



Chapter 05
Construction

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5. Construction

5.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the construction activities associated with the Templeogue / Rathfarnham 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 National Transport Authority (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 Phase impacts associated with the Proposed Scheme, this Chapter describes the indicative construction phasing and programme as well as the construction activities necessary to undertake the works, including information on the Construction Compounds, construction plant and equipment.

This Chapter provides 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 Compounds 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 to Chapter 21, 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 Transport Infrastructure Ireland (TII) Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan

(TII 2007), and the handbook published by Construction Industry Research and Information Association (CIRIA) in the United Kingdom, 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 four primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 18 sub-sections, according to the types of construction works required. The sections / sub-sections are:

- **Section 1:** Tallaght Road, Templeogue Road to Rathfarnham Road:
 - **Section 1a:** M50 to Spawell Roundabout;
 - **Section 1b:** Spawell Roundabout;
 - **Section 1c:** Spawell Roundabout to Cypress Grove Junction;
 - **Section 1d:** Cypress Grove Junction to Templeville Road;
 - **Section 1e:** Templeville Road to Rathdown Avenue;
 - **Section 1f:** Rathdown Avenue to Terenure Road North; and
 - **Section 1g:** Rathdown Crescent, Rathdown Park, Bushy Park Road, Wasdale Park, Wasdale Road, Wasdale Grove, Victoria Road, Zion Road and Orwell Road.
- **Section 2:** Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road:
 - **Section 2a:** Grange Road Junction to Main Street Junction;
 - **Section 2b:** Main Street Junction to Dodder Park Road;
 - **Section 2c:** Dodder Park Road to Terenure Junction;
 - **Section 2d:** Rathfarnham Junction to Mount Tallant Avenue; and
 - **Section 2e:** Mount Tallant Avenue to Harold's Cross.
- **Section 3:** Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road:
 - **Section 3a:** Terenure Junction to Rathgar Avenue; and
 - **Section 3b:** Rathgar Avenue to Rathmines Road.
- **Section 4:** Charleville Road to Dame Street;
 - **Section 4a:** Rathgar Road to Grove Road;
 - **Section 4b:** Grove Road to Cuffe Street;
 - **Section 4c:** Cuffe Street to Dame Street; and
 - **Section 4d:** Offline Sections.

The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR. The typical construction works 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 5.3.4. 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-SPW_ZZ-1012_XX_00-DR-CR-9001	Site Location Plan
BCIDC-ARP-GEO_GA-1012_XX_01-DR-CR-9001	General Arrangement
BCIDC-ARP-GEO_HV-1012_ML_00-DR-CR-9001	Mainline Plan and Profile
BCIDC-ARP-GEO_CS-1012_XX_01-DR-CR-9001	Typical Cross Sections
BCIDC-ARP-ENV_LA-1012_XX_00-DR-LL-9001	Landscaping General Arrangement
BCIDC-ARP-PAV_PV-1012_XX_00-DR-CR-9001	Pavement Treatment Plans
BCIDC-ARP-SPW_BW-1012_XX_00-DR-CR-9001	Fencing and Boundary Treatment
BCIDC-ARP-TSM_GA-1012_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDC-ARP-LHT_RL-1012_XX_00-DR-EO-9001	Public Street Lighting
BCIDC-ARP-TSM_SJ-1012_XX_00-DR-TR-9001	Junction System Design
BCIDC-ARP-DNG_RD-1012_XX_00-DR-CD-9001	Proposed Surface Water Drainage Works
BCIDC-ARP-UTL_UD-1012_XX_00-DR-CU-9001	IW Foul Sewer Asset Alterations
BCIDC-ARP-UTL_UE-1012_XX_00-DR-CU-9001	ESB Asset Alterations
BCIDC-ARP-UTL_UG-1012_XX_00-DR-CU-9001	GNI Asset Alterations
BCIDC-ARP-UTL_UW-1012_XX_00-DR-CU-9001	IW Water Asset Alterations
BCIDC-ARP-UTL_UT-1012_XX_00-DR-CU-9001	Telecommunications Asset Alterations
BCIDC-ARP-UTL_UC-1012_XX_00-DR-CU-9001	Combined Existing Utility Records

For further details on the specifications, with regards to matters such as parking and loading bay widths, signalised junctions, priority junctions, roundabouts, bus stops, accessibility, traffic signals, lighting, utilities, drainage, pavement, and landscape design, please refer to 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: Tallaght Road, Templeogue Road to Rathfarnham Road

5.3.1.1 Section 1a: M50 to Spawell Roundabout

Section 1a will encompass a length of approximately 480m (metres) along Tallaght Road, between the M50 junction 11 interchange and the Spawell roundabout. The construction activities at Section 1a will comprise of minor carriageway widening works in the vicinity of Spawell Roundabout. The construction activities at Section 1a will comprise resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new road lighting and landscaping works. Utility (telecommunications infrastructure) diversions and / or protections will be required. The expected construction duration will be approximately two months.

5.3.1.2 Section 1b: Spawell Roundabout

Section 1b encompasses a length of approximately 200m at the Spawell roundabout. As part of the construction works, the existing roundabout junction will be upgraded to a four-arm traffic signalised junction. The construction activities at Section 1b will comprise pavement reconstruction, and resurfacing of the roads, footpaths, and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting,

benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.) and landscaping works. The existing vegetation within the central island of the Spawell Roundabout will be removed however new trees will be provided as part of the works. Construction Compound TR1 will be located south of the Spawell roundabout, at the Tallaght Road / Spawell Link Road junction. Construction Compound TR6 will be located on the Spawell Link Road between Spawell Roundabout and Firhouse Road. The expected construction duration will be approximately six months.

5.3.1.3 Section 1c: Spawell Roundabout to Cypress Grove Junction

Section 1c encompasses a length of approximately 680m along Templeogue Road, between the Spawell Roundabout and the Cypress Grove Road junction. The construction activities at Section 1c will comprise localised reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. A short section of hedgerow in the existing central reserve and some trees in the verge area on the northern side of Templeogue Road will be removed, however new trees will be provided as part of the works. Various utility diversions and / or protections will be required; including electricity overhead lines and underground cables, and telecommunications infrastructure. The expected construction duration will be approximately three months.

An existing free standing stone arch located within the verge area to the north of the Templeogue Road is to be retained and conserved during the works. Refer to 5.5.4.1.1 for more details.

5.3.1.4 Section 1d: Cypress Grove Junction to Templeville Road

Section 1d encompasses a length of approximately 735m along the Templeogue Road, between the Cypress Grove Road junction and the Templeville Road / Springfield Avenue junction. Templeogue Village on Templeogue Road has recently been upgraded as part of the Templeogue Village Initiative by South Dublin County Council and as such, no works are proposed within Templeogue Village as part of the Proposed Scheme. The construction activities at Section 1d will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Sections of the existing boundary walls / fences and hedgerows along the northern side of the Templeogue Road will be realigned and reconstructed due to the proposed widening of the carriageway. A minor retaining wall approximately 15m in length and maximum 1.2m in retained height will be constructed along the south side of Templeogue Road adjacent to the Spawell Roundabout to Cypress Grove Junction (Structure Reference: RW01). Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Some existing trees along the northern and southern sides of Templeogue Road will be removed however new trees will be provided as part of the works. Various utility diversions and / or protections will be required; including electricity overhead lines and underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration will be approximately seven months.

5.3.1.5 Section 1e: Templeville Road to Rathdown Avenue

Section 1e encompasses a length of approximately 635m along Templeogue Road, between Templeville Road and Rathdown Avenue. The construction activities at Section 1e will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Some existing trees along the southern side of Templeogue Road will be removed however new trees will be provided as part of the works. Utility (electricity overhead lines)

diversions and / or protections will be required. The expected construction duration will be approximately three months.

