# Chapter 05
# Construction Strategy

# Contents



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# 5. Construction Strategy

## 5.1 Introduction

This chapter provides a description of the general activities associated with the construction of the Proposed Development. The design, operation and decommissioning of the Proposed Development are described separately in **Chapter 4**, *Description of the Proposed Development*.

This chapter of the EIAR has been prepared in accordance with Part 1 of Annex IV of the EIA Directive (2014/52/EU, amending 2011/92/EU). This section therefore provides the following information:

- Description of the construction works associated with the Proposed Development;
- Duration and phasing during the Construction Phase;
- Land use requirements to support the construction of the Proposed Development;
- Likely activities required to prepare the site and undertake the enabling works to support the construction of the Proposed Development;
- An overview of anticipated employment numbers, hours of working and construction safety measures which will be enforced during the construction of the Proposed Development; and
- An overview of typical site, materials and environmental management measures associated with the construction of the Proposed Development.

The Construction Environmental Management Plan (CEMP), which describes the minimum requirements that the Contractors will be required to implement, is provided in **Appendix 5.1** in **Volume 4** of this EIAR.

## 5.2 Overview of Proposed Development

The Proposed Development will function as an active travel link for pedestrian and cyclists to travel from the Little Island train station and surrounds to the Eastgate Business Park and the further surrounds of Little Island. It will also promote the use of sustainable public transport modes by providing a safe and attractive link for people travelling between Little Island train station and the wider Little Island area.

The Proposed Development will cross the following areas from north to south:

- Northern amenity park area;
- Cork City to Midleton / Cobh Irish Rail line;
- N25 national road dual carriageway;
- Wooded area, south of the N25; and
- Radisson Blu Hotel and Eastgate Business Park car parks.

The site is bounded by the L3004 Glounthaune Road to the north. Levels at the tie in to the Little Island train station area are approximately +2.5mOD, while levels at the at tie in to the Radisson Blu Hotel car park are approximately 5.2mOD. On the southwest of the site, there is a 1.1m drop in elevation between the Radisson Blu Hotel car park and the adjacent Eastgate Business Park car park (5.5mOD to 4.4mOD).

The proposed crossing main spans (N25 & Irish Rail) consist of a single span steel network arch structure over the N25 and a 2-span precast concrete segmental portal frame structure over the Irish Rail track and adjacent land to the south. The spans of these structures will be approximately 49m (N25) and 2x15m (Irish Rail).

Access ramps to main spans will consist of a combination of reinforced concrete elevated structures, embankments, landscaping and some at grade sections with minor cut or fill. For the northern approach

ramp, the lower ramp section will be a steepened slope green embankment transitioning into a reinforced concrete elevated ramp structure for higher sections in a north / south direction. The southern access ramp section between the Radisson Blu Hotel car park and the N25 bridge tie in is proposed to be an elevated reinforced concrete structure due to the sharp fall off in level to the north and east of the Radisson Blu Hotel car park. A retained embankment is proposed on the west side tie-in to the Radisson Blu Hotel car park from the lower Eastgate Business Park car park.

For the northern elevated ramp, a bespoke architectural concrete structure with single circular piers is proposed as the public will have access below the structure. For the southern elevated ramp, a more economical precast prestressed bridge beam structure with two column piers and crossheads is proposed. Illustrative examples of the types of structures are shown in **Chapter 4**, *Description of the Proposed Development.*

## 5.3 Indicative Construction Phasing

The commencement of construction works for the Proposed Development is subject to obtaining statutory consent, funding and the relevant permits and licences.

Construction is expected to commence in 2025, with the development becoming operational in 2026.

The approach outlined in **Table 5.1** represents an indicative, reasonable scenario as to how the Proposed Development may be constructed with regards to the sequencing and duration of activities. While the general requirements detailed in this section will be followed, the contractor, when appointed, will ultimately be responsible for the sequencing and implementation of the works in a safe and secure manner and in accordance with all statutory requirements.

It should be noted that trees and vegetation will not be removed between 1st March and 31st August to avoid direct impacts on nesting birds. Tree removal will be carried out in accordance with the Arboricultural Impact Assessment report (refer to **Appendix 8.1** in **Volume 4** of this EIAR).

**Table 5.1: Indicative construction phasing for key activities**

| Activities | M 1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 | M12 | M13 | M14 | M15 | M16 | M17 | M18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tender award | | | | | | | | | | | | | | | | | | |
| Bridge fabrication planning and approval | | | | | | | | | | | | | | | | | | |
| Site access, clearance and tree removal. Set up of construction compounds and construction surfacing. | | | | | | | | | | | | | | | | | | |
| Utility diversion | | | | | | | | | | | | | | | | | | |
| Bridge superstructure fabrication and precast concrete element casting (offsite) | | | | | | | | | | | | | | | | | | |
| Northern approach ramp embankment construction | | | | | | | | | | | | | | | | | | |
| Northern approach elevated ramp foundation construction (piling and substructure) | | | | | | | | | | | | | | | | | | |
| Irish Rail structures construction | | | | | | | | | | | | | | | | | | |
| Northern approach ramp elevated section deck construction | | | | | | | | | | | | | | | | | | |
| Southern approach ramp foundation construction (piling and substructure) | | | | | | | | | | | | | | | | | | |
| Southern approach ramp elevated section deck construction | | | | | | | | | | | | | | | | | | |
| N25 bridge foundation and abutment construction | | | | | | | | | | | | | | | | | | |
| N25 span assembly (offline) | | | | | | | | | | | | | | | | | | |
| N25 span erection | | | | | | | | | | | | | | | | | | |
| Ramp and bridge deck finishing (installation of lights, parapets, handrails, surfacing etc.) | | | | | | | | | | | | | | | | | | |
| Construction of southern embankment ramp | | | | | | | | | | | | | | | | | | |
| Tie in footway / cycleway construction and final landscaping / tree planting | | | | | | | | | | | | | | | | | | |

Note: M1, M2 etc. = Month 1, Month 2, etc.

## 5.4 Land Use Requirements

Construction of the Proposed Development will require temporary land take to accommodate two construction compounds, one bridge assembly area and additional on site activities.

Permanent land take is required for the construction of bridge abutments / piers and embankments in the Little Island train station area, northern amenity park area, Irish Rail tracks and adjacent land, land adjacent to the N25 (north and south), the southern woodland area, the Radisson Blu Hotel car park and the Eastgate Business Park car park.

Privately owned lands within the footprint of the Proposed Development will be acquired by Cork County Council (CCC). The private landowners that have been consulted with by CCC are:

- Irish Rail;
- Radisson Blu Hotel, Little Island;
- Private owner of land to south of N25; and
- O'Flynn Developments.

The construction footprint of the Proposed Development, including the construction compounds and bridge assembly area, is approximately 1.7 hectares. The construction footprint of the final works (excluding planting and minor tie in footpaths in the northern park amenity area) is approximately 0.3 hectares.

### 5.4.1 Construction compounds

Two construction compounds will be provided, one in the northern amenity park / Little Island train station area and one in the Radisson Blu Hotel car park area. Refer to **Image 5.1** for the locations of the proposed construction compounds. Proposed entry / exit points for the compounds and bridge assembly area are also shown.

