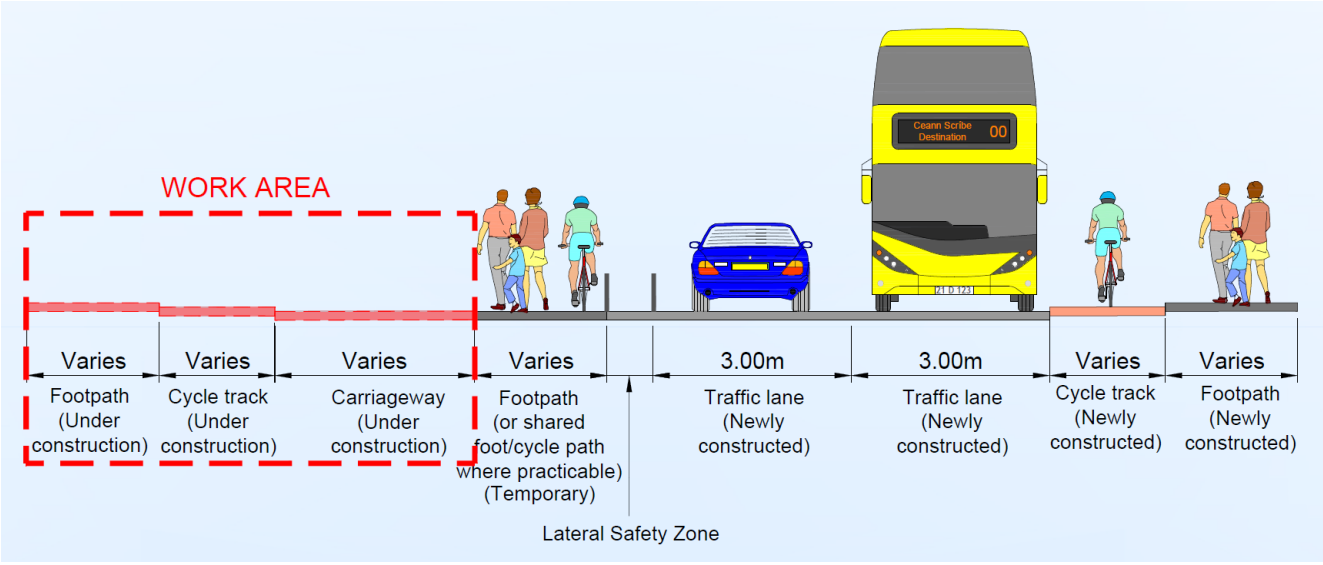


**Image 5.18: Traffic Management Cross Section, Section 4e – Stage 2**

5.8.3.6.6 Section 4f: Haddington Road to Fitzwilliam Street Lower

The works at Section 4f will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the central reservation, traffic reduced to single lane in each direction and realigned in narrow lanes to the verges, as shown in Image 5.19;
- Stage 2 – Construction works on the verges, traffic reduced to single lane in each direction and realigned in narrow lanes to the central reservation, as shown in Image 5.20; and
- Stage 3 – Finishing works undertaken out-of-hours; traffic reduced to single lane shuttle working.