5.3.1.6 Section 1f: Rathdown Avenue to Terenure Road North

Section 1f encompasses a length of approximately 915m along Templeogue Road, between Rathdown Avenue and Terenure Road North. Rathdown Drive which runs parallel to the south of Templeogue Road will be upgraded and a quiet street treatment applied. The construction activities at Section 1f will comprise the resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation 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. A gap in the existing wall to the south of Templeogue Road will be closed and infilled with a stone clad wall and railing detail, similar to the existing boundary. Further to the east, a short section of the existing wall and railing will be realigned to provide space for a bus stop and shelter. An existing informal path within the green area adjacent Rathdown Drive will be formalised as a footpath. Utility (water distribution) diversions and / or protections will be required. The expected construction duration will be approximately six months.

5.3.1.7 Section 1g: Rathdown Crescent, Rathdown Park, Bushy Park Road, Wasdale Park, Wasdale Road, Wasdale Grove, Victoria Road, Zion Road and Orwell Road

Section 1g encompasses a length of approximately 1490m along Rathdown Crescent, Rathdown Park, Bushy Park Road, Wasdale Park, Wasdale Road, Wasdale Grove, Victoria Road, Zion Road and Orwell Road. The construction activities at Section 1g will comprise the resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation 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. The expected construction duration will be approximately three months.

5.3.2 Section 2: Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road

5.3.2.1 Section 2a: Grange Road Junction to Main Street Junction

Section 2a encompasses a length of approximately 850m along Rathfarnham Road, between the Grange Road junction and the Rathfarnham Main Street junction. The construction activities at Section 2a will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Sections of the existing boundary walls along the eastern side of Grange Road and Rathfarnham Road, adjacent to Rathfarnham Castle Park, will be realigned and reconstructed due to the proposed widening of the carriageway. The low height wall at the junction with Rathfarnham Wood will also be realigned and reconstructed to accommodate the upgrade of the traffic signalised junction. The existing car park adjacent to Grange Road will be reconfigured, with amendments to the existing layout and the relocation of the existing bin centre and secure cycle parking. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Some existing trees along the eastern side of Grange Road and Rathfarnham Road, and along the central median on Rathfarnham Road will be removed, however new trees will be provided as part of the works. Various utility diversions and / or protections will be required; including electricity overhead lines and underground cables, gas mains and telecommunications infrastructure. The expected construction duration will be approximately eight months.

5.3.2.2 Section 2b: Main Street Junction to Dodder Park Road

Section 2b encompasses a length of approximately 460m along Rathfarnham Road, between the Rathfarnham Main Street junction and Dodder Park Road. The construction activities at Section 2b will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Sections of the existing boundary walls along the western side of Rathfarnham Road, will be realigned and reconstructed due to the proposed widening of the carriageway. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Some existing trees along the western side of Rathfarnham Road will be removed, however new trees will be provided as part of the works. Construction Compound TR3 will be located along Dodder View Road, across the road from Bushy Park, in the greenfield area between Dodder View Road, Woodview Cottages and Church Lane. Various utility diversions and / or protections will be required; including electricity overhead lines and water distribution infrastructure. The expected construction duration will be approximately nine months.

5.3.2.3 Section 2c: Dodder Park Road to Terenure Junction

Section 2c encompasses a length of approximately 620m along Rathfarnham Road, between Dodder Park Road and the Rathfarnham Road / Terenure Road East / Terenure Road North junction. Urban realm improvements are also proposed within Terenure Village. The construction activities at Section 2c will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Sections of the existing boundary walls along the eastern and western sides of Rathfarnham Road, will be realigned and reconstructed due to the proposed widening of the carriageway. A number of driveways will also be regraded to tie in with the proposed road levels following road widening. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Some existing trees and vegetation along the eastern and western sides of Rathfarnham Road will be removed, however new trees will be provided as part of the works. Various utility diversions and / or protections will be required; including electricity overhead lines and underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration will be approximately nine months.

5.3.2.4 Section 2d: Rathfarnham Junction to Mount Tallant Avenue

Section 2d encompasses a length of approximately 720m along Terenure Road North and Harold's Cross Road, between the Rathfarnham Road / Terenure Road East / Terenure Road North junction and Mount Tallant Avenue. The construction activities at Section 2d will comprise the resurfacing of the roads, footpaths, and cycle track pavements, and new kerbs. No carriageway widening works or new boundary treatment is expected within this section. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Construction Compound TR2 will be located north-west of Terenure Road North, between Eaton Road and Eagle Hill Avenue. Utility (electricity overhead lines) diversions and / or protections will be required. The expected construction duration will be approximately six months.

5.3.2.5 Section 2e: Mount Tallant Avenue to Harold's Cross

Section 2e encompasses a length of approximately 830m along Harold's Cross Road, between Mount Tallant Avenue and Harold's Cross. The construction activities at Section 2e will comprise the resurfacing of the roads, footpaths, and cycle track pavements, and new kerbs. No carriageway widening works or new boundary treatment is expected within this section. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and

information displays etc.)) and landscaping works. Some existing trees and vegetation along the eastern side of Harold's Cross Road will be removed, however new trees will be provided as part of the works. The expected construction duration will be approximately eight months.

5.3.3 Section 3: Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road

5.3.3.1 Section 3a: Terenure Junction to Rathgar Avenue

Section 3a encompasses a length of approximately 630m along Terenure Road East, between the Rathfarnham Road / Terenure Road East / Terenure Road North junction and the Rathgar Avenue / Orwell Road junction. A parallel route between the Bushy Park Road junction with the Rathfarnham Road, and continuing along Wasdale Park, Wasdale Grove, Victoria Road and Zion Road, will be subject to a quiet street treatment. New cycle tracks will also be constructed along Orwell Road, between the Zion Road junction and the Terenure Road East junction. A new pedestrian crossing will be constructed west of Brighton Road. The construction activities at Section 3a will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. New kerbs will also be provided following the realignment of the existing kerb lines. Sections of the existing boundary walls, fencing and hedges along the northern and southern sides of Terenure Road East, will be realigned and reconstructed due to the proposed widening of the carriageway. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Some existing trees and vegetation along the northern and southern sides of Terenure Road East will be removed, however new trees will be provided as part of the works. Various utility diversions and / or protections will be required; including electricity underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration will be approximately six months.

5.3.3.2 Section 3b: Rathgar Avenue to Rathmines Road

Section 3b will encompass a length of 1275m along Rathgar Road, between the Rathgar Avenue / Orwell Road junction and Rathmines Road Lower. Urban realm improvements are also proposed within Rathgar Village and a new pedestrian crossing will be constructed south of Wesley Road. The construction activities at Section 3b will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Various utility diversions and / or protections will be required; including water distribution and telecommunications infrastructure. The expected construction duration will be approximately nine months.

5.3.4 Section 4: Charleville Road to Dame Street

5.3.4.1 Section 4a: Rathgar Road to Grove Road

Section 4a encompasses a length of approximately 920m along Rathmines Road Lower, between Rathgar Road and Grove Road, including minor construction works on Richmond Hill and Mountpleasant Avenue Upper. Urban realm improvements are proposed within Rathmines Village. The construction activities at Section 4a will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements, and new kerbs. Urban realm improvements are proposed within Rathmines Village. No carriageway widening works or new boundary treatment is expected within this section. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Construction Compound TR4 will be located on Military Road, perpendicular to Rathmines Road Lower, south of St Marys College. Various utility diversions and / or protections will be required; including water distribution and gas mains. The expected construction duration will be approximately eight months.

5.3.4.2 Section 4b: Grove Road to Cuffe Street

Section 4b encompasses a length of approximately 880m along Camden Street, between Grove Road and Cuffe Street. The construction activities at Section 4b will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements, and new kerbs. No carriageway widening works or new boundary treatment is expected within this section. This section includes a number of heritage features, including heritage kerbs, heritage lighting columns and coal holes, which will be retained in their current location where practicable or relocated locally – refer to Chapter 16 (Architectural Heritage) for further information. Cellars along this section of the scheme will not be impacted. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. The existing La Touche Bridge structure will be retained in its current form, however the traffic lanes, footpaths and cycle paths will be reconfigured. New kerbs will be installed and pavement resurfacing works will be required over the bridge deck. Construction Compound TR5 will be located on Richmond Street South, on the slip road between Richmond Street South and Harcourt Road. The expected construction duration will be approximately eight months.