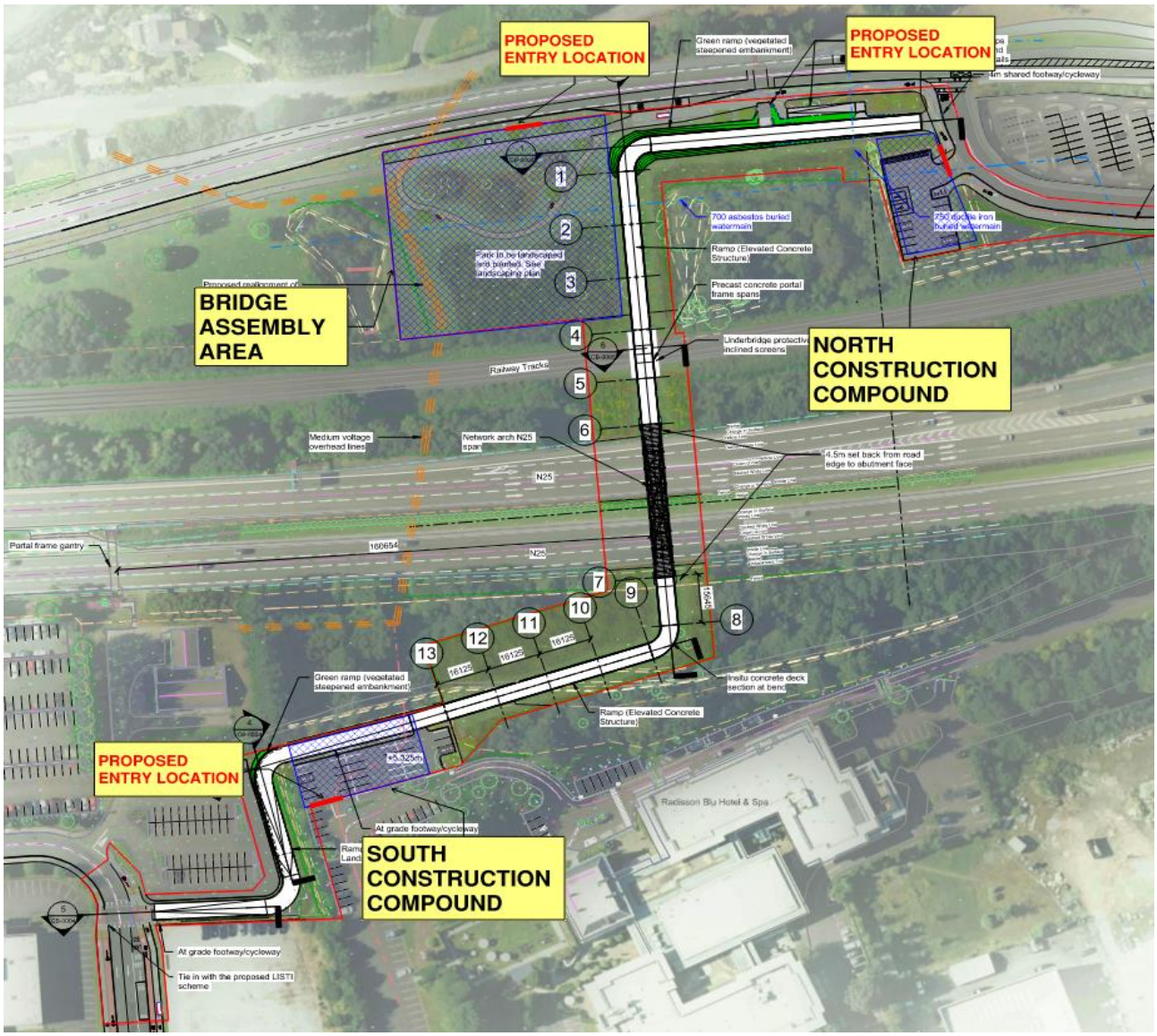


**Image 5.1: Proposed construction compounds and bridge assembly area**

Both construction compounds, the bridge assembly area and the overall site will be safely secured, and a detailed Construction Traffic Management Plan (CTMP) will be put in place by the contractor to facilitate vehicle and pedestrian diversions.

The construction compounds will provide the following:

- Space for materials lay down;
- Wheel wash facilities;
- Construction waste storage;
- Site offices;
- Electricity supplied by mains and /or an onsite generator;
- IT / telecommunication connection;
- Water supplied from the public watermain; and
- Mobile welfare facilities – either mobile welfare vans, towed units or self-contained units will be provided for construction personnel and will be fully bunded with foul sewage removed and disposed of off-site.

A designated bunded refuelling area on an impermeable surface will be provided at the construction compounds. Refuelling of vehicles will be restricted to these designated areas.

Specific controls / mitigation measures will be put in place to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase. These will be outlined in a Surface Water Management Plan (SWMP) that will be prepared and implemented by the contractor as part as part of the CEMP in advance of the commencement of the construction works.

Site drainage will be provided at the construction compounds to collect surface water runoff, which will be directed into the existing local drainage network. Surface water or contaminants within the construction compounds will not be released from the site to any waters or the bed and banks of any waters (including ground water).

Once construction works are complete, structures and facilities will be removed, with the construction compounds reinstated to their original condition.

### 5.4.2 Bridge assembly area

In addition to the construction compounds, a bridge assembly area will be required for assembly and erection works associated with the proposed N25 bridge structure, the northern elevated ramp structure and the precast segmental concrete portal frame structures over the Irish Rail line. This bridge assembly area, which will occupy a section of the northern amenity park area owned by CCC, located off the L3004 Glounthaune Road, will not be used for initial fabrication of the N25 bridge span or casting of precast concrete sections. These operations will occur off site. This area will be used for assembly of elements prior to erection.

As with the construction compounds, the bridge assembly area will be safely secured to prevent public access.

Within the bridge assembly area, the N25 bridge structure will be fully enclosed with a temporary scaffolding enclosure to allow for the assembly of the bridge, the welding of its segments together and potential paint repair of the bridge should it have become damaged in transit.

The bridge assembly area will contain all necessary functions similar to the construction compounds (e.g., bunded oil storage, welfare facilities etc).

Once the Proposed Development has been constructed, all structures and facilities will be removed, with the bridge assembly area landscaped as per the landscape plan (refer to Drawing No. LIPB-BSM-ZZ-XX-DR-L-0001 in **Volume 3** of this EIAR).

The location of the bridge assembly area is illustrated in **Image 5.1**.

## 5.5 Geotechnical Investigation

In order to ascertain the underlying ground conditions onsite, preliminary site investigations were carried out. The results of the site investigations are described in more detail in **Chapter 17**, *Land, Soils, Geology and Hydrogeology* of this EIAR.

## 5.6 Construction Methods

The construction of the Proposed Development will be completed using a combination of construction methods in a number of stages. Construction will be undertaken using internationally accepted methods. The likely stages of construction are as follows:

- Stage 1 – Site clearance, access and construction compounds;
- Stage 2 – Utility diversion;
- Stage 3 – Bridge fabrication;
- Stage 4 – Foundation construction;
- Stage 5 – Bridge transportation;

- Stage 6 – Bridge assembly;
- Stage 7 – Bridge erection; and
- Stage 8 – Completion of works.

It should be noted that where more than one potential construction method has been identified in the sections below, the reasonable worst-case option from an environmental perspective has been assessed throughout this EIAR.

### 5.6.1 Stage 1 – Site Clearance, access and construction compounds

A CEMP has been prepared for the Proposed Development and is included in **Appendix 5.1** in **Volume 4** of this EIAR. Prior to commencement of works, the contractor will further develop the CEMP and agree its content with CCC. Once agreed with CCC, the CEMP will be implemented and site clearance works will be carried out, with fencing also erected along the Proposed Development boundary.

Site clearance including vegetation clearance will be undertaken within the Proposed Development boundary and in accordance with the methodology outlined in the CEMP (refer to **Appendix 5.1** in **Volume 4** of this EIAR). Trees and vegetation will not be removed between 1st March and 31st August to avoid direct impacts on nesting birds. Tree removal will be carried out in accordance with the Arboricultural Impact Assessment report (refer to **Appendix 8.1** in **Volume 4** of this EIAR). Trees to be retained will be identified and protected to avoid accidental damage during the construction works.

Site drainage will be provided to collect surface water runoff, which will be directed into a site water treatment facility before being discharged to the local drainage network. Drainage ponds, silt traps and interceptor ditches will be constructed in advance of the main earthworks to collect, treat and discharge all surface water run off during construction. Specific controls / mitigation measures will be put in place to manage runoff and minimise pollution to receiving waterbodies during the Construction Phase. These will be outlined in a SWMP that will be prepared and implemented by the contractor as part as part of the CEMP in advance of the commencement of the construction works.