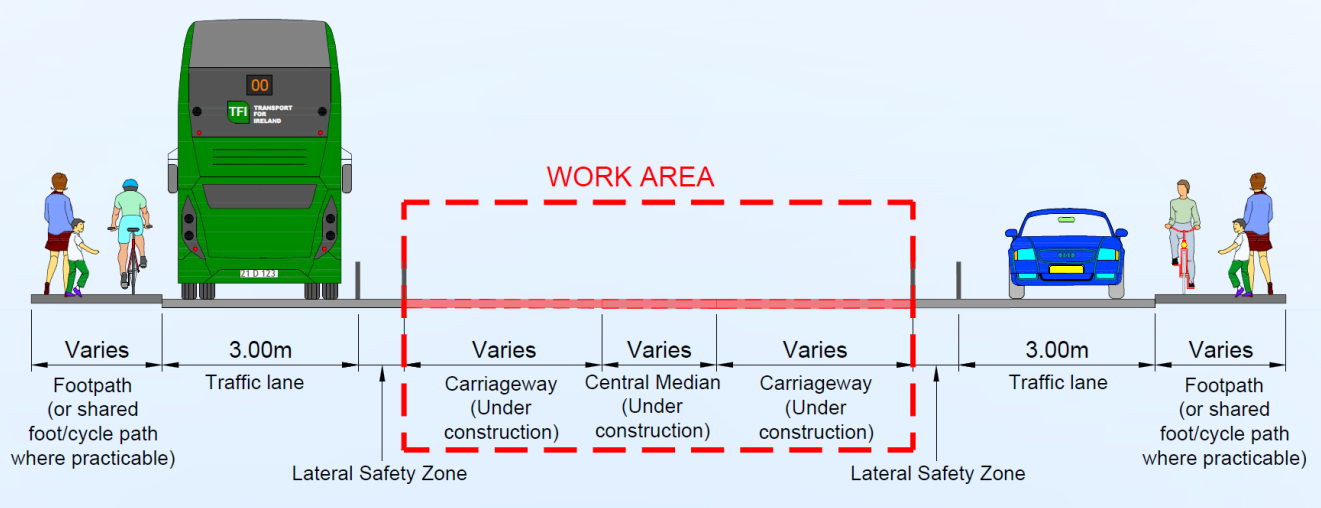


**Image 5.19: Traffic Management Cross Section, Section 4f – Stage 1**

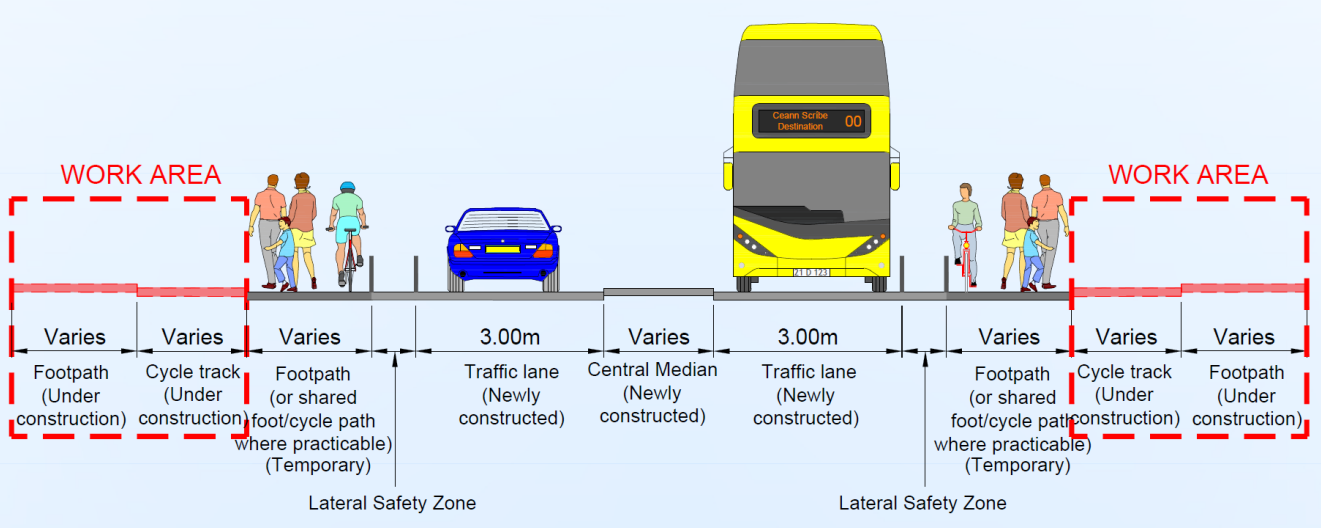


**Image 5.20: Traffic Management Cross Section, Section 4f – Stage 2**

5.8.3.6.7 Section 4g: Fitzwilliam Street Lower

The works at Section 4g will be undertaken in three traffic management stages, under the same traffic management measures as will be undertaken at Section 3a.