5.3.4.3 Section 4c: Cuffe Street to Dame Street

Section 4c encompasses a length of approximately 720m along the R114 Road, between Cuffe Street and Dame Street. The construction activities at Section 4b will comprise the reconstruction and resurfacing of the roads, footpaths, and cycle track pavements. No carriageway widening works or new boundary treatment is expected within this section. This section includes a number of heritage features, including heritage kerbs, heritage lighting columns and coal holes, which will be retained in their current location where practicable or relocated locally – refer to Chapter 16 (Architectural Heritage) for further information. Cellars along this section of the scheme will not be impacted. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. Utility (water distribution) diversions and / or protections will be required. The expected construction duration will be approximately six months.

5.3.4.4 Section 4d: Offline Sections

Section 4d encompasses a length of approximately 400m altogether and is made up of multiple small, isolated, sections of works adjacent, but not directly along the Proposed Scheme. The offline sections are listed as follows:

- Fortfield Road / Greenlea Road Junction;
- Fortfield Road / Lavarna Grove Junction;
- Kimmage Road Lower / Aideen Avenue Junction;
- Grand Parade / Dartmouth Place Junction;
- Cullenswood Road / Ranelagh Road Junction;
- Sandford Road / Merton Drive Junction;
- Ranelagh Road / Ashfield Road, Chelmsford Lane & Sallymount Avenue Junctions; and
- Highfield Road / Rathmines Road Upper Junction.

The construction activities at Section 4d will mainly comprise the installation of new traffic signs. At the Highfield Road / Rathmines Road Upper Junction, construction works will also include the reconstruction, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, and new and amended traffic signal infrastructure. The expected construction duration of each individual section will vary between approximately one to two days and three months.

5.4 Construction Programme

An indicative 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 estimated 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: Proposed Scheme Construction Programme

Section No.	Estimated Construction Duration	Approximate Length (m)	Year 1				Year 2			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Section 1a	2 months	480								
Section 1b	6 months	Roundabout								
Section 1c	3 months	700								
Section 1d	7 months	735								
Section 1e	3 months	635								
Section 1f	6 months	915								
Section 1g	3 months	1490								
Section 2a	8 months	850								
Section 2b	9 months	460								
Section 2c	9 months	630								
Section 2d	6 months	710								
Section 2e	8 months	830								
Section 3a	6 months	630								
Section 3b	9 months	1275								
Section 4a	8 months	920								
Section 4b	8 months	880								
Section 4c	6 months	720								
Section 4d	3 months	400								

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 Period

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 any decision by An Bord Pleanála, 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 Compounds, the installation of appropriate fencing/hoarding 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. 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 (hereafter referred to as the Traffic Signs Manual) (Department of Transport, Tourism and Sport 2019). 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 the British Standards Institution (BSI) British Standard (BS) 5837:2012 Trees in Relation to Design, Demolition and Construction (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 (BCIDA-ARP-ENV_LA-0809_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 Impact Assessment 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), 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 of the 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 investigation 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 Compounds

As part of preparatory works, the Construction Compounds 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 Compounds will be secured with Closed-Circuit Television (CCTV) where necessary, 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 Compounds is included in Section 5.7.

5.5.2.9 Lighting

The majority of the Proposed Scheme 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 Compounds 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 5.8.4, 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 residents and business owners 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-1012_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

Access will be maintained for emergency vehicles 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 Compounds for reuse, where practicable, in line with the principles of a 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 Guidelines for the Management of Waste from National Road Construction Projects (TII 2017), and Number 10 of 1996 - Waste Management Act, 1996, as amended (hereafter referred to as the Waste Management Act). The management of materials is discussed in Chapter 18 (Waste & Resources) of this EIAR. The overall estimated quantities of demolition, excavation, and reuse materials for the Proposed Scheme are outlined respectively in Table 18.8, Table 18.9 and Table 18.13 in Chapter 18 (Waste & Resources) of this EIAR. The overall estimated quantities of imported materials for the Proposed Scheme are outlined in Table 19.10 in Chapter 19 (Material Assets) 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 4b and Section 4c. Cycle track construction works at these locations will impact two coal holes to a cellar on Richmond Street South, involving the relocation of the access chambers to the coal chutes further back from the proposed cycle track and into the footway. 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 water bodies 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:

- Watermains;
- Storm water and foul sewers;
- 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 agreement 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 paths, 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 Pavement Treatment Plans (BCIDC-ARP-PAV_PV-1012_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. 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 Drawings (BCIDC-ARP-ENV_LA-1012_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

5.5.4 Structural Works

5.5.4.1 Miscellaneous Structural Works

The miscellaneous structural works which form part of the Proposed Scheme are summarised in Table 5.3. Further details are provided in Section 5.5.4.2.1 to Section 5.5.4.2.5.

Table 5.3: Miscellaneous Structures

Structure Name	Structure Reference	Section Reference
Templeogue Archway	N/a	Section 1c
Rathfarnham Castle Boundary Wall & Woodlands	N/a	Section 2a
Rathfarnham Castle Historic Passageway	N/a	Section 2a
Miscellaneous Retaining Walls	RW01	Section 1d
Digipoles / Digipanel	N/a	Section 4a Section 4b

5.5.4.1.1 Templeogue Archway

The existing freestanding stone arch located to the north of Templeogue Road is to be conserved in its current location during the construction works. The existing fencing around the arch will be removed and the arch

opened up to the public realm. It is proposed to install high quality stone paving, decorative lighting and soft landscaping elements around the arch as well as to construct a new footpath running behind the arch.

5.5.4.1.2 Rathfarnham Castle Boundary Wall & Woodlands

The existing boundary wall at Rathfarnham Castle is approximately 380m in length and will be demolished. A new boundary wall will be constructed over the same length along the Proposed Scheme boundary line. The new boundary wall will be circa 2.5m to 2.8m high with round capping rough cast render. A short 20m section of low wall and railing will be constructed along the new set-back entrance point to the castle grounds as per existing design. Temporary fencing / hoarding will be established along the existing roadside kerb line as well as approximately 3m behind the new boundary line to provide working space and to separate the castle grounds from the construction site. The existing footpath over the length of the boundary wall will be closed, with pedestrians directed to the other side of the road via the existing signalised crossings. Scaffolding will also be required. Once the existing boundary wall is removed and the new wall completed, the appointed contractor will complete the new road widening works. As part of the process of forming the new boundary, a number of trees directly impacted by the works will be removed.

5.5.4.1.3 Rathfarnham Castle Historic Passageway

An underground historic passageway that connected the Castle to an old orchard immediately north of the Rathfarnham Road / Butterfield Avenue junction shall be retained and protected throughout the works. The appointed contractor shall employ specific works methodologies when carrying out construction works in the vicinity of the passageway so as not to compromise the integrity of the passageway. Prior to any construction activities in the area the contractor will be required to carry out exploratory excavations to confirm the exact location, depth and condition of the passageway. A conservation architect and structural engineer shall inspect the exposed passageway in advance of any works and continue do so throughout construction activities in the vicinity of passageway. Demolition of the existing boundary wall and construction of the new wall will also take into consideration the passageway during construction.

5.5.4.1.4 Retaining Walls

Retaining walls with a retained height less than 1.5m are classed as minor structures. There is one minor retaining wall along the Proposed Scheme, as detailed in Table 5.4. Retaining walls are typically installed to cater for level differences between the road and adjoining lands.

Table 5.4: Minor Retaining Walls along the Proposed Scheme

Structure Reference	Chainage (m)	Length (m)	Max Retained Height (m)	Section Reference
RW01	J1490 to J1505	15	1.2	1d

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.

5.5.4.1.5 Digipoles / Digipanel

Existing digital advertising panels will be relocated to facilitate the provision of the Proposed Scheme. The digital advertising panels will be relocated as close as practicable to their current location by the appointed contractor. The digital advertising panels to be relocated are at the following locations:

- Junction of Rathmines Road Upper and Rathmines Road Lower – Outbound footpath;
- Junction of Camden Street Lower and Charlotte Way – Within the central traffic island; and
- Camden Street Lower, to the south of Montague Street – Outbound footpath.