As mentioned in **Section 5.4**, two construction compounds and one bridge assembly area will be required for the Proposed Development. Hoarding or fencing (2.4 metres in height as a minimum), which will remain in-situ for the duration of the works, will be erected around the construction compounds and the bridge assembly area. Site offices and welfare facilities will be installed within the construction compounds.

#### *5.6.1.1 Access to foundations in Irish Rail land*

To facilitate the construction of the precast concrete portal frame structures across Irish Rail land and the northern abutment of the N25 bridge span, access will be required to Irish Rail land. This access will be obtained in agreement with Irish Rail. Access is proposed to be from the northern amenity park area and via the N25 hard shoulder for site clearance. The train line service will remain unaffected by the works, with safe working areas and appropriate protection in line with Irish Rail requirements being set up along the track zone.

Access for the construction of the span crossing the railway line will take place during a temporary track closure in agreement with Irish Rail. This is anticipated to be a weekend closure during the Christmas or Easter downtime periods.

#### *5.6.1.2 Access to foundations adjacent to the N25*

Access for construction of the northern foundations and abutment adjacent to the N25 will be via a localised closure of the hard shoulder and slip lane adjacent to the abutment to form a works area, with associated traffic management on either side of the works area. This will enable construction access and egress as well as protection for the works area. The exit to N25 junction 2 on the eastbound slip lane is proposed to be maintained. Abutments will be constructed in a planned accelerated programme to minimise the duration that traffic management is required.

The southern abutment for the N25 bridge structure is proposed to be constructed with access from the southern wooded area. Therefore, no significant traffic management on the N25 is anticipated to be required for these works.

Access to the entire N25 will be required for the bridge steelwork erection during an overnight / weekend closure of the highway. A diversion is expected for eastbound traffic from the western side of junction 1 and the eastern side of junction 2 via the L3004 Glounthaune Road. Traffic in an eastbound direction is expected to be diverted off the westbound exit from N25 junction 2 and via the L3004 Glounthaune Road to the Dunkettle Interchange.

#### *5.6.1.3 Access to southern wooded area*

Access to the southern wooded area will be primarily via the construction compound in the existing Radisson Blu Hotel car park. Following site clearance works, a temporary construction surface will be placed to allow plant and machinery access for the construction of the south abutment of the N25 bridge, as well as the foundations and structure for the south elevated ramp.

Due to the variable level changes in this area and to allow construction access, it is anticipated that a temporary access ramp will be constructed of hardcore fill material, with an anticipated width of 5-10m and a longitudinal slope of approximately 1:10. The lower area will be levelled to allow for construction and craneage. Refer to **Image 5.2** for further details.

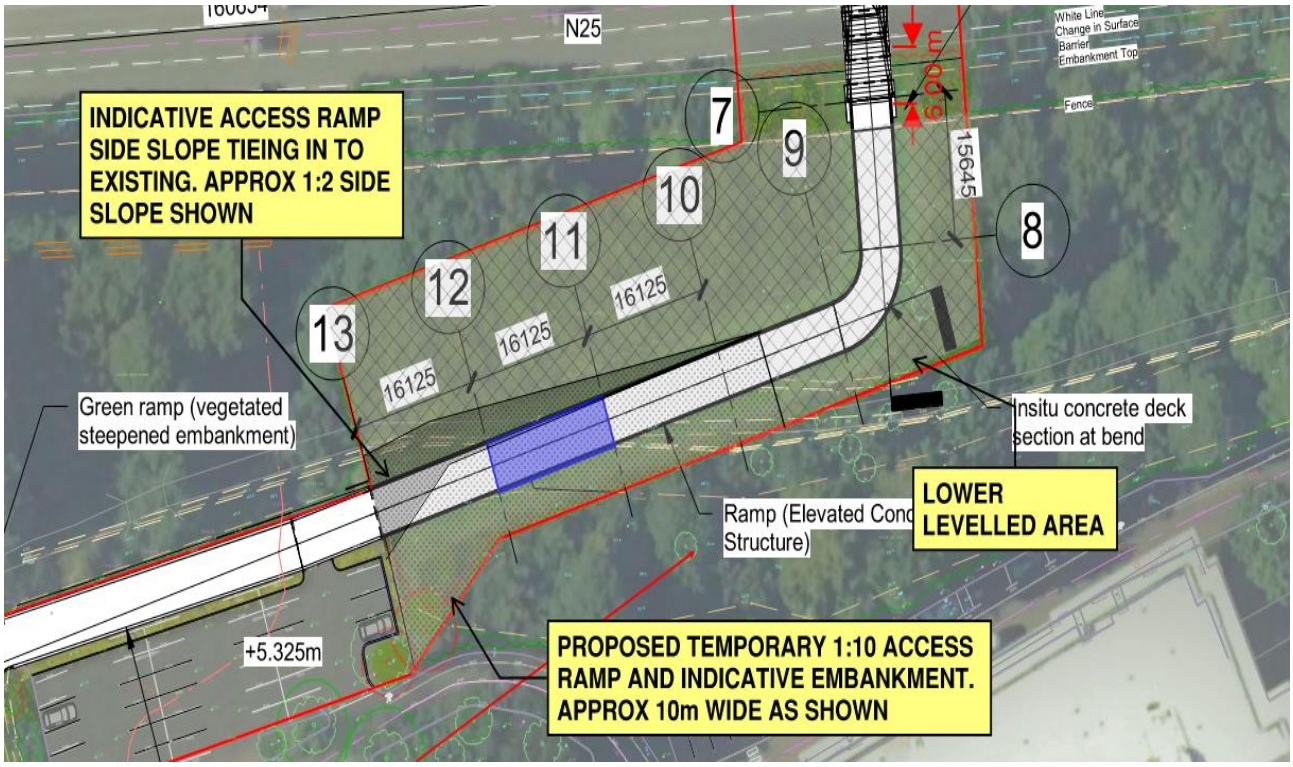


**Image 5.2: Indicative temporary access proposals for southern wooded area**

### 5.6.2 Stage 2 – Utility diversions

Any area to be excavated will be subject to utilities surveys, ground penetrating radar (GPR) surveys and cable avoidance tool (CAT) scanning. Service diversions are only anticipated to be require in the northern amenity park area.

Following identification of services with the relevant utility providers, including Uisce Eireann, Eir, GNI, BT Ireland, Enet and ESB Networks, the proposed utility diversions / protection measures are as follows:

- The Uisce Eireann 750mm diameter ductile iron water main is proposed to be protected via an *in situ* concrete structure where it passes under the proposed north embankment ramp. Refer to **Image 5.3**.