### 5.8.3.7 Section 5: Nutley Lane

The works at Section 5 will be undertaken in three traffic management stages:

- Stage 1 – Construction works on northeastbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the east, as shown in Image 5.21;
- Stage 2 – Construction works on southwestbound verge, traffic reduced to single lane in each direction and realigned in narrow lanes to the west, as shown in Image 5.22; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

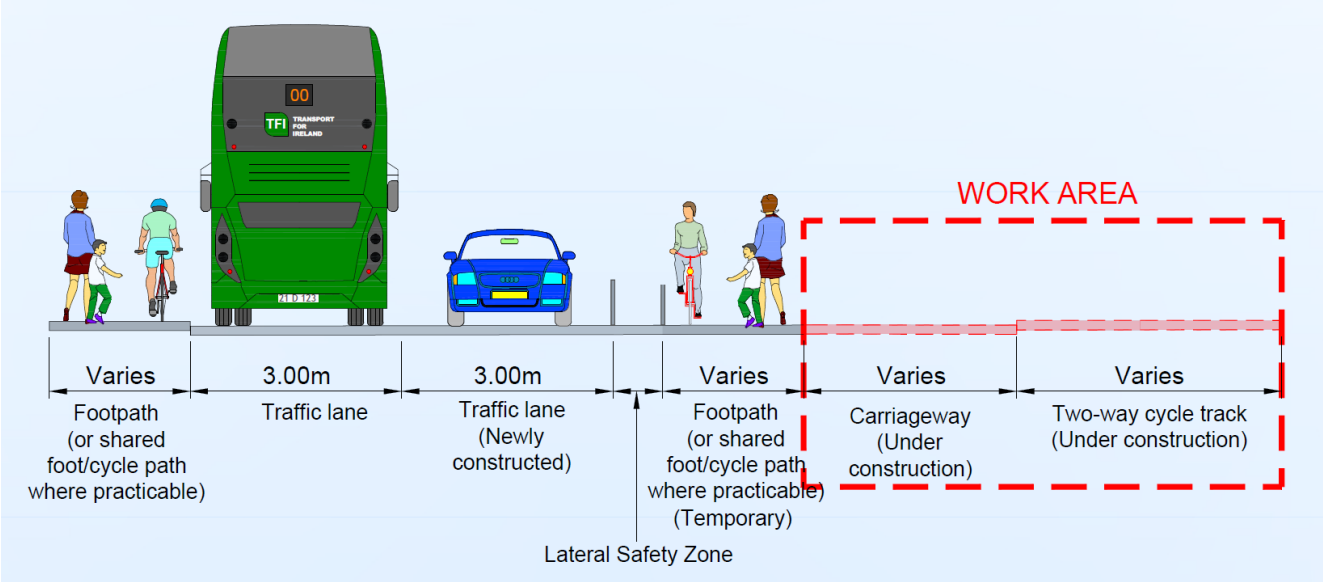


**Image 5.21: Traffic Management Cross Section, Section 5 – Stage 1**

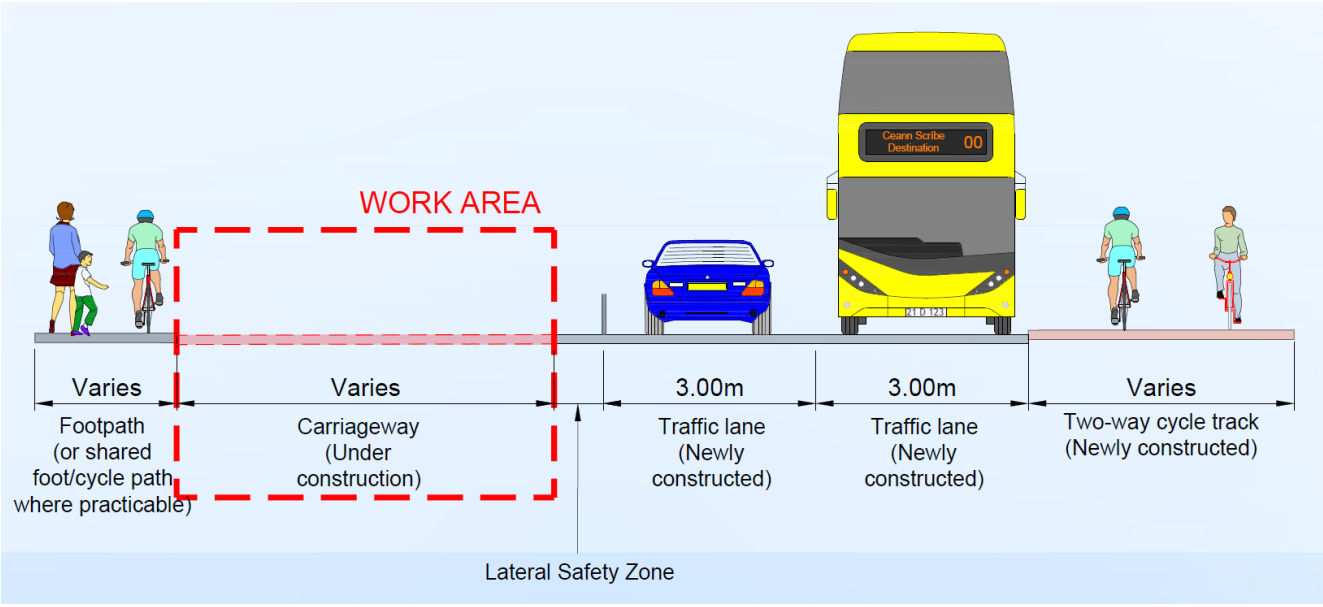


**Image 5.22: Traffic Management Cross Section, Section 5 – Stage 2**

### 5.8.4 Road Closures and Diversions

Road closures and diversions will need to be carried out during the Construction Phase of the Proposed Scheme; however, these measures will be minimised wherever possible and likely to be short lived and only required for limited activities. Where necessary, road closures and diversions will take into consideration the impact on road users, residents, businesses etc. Road closures and diversions will be carried out with regard to the Traffic Signs Manual. All road closures and diversions will be determined by the NTA, in consultation with the local authority

and An Garda Siochana, as necessary. Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

## 5.9 Interface with Other Projects

The likely timelines of the Proposed Scheme construction works have considered the potential for simultaneous construction of, and cumulative impacts with other infrastructure projects and developments which are proposed along, or in the vicinity of, the Proposed Scheme. The likely significant cumulative impacts caused by the Proposed scheme in combination with other existing or planned projects were identified and assessed in Chapter 21 (Cumulative Impacts & Environmental Interactions) of this EIAR.