5.5.5 Construction Site Decommissioning

On completion of construction, all construction facilities and equipment such as plant, materials, temporary signage, and laydown areas, Construction Compounds, etc. will be removed. The area which was occupied by the Construction Compounds will be reinstated (refer to the Landscaping General Arrangement Drawings (BCIDC-ARP-ENV_LA-1012_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 and 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 5.5. 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 5.5: Estimated Peak Daily Plant and Equipment Numbers

Plant / Equipment Type	Section																	
	1a	1b	1c	1d	1e	1f	1g	2a	2b	2c	2d	2e	3a	3b	4a	4b	4c	4d
Lorry (including concrete trucks)	10	8	14	14	12	14	4	10	16	14	14	14	14	18	12	14	12	1
Backhoe Mounted Hydraulic Breaker	2	3	3	3	2	2	1	3	2	2	2	2	2	2	2	2	2	0
8t (tonne) Excavator	3	3	4	3	3	3	1	3	3	3	4	4	3	4	4	3	3	1
13t (Rubber Wheeled) Excavator	4	4	4	4	4	4	2	4	2	2	2	2	2	4	4	4	4	1
16t (Rubber Wheeled) Excavator	2	2	3	3	3	3	0	3	3	3	4	4	3	4	4	3	3	0
6t Dumper	4	4	4	6	6	6	2	4	4	4	4	4	4	6	6	6	6	1
Road Planer	2	1	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1
Road Sweeper	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1
Asphalt Paver	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asphalt Roller	3	2	3	3	3	3	1	3	3	3	3	3	3	3	3	3	3	1
3t Roller	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1

5.7 Construction Compounds

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

5.7.1 Construction Compound Locations

The location of the Construction Compounds in relation to the Proposed Scheme are shown in Figure 5.1 in Volume 3 of this EIAR. The Construction Compound locations have been selected due to the amount of available space, their relative locations near to the majority of the Proposed Scheme major works and access to the National and Regional Road network. Refer to Chapter 6 (Traffic & Transport) of this EIAR for an assessment of the construction traffic.

Construction Compound TR1 will be located south of the Spawell roundabout, at the Tallaght Road / Spawell Link Road junction, as shown in Image 5.1. The area of Construction Compound TR1 is approximately 330m².

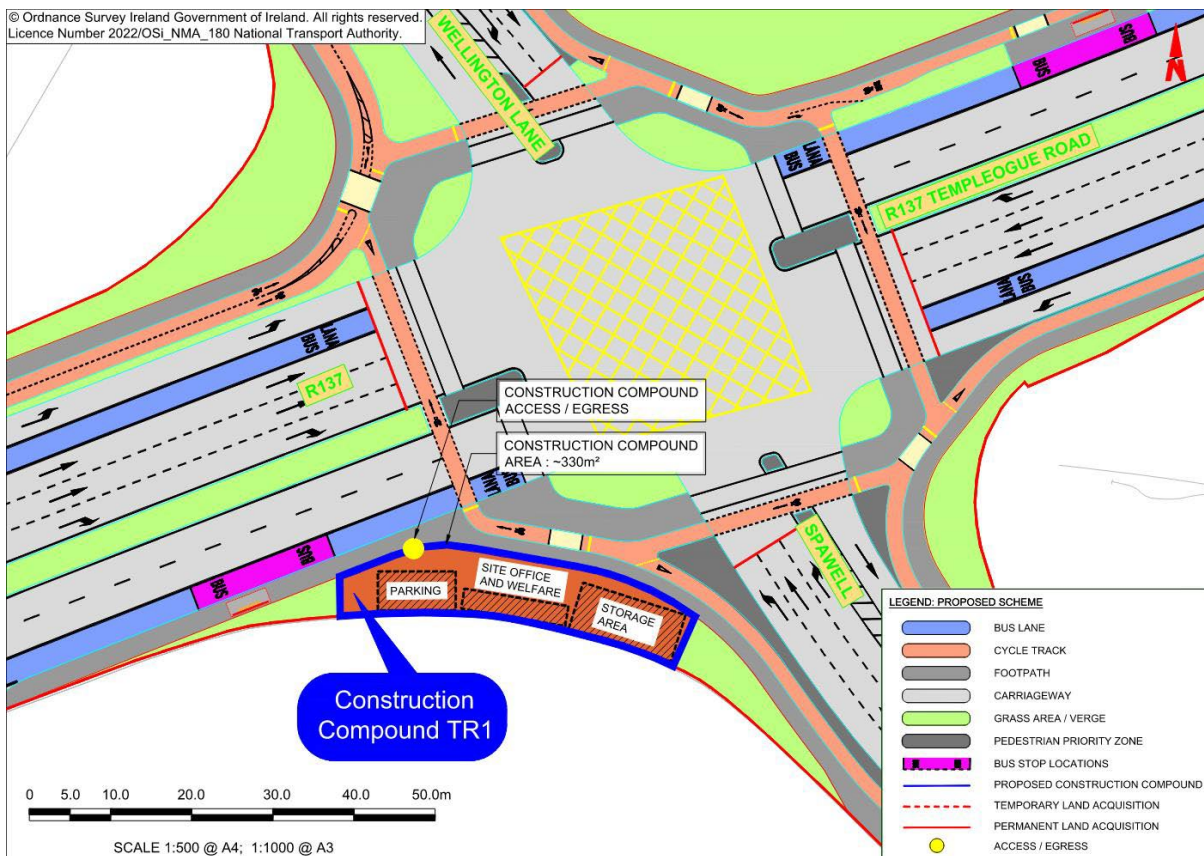


Image 5.1: Location and Extent of Construction Compound TR1

Construction Compound TR2 will be located north-west of Terenure Road North, between Eaton Road and Eagle Hill Avenue, as shown in Image 5.2. The area of Construction Compound TR2 is approximately 110m².