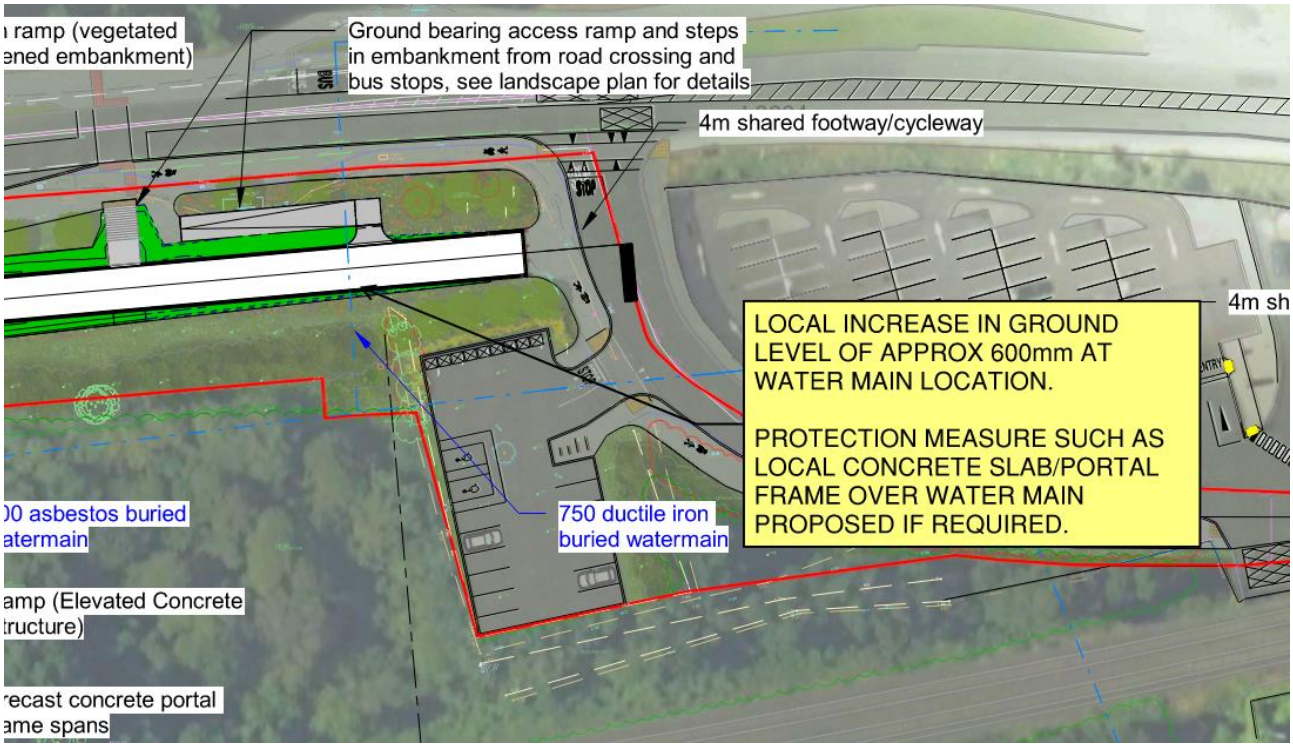


**Image 5.3: Proposed protection measure to water main under north embankment**

- Subject to discussions with Uisce Eireann, it is proposed that the 700mm diameter asbestos water main will remain in place with suitable protection measures and easements to allow piling works and bridge assembly / protection works. Refer to **Image 5.4**.

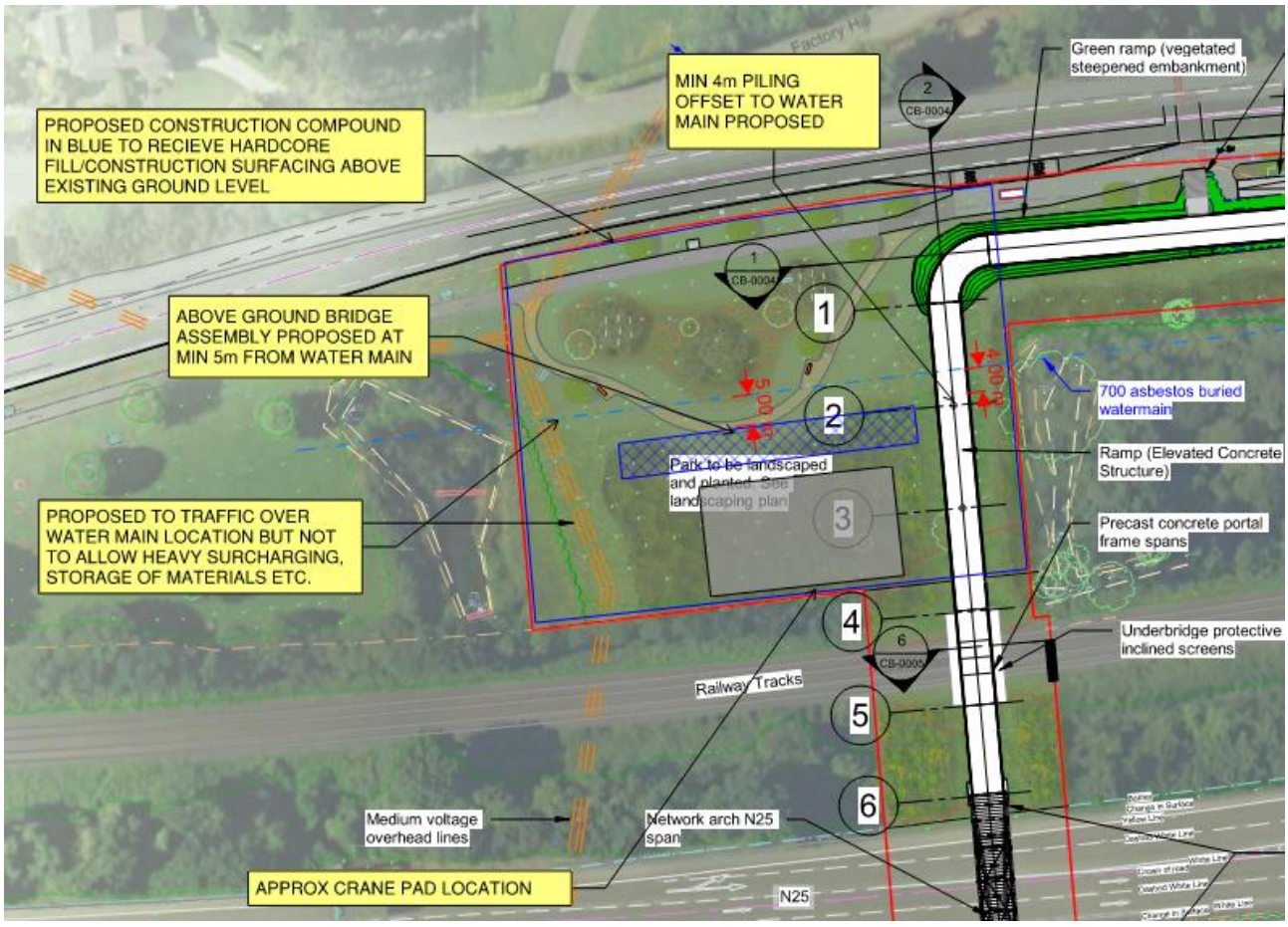


**Image 5.4: Proposed easement to underground water main running through bridge assembly area**

- Subject to discussions with ESB, it is proposed that the existing medium voltage overhead lines traversing through the northern amenity park area in a north / south direction be slightly rerouted by moving a single electricity pole and moving connecting overhead lines. This will allow for bridge assembly and erection to take place from the bridge assembly area, with suitable protection measures in place. Refer to **Image 5.5**.