Interface liaison will take place on a case-by-case basis through the NTA, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Scheme works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

## 5.10 Construction Environmental Management

### 5.10.1 Construction Environmental Management Plan

As stated in Section 5.1, a Construction Environmental Management Plan (CEMP) has been prepared for the Proposed Scheme and is included as Appendix A5.1 in Volume 4 of this EIAR. The CEMP will be updated by the NTA prior to finalising the Construction Contract documents for tender, so as to include any additional measures required pursuant to conditions attached to An Bord Pleanála's decision. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the CEMP the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR. 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).

Details of mitigation measures proposed to address potential impacts arising from construction activities are described in Chapter 6 (Traffic & Transport) to Chapter 21 (Cumulative Impacts & Environmental Interactions) as appropriate and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

A number of sub-plans have also been prepared as part of the CEMP and these are summarised in the following sections. For the avoidance of doubt, all of the measures set out in the CEMP and the sub-plans appended to this EIAR will be implemented in full by the appointed contractor to the satisfaction of the NTA.

#### 5.10.1.1 Construction Traffic Management Plan

The Construction Traffic Management Plan (CTMP) has been prepared to demonstrate the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the CTMP the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála, should they grant approval. Further details on the assessment of construction traffic, and traffic related mitigation measures are provided in Chapter 6 (Traffic & Transport) of this EIAR.