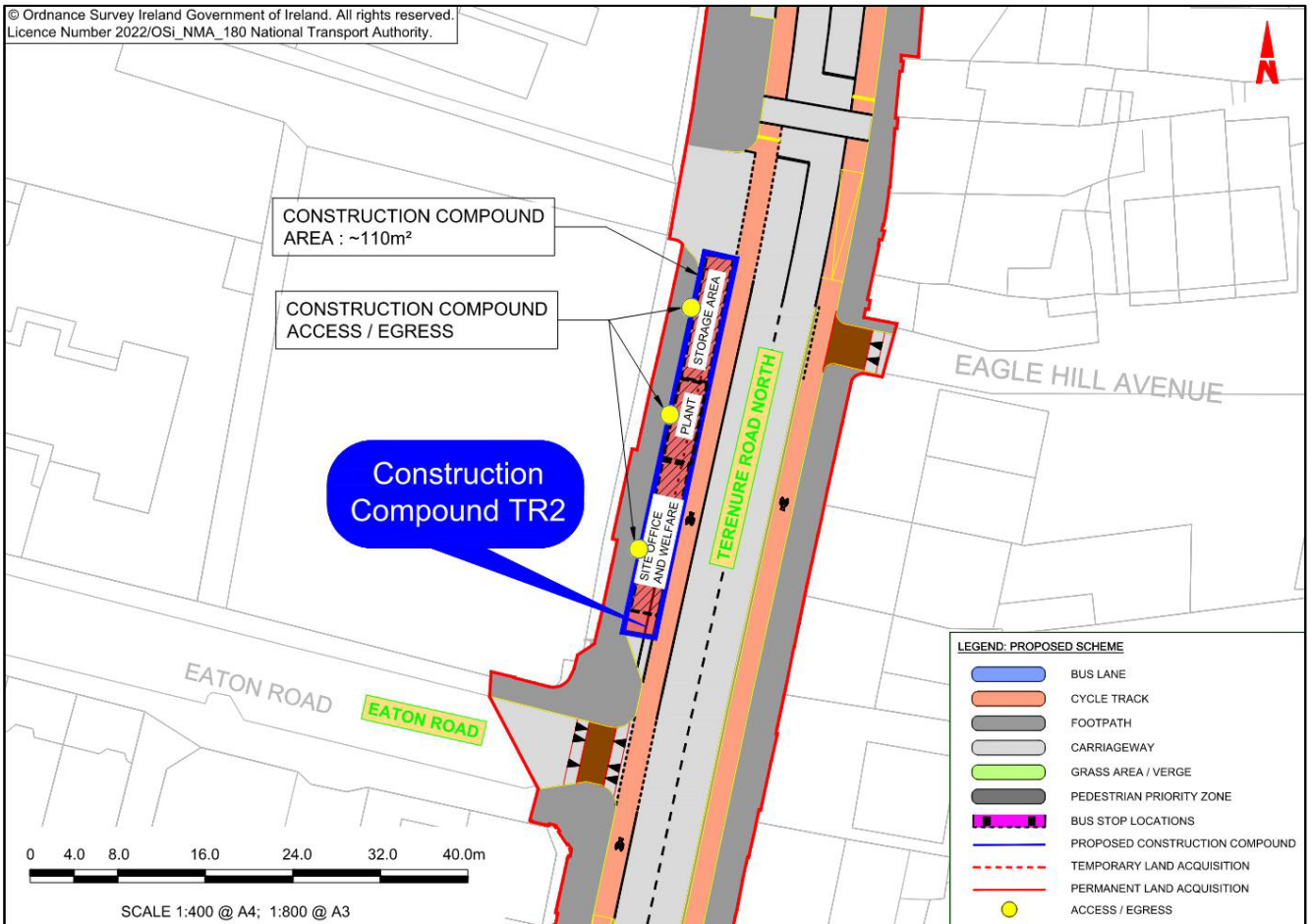


Image 5.2: Location and Extent of Construction Compound TR2

Construction Compound TR3 will be located along Dodder View Road, across the road from Bushy Park, in the greenfield area between Dodder View Road, Woodview Cottages and Church Lane, as shown in Image 5.3. The area of Construction Compound TR3 is approximately 5,120m².

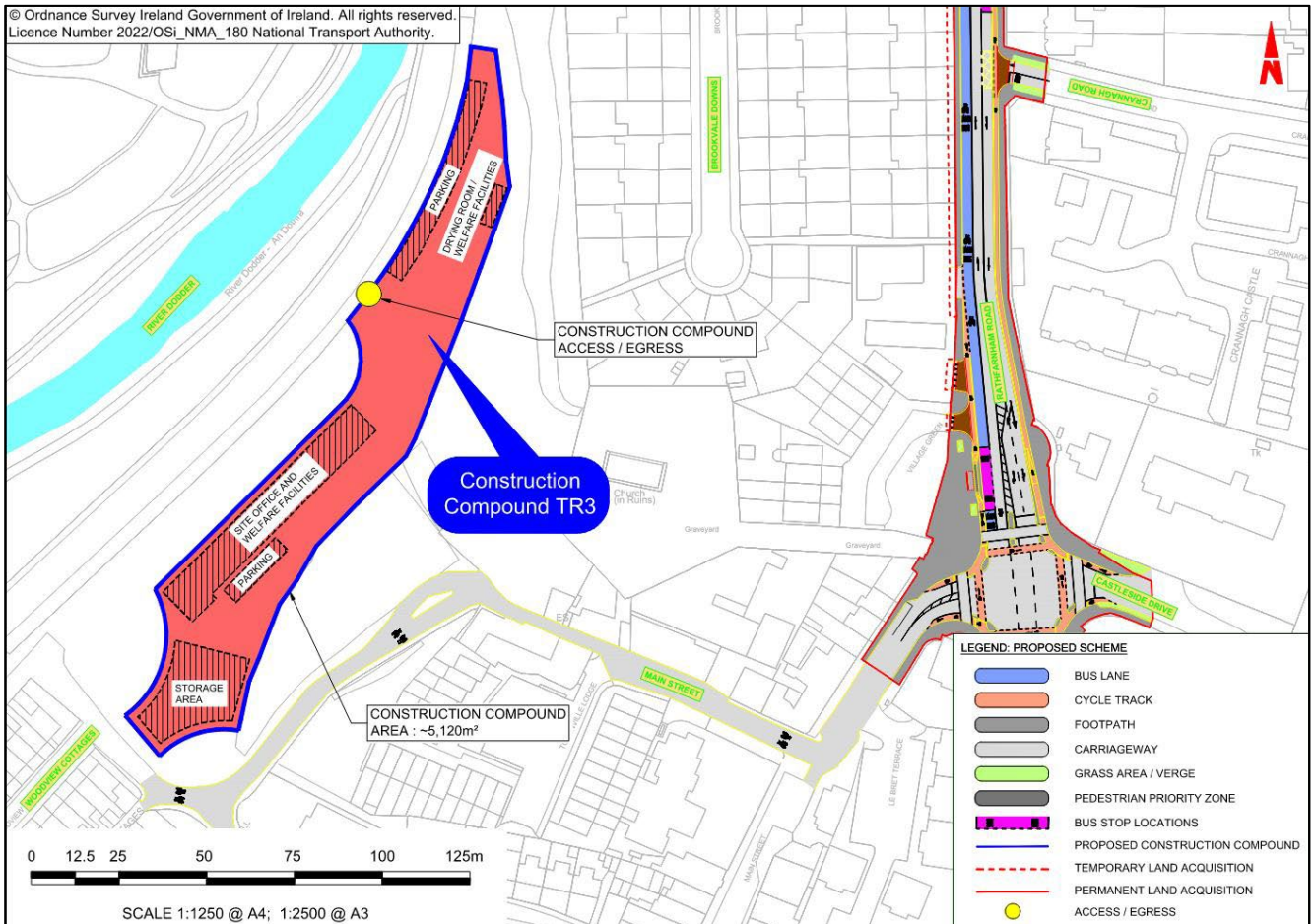


Image 5.3: Location and Extent of Construction Compound TR3

Construction Compound TR4 will be located on Military Road, perpendicular to Rathmines Road Lower, south of St Marys College, as shown in Image 5.4. The area of Construction Compound TR4 is approximately 90m².