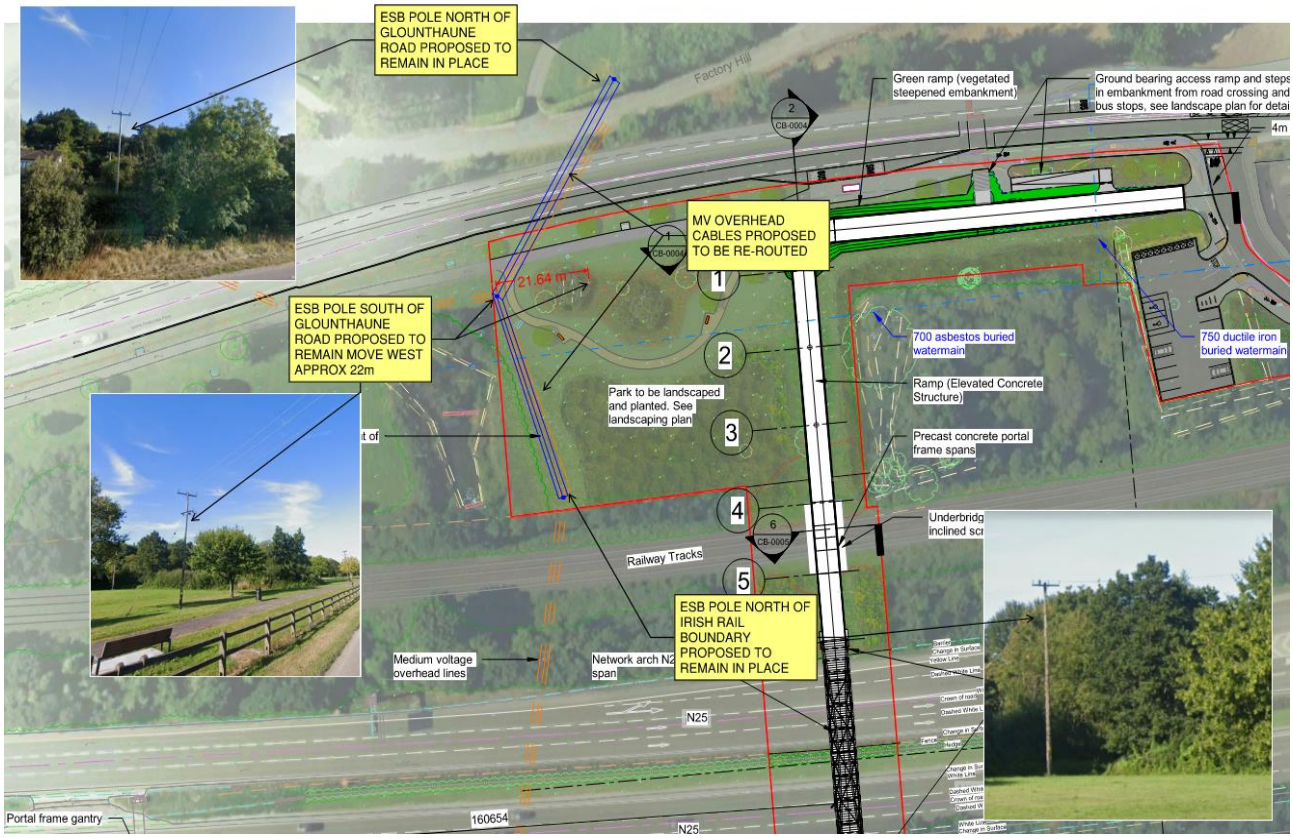


**Image 5.5: Proposed re-routing of ESB MV overhead lines**

## 5.6.3 Stage 3 – Bridge fabrication

### *5.6.3.1 Precast concrete elements*

Precast, prestressed concrete bridge beams are proposed to be used for construction of the southern ramp superstructure. Additionally, it is possible that the ramp piers could also be precast concrete subject to the contractor preference. Precast concrete elements will most likely be fabricated in Ireland and delivered to site in sections to be lifted into place.

The precast concrete portal frame crossing the Irish Rail land will be a precast concrete proprietary system. These structures are built in accordance with well-defined designs developed by suppliers for efficiency of structure and construction. The portal frames will be delivered to site in segments for construction on site by the contractor or a specialist supplier.

### *5.6.3.2 N25 main span superstructure*

The design of the Proposed Development has been chosen to comprise an approximately 49m span steel network arch bridge. This bridge form comprises a steel frame and double arch with tension elements supporting the deck and transferring load to the main arch. Refer to **Image 5.6** for an example of a similar structure.

**Image 5.6: Example of steel network arch bridge structure with concrete deck**

The N25 bridge span will be fabricated off-site within Ireland, the UK or in Europe. Off-site fabrication minimises disruption to the existing environment and traffic and ensures maximum quality and precision of all aspects of the fabrication.

Prior to transport, the bridge will be pre-assembled to its final profile in a workshop in a test assembly. Following this test assembly, the structure will be broken up into components suitable for road transportation and delivered to site where it will be assembled on temporary supports in the staging / assembly area in the northern amenity park area. Suitable protective measures and canopies will be provided on site to provide a suitable working environment for any on site welding or painting, if required. Refer to **Image 5.7** for an example of bridge fabrication in a workshop.

The bridge assembly area is proposed to be located in the northern amenity park area, immediately to the west of the proposed elevated northern ramp.

**Image 5.7: Example of bridge fabrication and pre-assembly in workshop**

### 5.6.4 Stage 4 – Foundation construction

The foundations for the Proposed Development will consist of:

- Northern steepened slope reinforced earth embankment ramp, with green vegetated finish;
- North elevated ramp structure: 3 no. piers / pile groups (shares one support with portal frame structure);
- Precast portal frame structures: 2 no. piers / pile groups (shares one support with N25 northern abutment). Piles and abutments adjacent to the rail track are to be set back a minimum of 4.5m from the nearest running rail in accordance with the Irish Rail Standard 'Requirements for Track and Structures Clearances I-PWY-1101' (Irish Rail, 2010);
- N25 main span: 2 no. piled abutments. Piles and abutments adjacent the highway are to be set back a minimum of 4.5m from the road edge as per TII requirements;
- South elevated ramp structure: 6 no. piers / pile groups (shares one support with N25 southern abutment); and
- Northern steepened slope reinforced earth embankment ramp, with green vegetated finish.

#### *5.6.4.1 Piled foundations*

All structural forms will sit on reinforced concrete piled foundations. It is expected, subject to detailed design, that piles will be approximately 900mm diameter and 20-30m in length. Elevated ramp foundations are proposed to have approximately 4-6 piles per pile group with main bridge foundations proposed to have 6-8 foundations per pile group. The pile details are to be refined at detailed design stage and smaller piles or less piles with inherently lower construction and environmental impacts may be provided, if possible. The piling methodology is assumed to be rotary bored and cased piles or Continuous Flight Auger (CFA) piles.

Following site clearance and placement of temporary construction surfaces, it is anticipated piling will take place for all foundations. Piling works adjacent to the N25 and Irish Rail site are expected to take place during closures of the rail line and lane closures of the N25, with suitable traffic management and protection measures in place.

In undertaking the piling works, the contractor will be conscious of utilities and will be responsible for carrying out survey works to confirm utility locations in the vicinity of the piling works and to maintain agreed easements with utility providers.

#### *5.6.4.2 Pilecaps and piers / abutments*

Following piling works, the tops of the piles will be broken down and in situ reinforced concrete pilecaps will be constructed. All pilecaps will sit below the existing ground level by approximately 500mm.

The northern elevated ramp piers and N25 abutments will be constructed on site with their reinforcement fixed and with in-situ poured concrete. Suitable protection and access measures, including temporary lane closures on the northern eastbound lanes of the N25, will be made to allow for reinforcement fixing, shuttering and pouring concrete.

Piers for the Irish Rail portal frame structures are expected to be placed in the same work cycle as the portal frame roof slab during a weekend closure of the railway in agreement with Irish Rail. Specific environmental management measures for works on the Irish Rail portal frame span in the vicinity of the Kilcoolishal Stream are presented in Section 5.6.9 of the CEMP (refer to **Appendix 5.1** in **Volume 4** of this EIAR).

Piers and crosshead for the south elevated ramp structure will be either in-situ reinforced concrete or precast sections. Due to space limitations in the southern wooded area, it is anticipated the contractor may construct piers and superstructures for this structure starting at the furthest point from the access to the wooded area (adjacent to the N25) and working back towards the access point in the construction compound. Due to access constraints, the contractor may use precast concrete piers and crossheads.

#### *5.6.4.3 Embankments*

Embankments will be used in the northern and southern areas of the Proposed Development. While not strictly foundations, these embankments will support the ramped footway / cycleways meeting the elevated structures. The embankments are expected to be constructed using strengthened and reinforced soil methods to minimise the overall land take and material import volumes required. Side slopes of the embankments are proposed to be up to 70 degrees.

The sides of the embankments are proposed to have a green finish with vegetation. Additional planting works will take place around the embankments to enable them to blend in with the surrounding environment – refer to the landscaping proposals in **Chapter 8**, *Landscape and Visual* for further details.

Refer to Section 5.7.1 for details of earthworks import and export volumes.

**Image 5.8: Example of steepened slope reinforced soil embankment (left before growth, right after growth)**

### 5.6.5 Stage 5 – Bridge transportation

#### *5.6.5.1 N25 bridge steelwork components*

It is intended that the proposed bridge elements will be fabricated in a steelwork fabrication yard offsite and transported to site in transportable lengths ahead of final erection. A CTMP will be prepared and implemented by the contractor to ensure the safe delivery of the prefabricated bridge elements to the bridge assembly area. The contents of the CTMP will be agreed with CCC prior to the delivery of the bridge components. In addition, the CTMP will designate traffic routes, timings and parking arrangements. Refer to the CEMP in **Appendix 5.1** in **Volume 4** of this EIAR for further details on the CTMP.