#### 5.10.1.2 Invasive Species Management Plan

The Invasive Species Management Plan (ISMP) has been prepared which provides the strategy to be adopted in order to manage and prevent the spread of the non-native invasive plant species. Non-native invasive plant species were identified in close proximity to the Proposed Scheme during ecological surveys. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in

the ISMP how it is intended to complete the works in accordance with the Employer's Requirements, and will be subject to the NTA's approval. Further details on the assessment of non-native invasive species, and associated mitigation measures are provided in Chapter 12 (Biodiversity) of this EIAR.

#### 5.10.1.3 Surface Water Management Plan

The Surface Water Management Plan (SWMP) has been prepared which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.

#### 5.10.1.4 Construction and Demolition Resource and Waste Management Plan

The Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared which provides the strategy that will be adopted in order to ensure that optimum levels of reduction, re-use and recycling are achieved. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the CDRWMP the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. Further details on waste management are provided in Chapter 18 (Waste & Resources) of this EIAR.

#### 5.10.1.5 Environmental Incident Response Plan

The Environmental Incident Response Plan (EIRP) has been prepared to ensure that in the unlikely event of an incident (environmental, or non-environmental), response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP details the procedures to be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g., concrete), non-compliance incident with any permit or licence, or other such risks that could lead to a pollution incident, including flood risks. It will be a condition of the Employers Requirements that the successful contractor, immediately following appointment must detail in the EIRP, the manner in which it is intended to effectively implement all the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.

### 5.10.2 Mitigation Measures

Mitigation and monitoring measures have been identified as environmental commitments and overarching requirements which shall avoid, reduce or offset potential impacts which could arise throughout the Construction Phase of the Proposed Scheme. These mitigation and monitoring measures which are relevant to the Construction Phase of the Proposed Scheme are detailed in Chapter 6 (Traffic & Transport) to Chapter 21 (Cumulative Impacts & Environmental Interactions) and summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) and Appendix A5.1 CEMP in Volume 4 of this EIAR.

### 5.10.3 Working Hours

It is envisaged that generally construction working hours will be between 07:00hrs and 23:00hrs on weekdays, and between 08:00hrs and 16:30hrs on Saturdays. Night-time and Sunday working will be required during certain periods in order to facilitate street works that cannot be undertaken under day-time/ evening time conditions. The planning of such works will take consideration of sensitive receptors, in particular any nearby residential areas.

### 5.10.4 Personnel Numbers

Throughout the Construction Phase there will be some variation in the numbers of personnel working on site. It is anticipated there will be approximately 200 personnel directly employed across the Proposed Scheme, rising to 250 personnel at peak construction.

### 5.10.5 Construction Health and Safety

The requirements of the Safety, Health and Welfare at Work Act 2005, the Safety, Health and Welfare at Work (Construction) Regulations, 2013 and other relevant Irish and EU safety legislation will be complied with at all times. As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to the completion of the Construction Phase. This plan will be reviewed as the Proposed Scheme progresses. The contents of the Health and Safety Plan will follow the requirements of the Regulations. In accordance with the Regulations, a “Project Supervisor Design Process” has been appointed and “Project Supervisor Construction Stage” will be appointed as appropriate.

## 5.11 References

British Standards Institution (2010). British Standard 3998:2010 Tree Work. Recommendations.

British Standards Institution (2012). British Standard 5837:2012 Trees in Relation to Design, Demolition, and Construction. Recommendations.

Construction Industry Research and Information Association (2015). Environmental Good Practice on Site Guide, 4th Edition.

Department of Transport, Tourism and Sport (2019). Chapter 8, Temporary Traffic Measures and Signs for Roadworks, Traffic Signs Manual.

Transport Infrastructure Ireland (2007). Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.

Transport Infrastructure Ireland (2017). The Management of Waste from National Road Construction Projects.

Directives and Legislation

Safety, Health and Welfare at Work (Construction) regulations 2013.

Safety, Health and Welfare at Work Act 2005, as amended.

Waste Management Act 1996, as amended.