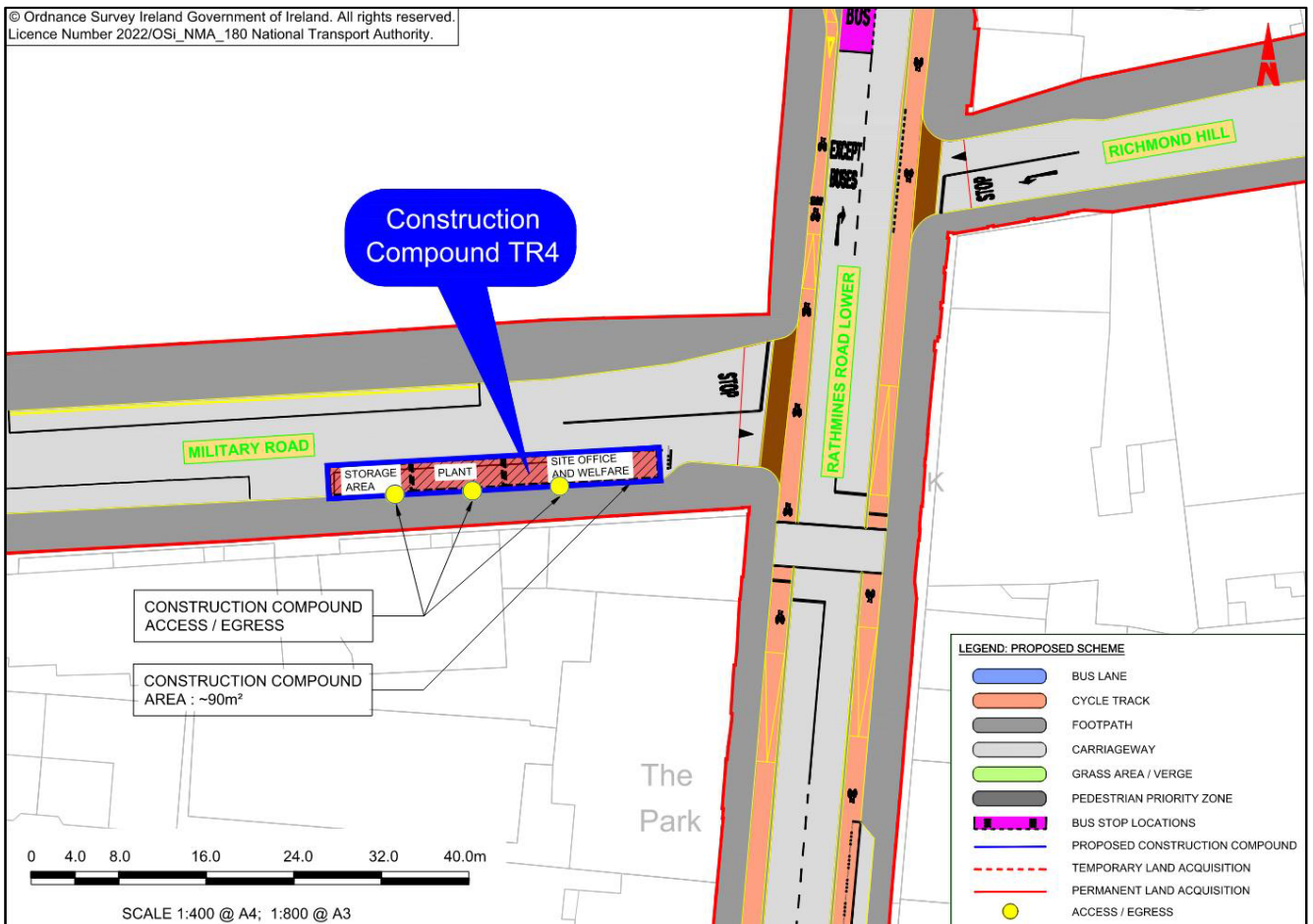


Image 5.4: Location and Extent of Construction Compound TR4

Construction Compound TR5 will be located on Richmond Street South, on the slip road between Richmond Street South and Harcourt Road, as shown in Image 5.5. The area of Construction Compound TR5 is approximately 70m².

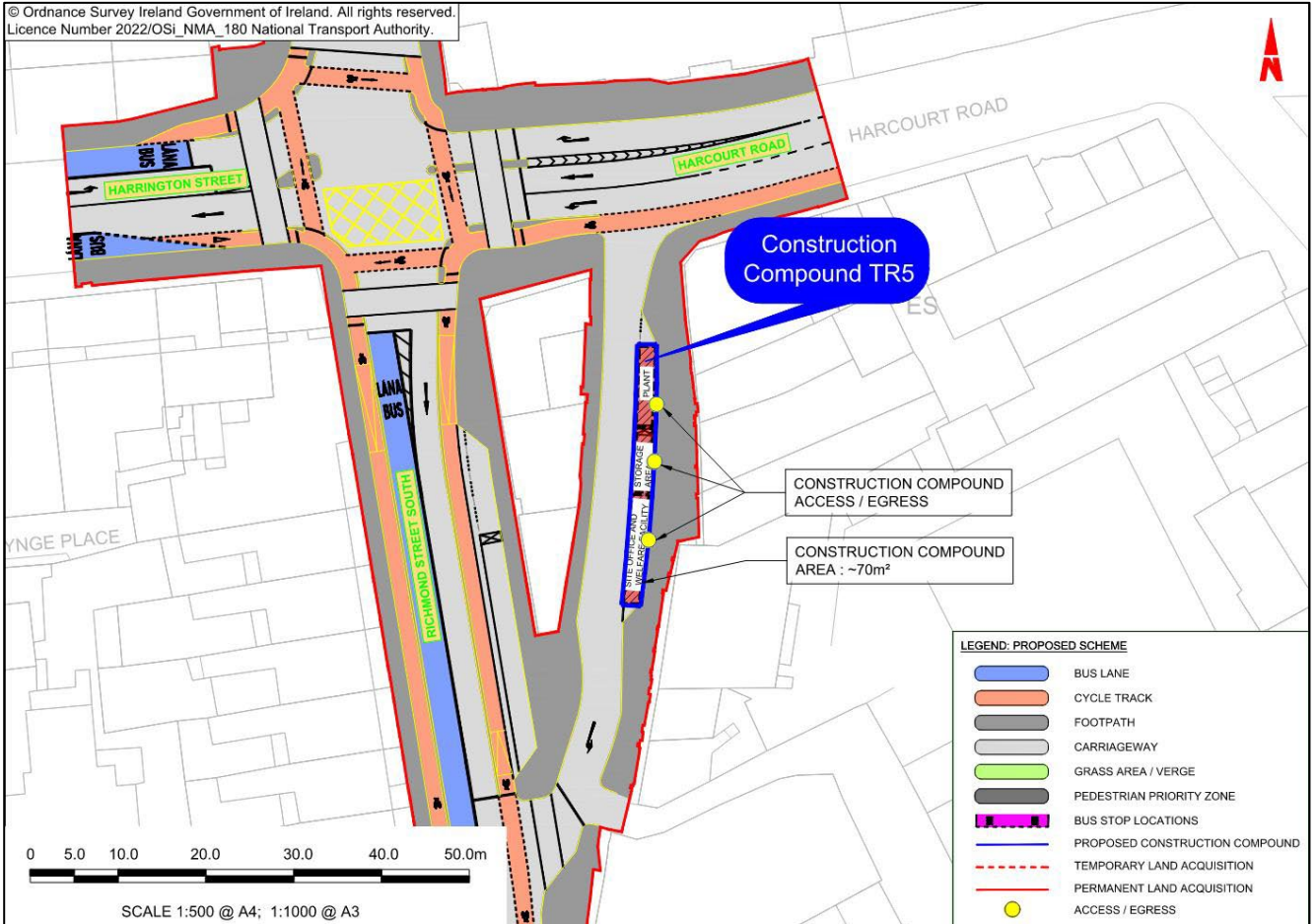


Image 5.5: Location and Extent of Construction Compound TR5

Construction Compound TR6 will be located on Spawell Link Road, between Spawell Roundabout and Firhouse Road, as shown in Image 5.6. The area of Construction Compound TR6 is approximately 3,170m².