The maximum component length is anticipated to be under 20m which is within the standard abnormal load length. However, junctions will be surveyed as necessary to ensure that the bridge can be transported safely.

Transportation of the large, prefabricated elements will be limited to night-time hours to limit impact on traffic in the surrounding area. Routes and times will be agreed and coordinated with CCC and An Garda Siochana in advance.

Once at the Proposed Development site, the prefabricated elements will be stored in the bridge assembly area which is located in the northern amenity park area. Security will be in place at the bridge assembly area at all times.

#### *5.6.5.2 Precast concrete elements*

It is intended that precast concrete elements will be fabricated in a precast yard offsite and transported to the Proposed Development site in transportable lengths ahead of final erection. The contents of the CTMP will be agreed with CCC prior to the delivery of the precast concrete elements to the bridge assembly area.

In addition, the CTMP will designate traffic routes, timings and parking arrangements. The maximum component length is anticipated to be under 20m which is within the typical abnormal load length. However, all junctions will be surveyed to ensure that the bridge can be transported safely.

Routes and times will be agreed and coordinated with CCC and An Garda Siochana in advance. For the southern elevated ramp bridge, beams will be stored in the southern construction compound area adjacent to

the ramp prior to being lifting into final position. If precast sections are used for the northern elevated ramp, they will be stored in the proposed bridge assembly area to the west of the proposed ramp.

### 5.6.6 Stage 6 – Bridge assembly

#### *5.6.6.1 Irish rail portal frame construction*

Precast portal frame components are not expected to require specific assembly on site prior to erection into their final positions.

#### *5.6.6.2 Reinforced concrete deck assembly for elevated approach ramps*

Precast prestressed bridge beams for the elevated ramps will not require specific assembly on site prior to lifting into their final positions.

#### *5.6.6.3 N25 bridge steelwork components*

Following delivery of the prefabricated bridge elements, it is anticipated that sections of the main bridge span will be assembled and welded together in the bridge assembly area. It is also anticipated that all ancillary features such as the parapet infill panels, handrails, deck surfacing, floor grille and lighting will be installed before final erection. If a concrete decking is proposed in detailed design, it is anticipated that this will be installed after the bridge is lifted in to place due to the prohibitive weight for lifting a full concrete deck into place. In this case, permanent formwork will be installed in advance of the bridge lift to allow for a safe working platform.

#### *5.6.6.4 Summary*

It is predicted that the bridge assembly will take between 12 and 16 weeks. The bridge assembly area will be safely secured to prevent public access. Measures outlined in the CEMP (refer to **Appendix 5.1** in **Volume 4** of this EIAR) will be implemented by the contractor to manage the potential effects of the Proposed Development on the environment e.g., surface water management and noise control. A CTMP will also be developed by the contractor which will outline how traffic associated with the Proposed Development will be managed and the segregation measures that will be implemented to ensure the safety and welfare of pedestrians and other road users during the Construction Phase. It is anticipated that the volume of traffic passing the bridge assembly area will be low and it is proposed that the footpath that currently passes through the northern amenity park area will be temporarily diverted, either around the bridge assembly area or to the Dunkettle to Carrigtwohill pedestrian and cycle route on the opposite side of the L3004 Glounthaune Road. Refer to **Chapter 7**, *Traffic and Transportation* for further details.

### 5.6.7 Stage 7 – Bridge erection

#### *5.6.7.1 Precast concrete elevated ramp erection*

Precast elements of the elevated approach ramps consist of MY bridge beams on the southern ramp and will potentially also consist of bespoke precast superstructure sections on the northern elevated ramp.

For the northern elevated ramp sections, the total superstructure weight for each of the spans will be approximately 140 tonnes. These can be lifted into place using mobile cranes sited at a close distance to the structure. Due to the open nature of the amenity park area, this is possible and will reduce the need for major crane pads. A suitable crane for the lifting of the northern spans is expected to be a Liebherr LTM 1750-6.1 800 tonne mobile crane, or similar. Refer to **Image 5.9** for further details.

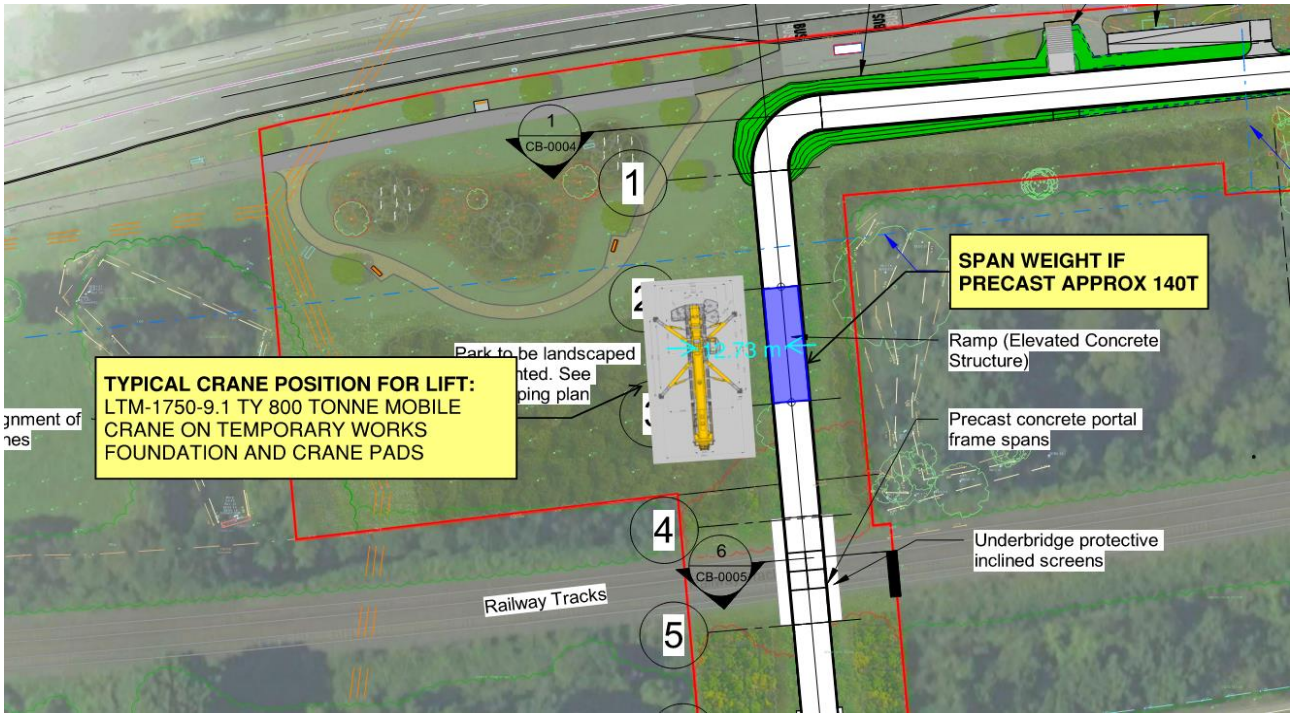


**Image 5.9: Proposed methodology for erection of north elevated ramp superstructure for precast deck option**

For the southern elevated ramp, MY prestressed precast bridge beams with an in-situ concrete stitch deck are proposed. The maximum lifting weight of an MY edge bridge beam is approximately 14 tonnes. Due to the uneven nature of the terrain surrounding the southern elevated ramp, a rough terrain crane is anticipated to be used for lifting of the bridge beams into position. The surrounding area will be cleared and a construction surface placed prior to construction. Due to the variable level changes in this area and to allow construction access, it is anticipated that a temporary access ramp will be constructed of hardcore fill material with a width of approximately 5-10m and a slope of approximately 1:10. The lower area will be levelled to allow for construction and craneage.