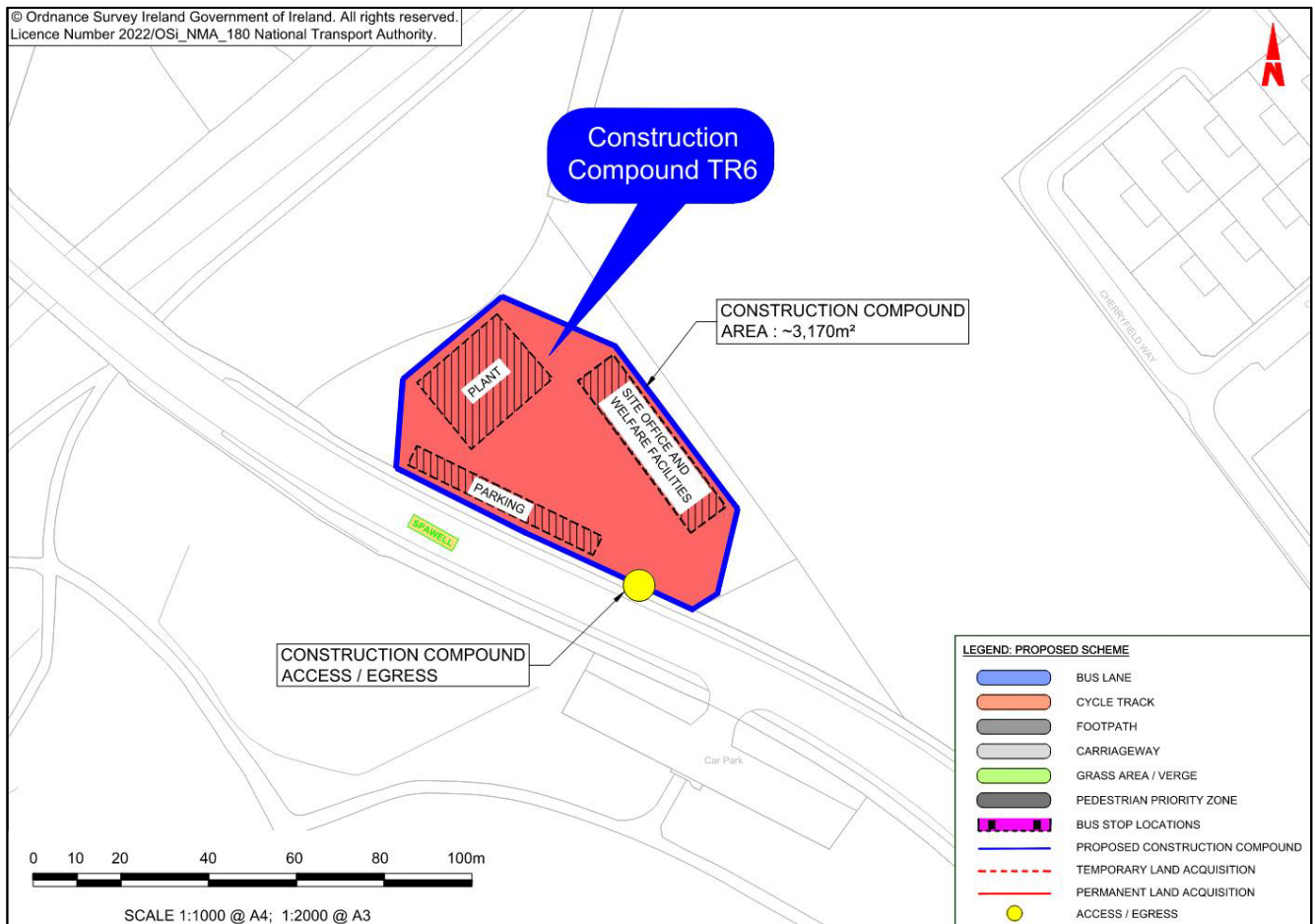


Image 5.6: Location and Extent of Construction Compound TR6

5.7.2 Construction Compound Activities

Construction Compound TR3 will be the main Construction Compound, and Construction Compound TR1, Construction Compound TR2, Construction Compound TR4, Construction Compound TR5 and Construction Compound TR6, will be the satellite Construction Compounds serving the Proposed Scheme.

As shown in Image 5.1 to Image 5.5, the Construction Compounds will contain a site office and welfare facilities for NTA personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds, 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 Compounds for reuse, as necessary. Items of plant and equipment, described in Section 5.6, will also be stored within the Construction Compounds.

All necessary authorisations, under the Waste Management Act, as amended, will be obtained prior to undertaking temporary storage. Certain materials will be reused, where practicable, primarily excavated material. Further information on the reuse of material within the Proposed Scheme is included in Chapter 18 (Waste & Resources) of this EIAR. Further information on the 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 Compounds 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 Compounds, as described in Section 5.5.2.9. Access to the Construction Compounds will be restricted to site personnel and authorised visitors only.

The Construction Compounds 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 Compounds, for example, to minimise the risk of fuel spillage, and to ensure that the Construction Compounds 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 is included 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 areas will be cleared and reinstated to match pre-existing conditions.

5.8 Construction Traffic Management

A 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 Phase 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 (Department of Transport, Tourism and Sport 2019). Construction traffic management measures are summarised in Section 5.8.3 to Section 5.8.4, 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 (Department of Transport, Tourism and Sport 2019) 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. Where this is not practicable, pedestrians will be directed to use the footpath the opposite side of the road, crossing at controlled crossing points.

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. This will be done in discussion with the NTA, and service providers. 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 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 this will be 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 5.8.3.4.

5.8.3.1 Section 1: Tallaght Road, Templeogue Road to Rathfarnham Road

5.8.3.1.1 Section 1a: M50 to Spawell Roundabout

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

- Stage 1 – Construction works on the central reservation, traffic reduced to two lanes in each direction, and realigned to the verges, as shown in Image 5.6;
- Stage 2 – Construction works on the outer verges, bus lanes closed and traffic reduced to two lanes in each direction, and realigned to the central reservation, as shown in Image 5.7; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

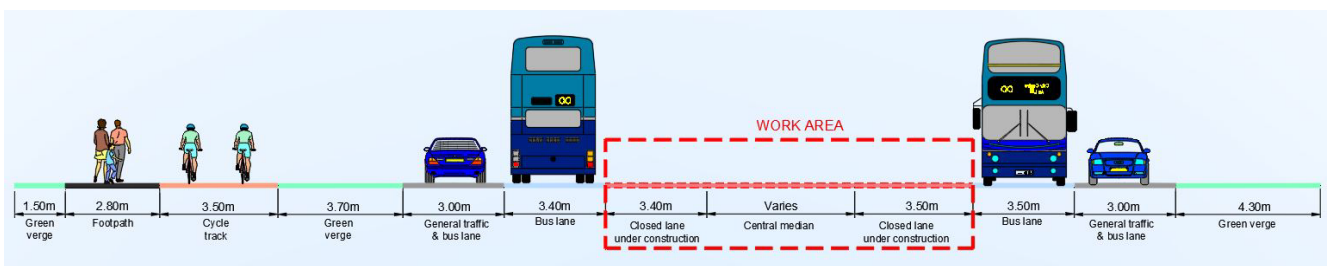


Image 5.7: Traffic Management Cross Section, Section 1a and Section 1c – Stage 1

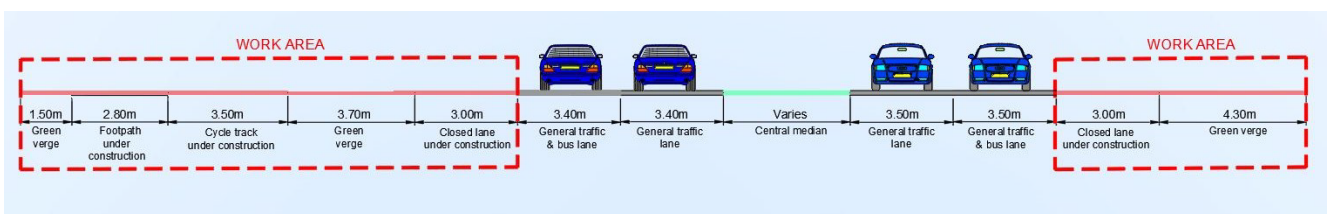


Image 5.8: Traffic Management Cross Section, Section 1a and Section 1c – Stage 2

5.8.3.1.2 Section 1b: Spawell Roundabout

The Spawell Roundabout will be upgraded from a roundabout to a signalised junction. The works at section 1b will be undertaken in a phased manner, in conjunction with the phasing of Sections 1a and 1c, to allow traffic to continue to use the junction as it is being upgraded. The roundabout will be broken out and surfaced, and out-of-hour closures are likely to be required for surfacing and white lining works.

Section 1c: Spawell Roundabout to Cypress Grove Junction

The construction works in Section 1b, Spawell Roundabout, will run concurrently with Section 1a and 1c. The works at Section 1c will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the central reservation, traffic reduced to two lanes in each direction, and realigned to the verges, as shown in Image 5.6;

- Stage 2 – Construction works on the outer verges, bus lanes closed and traffic reduced to two lanes in each direction, and realigned to the central reservation, as shown in Image 5.7; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.1.3 Section 1d: Cypress Grove Junction to Templeville Road

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

- Stage 1 – Construction works on the eastbound side, traffic realigned in narrow lanes to the south, as shown in Image 5.8;
- Stage 2 – Construction works on the westbound side, traffic realigned in narrow lanes to the newly constructed area on the north, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

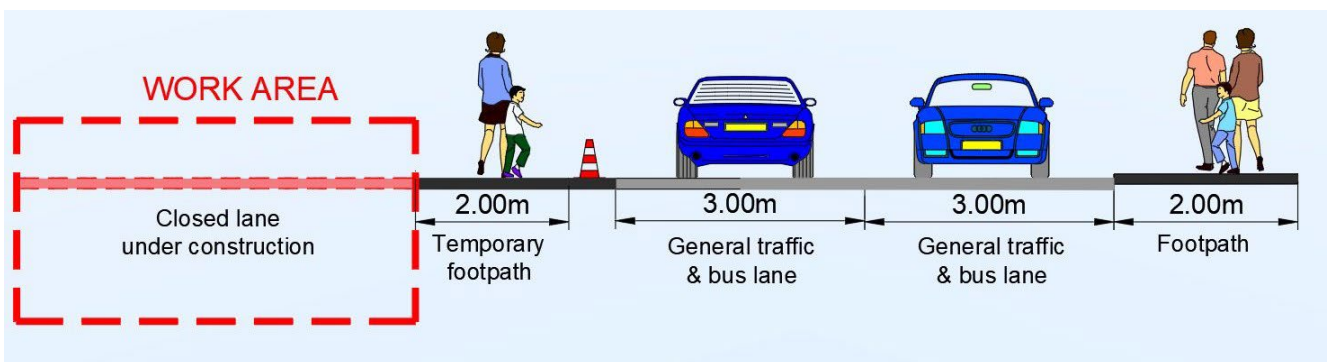


Image 5.9: Traffic Management Cross Section, Section 1d, Section 1e, Section 1f, Section 2a, Section 2b, Section 2c, Section 2d, Section 2e, Section 3a, Section 3b, Section 4a, Section 4b, and Section 4c – Stage 1

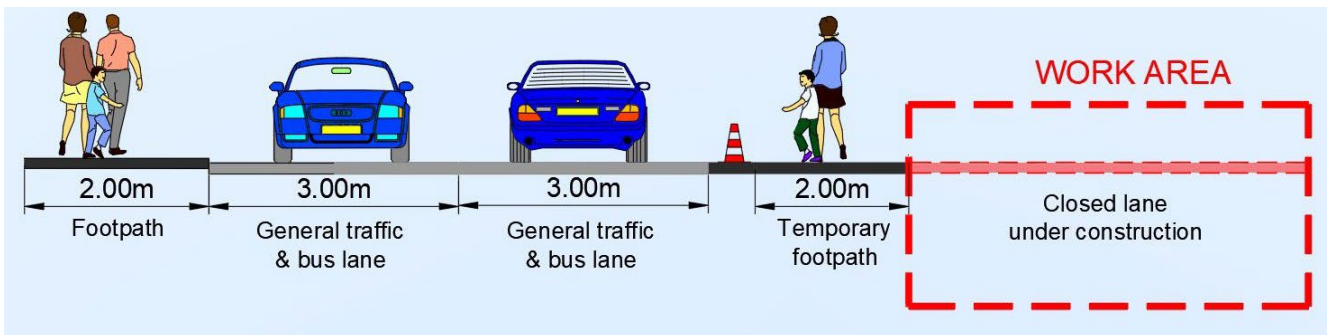


Image 5.10: Traffic Management Cross Section, Section 1d, Section 1e, Section 1f, Section 2a, Section 2b, Section 2c, Section 2d, Section 2e, Section 3a, Section 3b, Section 4a, Section 4b, and Section 4c – Stage 2

5.8.3.1.4 Section 1e: Templeville Road to Rathdown Avenue

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

- Stage 1 – Construction works on the eastbound side, traffic realigned in narrow lanes to the south, as shown in Image 5.8;
- Stage 2 – Construction works on the westbound side, traffic realigned in narrow lanes to the newly constructed area on the north, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

During construction, the NTA and the appointed contractor will liaise with the organisers of the Bushy Park Market at Bushy Park, to ensure any disruption to the market is kept to a minimum.

5.8.3.1.5 Section 1f: Rathdown Avenue to Terenure Road North

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

- Stage 1 – Construction works on the eastbound side, traffic realigned in narrow lanes to the south, as shown in Image 5.8;
- Stage 2 – Construction works on the westbound side, traffic realigned in narrow lanes to the newly constructed area on the north, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

Due to the proposed introduction of a bus gate at this section, only public service vehicles, bicycles and local access will be permitted during construction and on completion of the construction works.

5.8.3.1.6 Section 1g: Rathdown Crescent, Rathdown Park, Bushy Park Road, Wasdale Park, Wasdale Road, Wasdale Grove, Victoria Road, Zion Road and Orwell Road

The works at Section 1g will generally be completed under localised traffic management measures with the use of temporary traffic lights. Where works are to take place across the full width of the carriageway, the works will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the eastbound/northbound side, traffic realigned in narrow lanes to the south/east, as shown in Image 5.8;
- Stage 2 – Construction works on westbound/southbound side, traffic realigned in narrow lanes to the newly constructed area on the north/west, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.2 Section 2: Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road

5.8.3.2.1 Section 2a: Grange Road Junction to Main Street Junction

The construction works in Section 2a will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on the northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.2.2 Section 2b: Main Street Junction to Dodder Park Road

The construction works in Section 2b will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the northbound side, traffic realigned in narrow lanes to the east, as shown in Image 5.8;
- Stage 2 – Construction works on the southbound side, traffic realigned in narrow lanes to the newly constructed area on the west, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.2.3 Section 2c: Dodder Park Road to Terenure Junction

The construction works in Section 2c will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and

- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.2.4 Section 2d: Rathfarnham Junction to Mount Tallant Avenue

The construction works in Section 2d will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.2.5 Section 2e: Mount Tallant Avenue to Harold's Cross

The construction works in Section 2e will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.3 Section 3: Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road

5.8.3.3.1 Section 3a: Terenure Junction to Rathgar Avenue

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

- Stage 1 – Construction works on the eastbound side, traffic realigned in narrow lanes to the south, as shown in Image 5.8;
- Stage 2 – Construction works on the westbound side, traffic realigned in narrow lanes to the newly constructed area on the north, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.3.2 Section 3b: Rathgar Avenue to Rathmines Road

The construction works in Section 3b will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.4 Section 4: Charleville Road to Dame Street

5.8.3.4.1 Section 4a: Rathgar Road to Grove Road

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

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

The construction works on Richmond Hill and Military Road will be completed under localised traffic management measures with the use of temporary traffic lights.

5.8.3.4.2 Section 4b: Grove Road to Cuffe Street

The construction works in Section 4b will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

The NTA and the appointed contractor will liaise with stakeholders located along the scheme to ensure access is maintained to all properties and businesses, and that disruption is kept to a minimum during construction.

5.8.3.4.3 Section 4c: Cuffe Street to Dame Street

The construction works in Section 4c will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 2 – Construction works on northbound side, traffic realigned in narrow lanes to the newly constructed area on the east, as shown in Image 5.9; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

The NTA and the appointed contractor will liaise with stakeholders located along the scheme to ensure access is maintained to all properties and businesses, and that disruption is kept to a minimum during construction.

5.8.3.4.4 Section 4d: Offline Sections

The construction works at Section 4d will be completed under localised traffic management measures with the use of temporary traffic lights.

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. 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 (Department of Transport, Tourism and Sport 2019). All road closures and diversions will be determined by the NTA, in consultation with the local authority and An Garda Síochána, as necessary. As mentioned previously, 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 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 appointed 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 Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007), and the handbook published by 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 to Chapter 21, 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 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 appointed 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 appointed 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 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 appointed 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, reuse and recycling are achieved. It will be a condition of the Employer's Requirements that the successful appointed 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 Employer's Requirements that the successful appointed 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 to Chapter 21 and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

5.10.3 Construction Working Hours

It is generally envisaged that 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 to facilitate street works that cannot be undertaken during daytime / evening 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 Number 10 of 2005 - Safety, Health and Welfare at Work Act 2005, S.I. No. 291/2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013 (hereafter referred to as the Regulations) and other relevant Irish and European Union 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.

5.10.6 Monitoring Measures

All monitoring measures relating to the Construction Phase of the Proposed Scheme have been set out in various chapters of the EIAR and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

5.11 References

BSI (2010). BS 3998:2010 Tree Work – Recommendations

BSI (2012). BS 5837:2012 Trees in Relation to Design, Demolition and construction

CIRIA (2015). Environmental Good Practice on Site Guide, 4th Edition

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

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

TII (2011). TII Specification for Road Works Series 100

TII (2017). Guidelines for the Management of Waste from National Road Construction Projects

Directives and Legislation

Number 10 of 1996 - Waste Management Act, 1996, as amended

Number 10 of 2005 - Safety, Health and Welfare at Work Act 2005

S.I. No. 291/2013 -Safety, Health and Welfare at Work (Construction) Regulations 2013