Crane pads or a build-up of hardcore is expected to be required at the craning positions. A suitable crane is the Liebherr LTR 1100-2.1 100 tonne rough terrain crane or similar which is available from Irish suppliers. Refer to **Image 5.10** for an indication of the lift radii and crane pad positions.

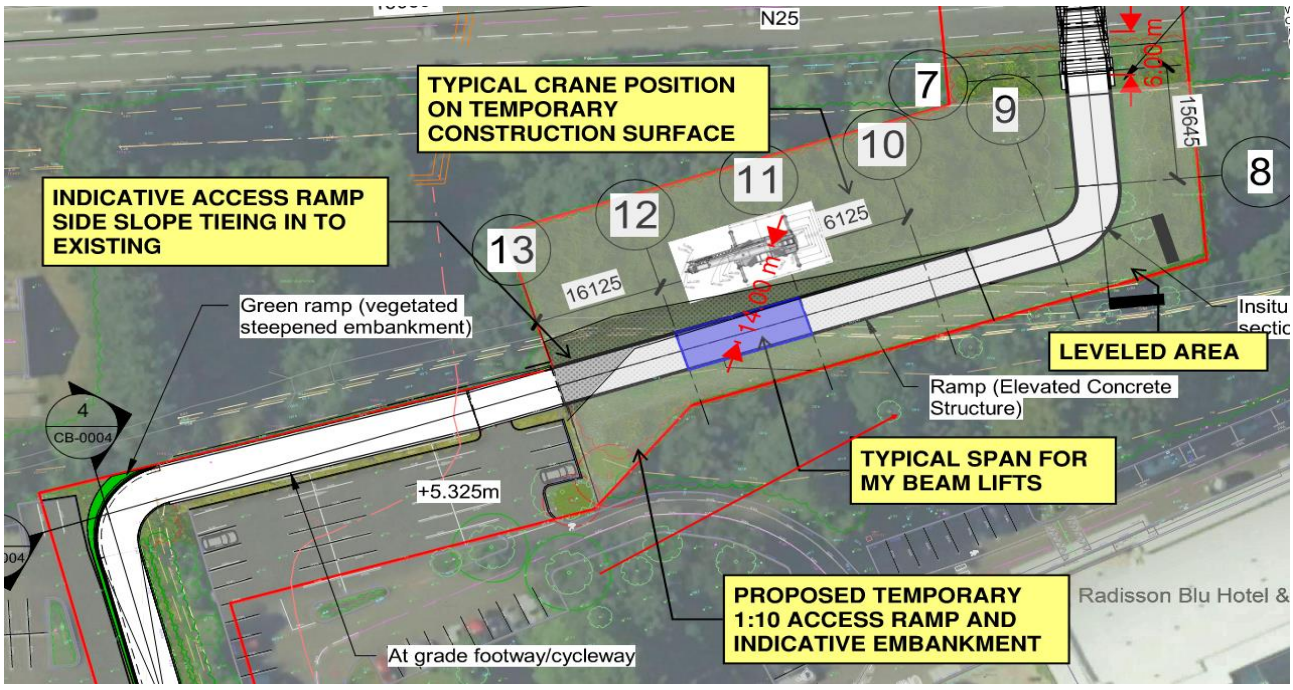


**Image 5.10: Proposed methodology for erection of southern elevated ramp precast concrete bridge beams**

### *5.6.7.2 Irish Rail spans precast concrete portal frame*

The erection of portal frame components will be by the main contractor or a specialist supplier. The portal frame will be assembled in its final position during a temporary track closure in agreement with Irish Rail. Sections will be joined together via in-situ concrete stitches as per the supplier details.

Components are designed to be lifted into place by mobile cranes. The crane size to be used will be confirmed by the contractor. However, it is anticipated to be placed on the same temporary works crane pad as that used for the first lift of the N25 bridge. Due to the higher volume of concrete, the lift weight for the larger roof sections of the portal frame is expected to be similar to the N25 bridge lift weight – approximately 55 tonnes. For the roof sections of the south portal frame span, it is expected that the crane will be located on the N25 northern carriageway. This will require an overnight partial closure of the N25 eastbound carriageway. It is expected that it will be possible for a single lane to remain open with suitable traffic management measures in place.

As such, it is expected that the crane required will be the same crane as that required for the N25 bridge lift. A suitable crane is the Liebherr LTM 1750-9.1 800 tonne mobile crane TY variant. This crane is available from local suppliers.

It is proposed that the erection of the Irish Rail spanning portal frames be completed prior to the erection of the N25 steel bridge to allow for these spans to be used as an intermediate support position for the N25 span during the craning operation.

Refer to **Image 5.11** for further details.

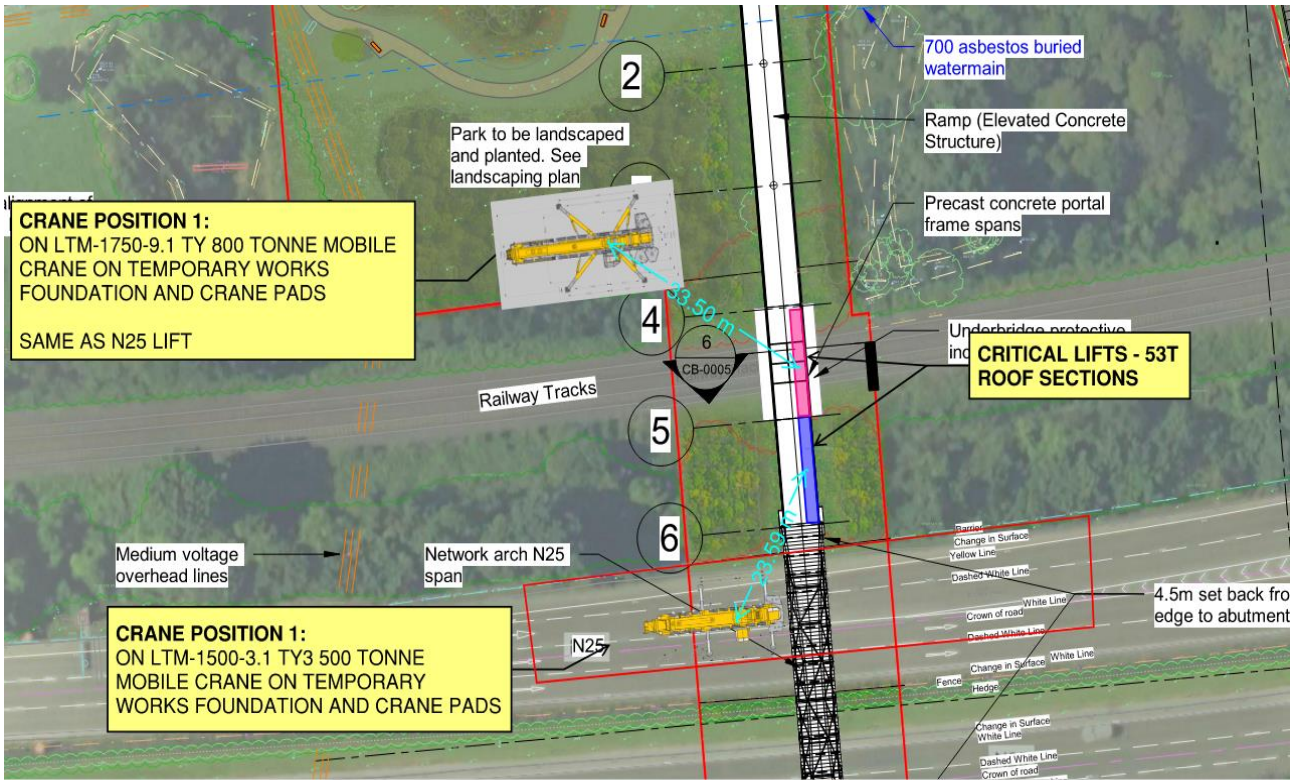


**Image 5.11: Proposed methodology for erection of precast portal frame elements of railway spans**

### *5.6.7.3 N25 bridge span*

Following assembly of the N25 steel network arch bridge structure on temporary supports and following construction of the northern ramp and portal frame structures (without parapets fitted), it is proposed that a large mobile crane (LTN 1750-9.1 TY 800 tonne crane or similar) is set up on a temporary works crane pad adjacent to the Irish Rail boundary in the bridge assembly yard. This crane is proposed to lift the bridge structure with a maximum lifting radius of approximately 35m onto a temporary seating position on the northern elevated ramp and portal frame structures. It is expected that the end of the N25 structure will over span the portal frame slightly and cantilevers over the N25 hard shoulder in its temporary position. The lifting weight of the N25 structure is assumed to be approximately 55 tonnes. The distributed weight on the

northern ramp and portal frame of this structure is less than the design live load for the ramps. Therefore, no special strengthening measures of these structures are anticipated for this stage.

Following the initial lift, the crane is proposed to be repositioned to the northern edge of the N25 carriageway during an overnight closure of the N25 at this location. A second lift will then take place to lift the structure into its final position. The proposed crane is available from local suppliers.

The two-stage lift of the N25 structure and crane pad positions is illustrated in **Image 5.12**.

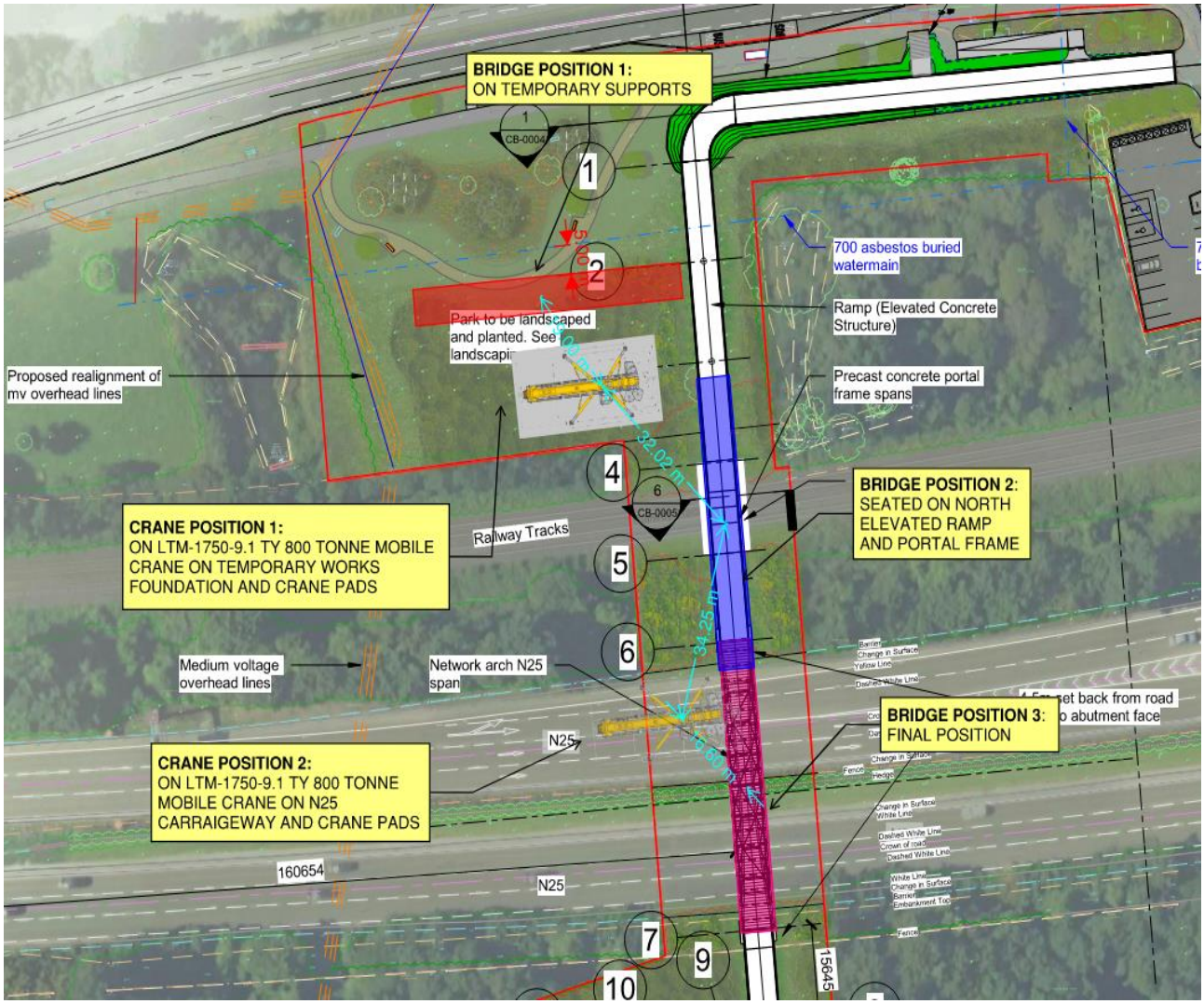


**Image 5.12: Proposed methodology for bridge lift 1 using LTN1750-9.1 TY**

### 5.6.8 Stage 8 – Completion of works

Stage 8 will comprise the completion of the works. This stage will include paint repair works required due to any paint that may have become damaged during the N25 bridge lift, adjustments to handrailing, installation of parapets on the northern ramp and commissioning of lights. Other works during this stage will comprise surfacing to ramps and at the tie in points, as well as works to reinstate the existing footways / cycleways. All construction related material will be removed from site following completion of the works.

#### *5.6.8.1 Paving and landscaping works*

The completion of the works will also include the removal of the two construction compounds and the bridge assembly area, with these work areas being returned to their original condition and use. Areas in the northern amenity park area and southern wooded area will be landscaped and planted with compensatory planting to compensate for the trees removed during site clearance works. Additional linking footpaths will be constructed, linking the bridge structure with surrounding active travel and public transport infrastructure. Refer to the landscaping proposals in **Chapter 8**, *Landscape and Visual* for further details.

## 5.7 Construction Access

### 5.7.1 Construction traffic

Construction access to the L3004 Glounthaune Road construction compound (north) and Radisson Blu Hotel construction compound (south) will be from the local road network. Access to the local access roads to the construction compounds will be via the N25 dual carriageway using Little Island junction 2 to avoid excessive traffic on the surrounding local road network. It is anticipated construction traffic will use the following routes to access the site from the N25 Little Island junction:

- North construction compound: N25 junction 2, R623 north, L3004 Glounthaune Road west;
- South construction compound: N25 junction 2, R623 south, Eastgate Way, Radisson Blu Hotel local access road; and
- Southwest tie in area: N25 junction 2, R623 south, Eastgate Way, Eastgate Road north.

**Table 5.2** and **Table 5.3** provide a breakdown of the construction truck journeys expected to the different site areas.

**Table 5.2: Estimated construction traffic – north compound traffic and bridge assembly area**

| Works Element | Quantity of material | Tonnage (t) | Construction vehicles required | Approximate No. of deliveries |
|---|---|---|---|---|
| Tree removal and vegetation clearance | 7,800m$^2$ minor vegetation clearance and 21 trees removed | N/A | 2 no. 12m flatbed trucks<br>1 no. excavator<br>1 no. mini excavator<br>2 no. 6 tonne dumper trucks | 10 no. |
| Construction surfacing (hard core / crane pads etc.) | 7,800m$^2$ of construction surfacing x 1m deep | 23,800 tonnes (bulk weight) | 20 tonne dumper trucks<br>2 no. excavators<br>2 no. 12 tonne dumper | 1,190 no. |
| Excavation for footways / embankments | 660m$^2$ of embankment footprint + 1,000m$^2$ at grade shared footway / cycleway | 1,520 tonnes (bulk weight) | 1 no. 20 tonne dumper truck<br>1 no. 6 tonne dumper truck on site<br>1 no. mini excavator | 76 no. |
| Embankment material delivery | 1,550m$^3$ compacted embankment material | 4,740 tonnes (bulk weight) | 20 tonne dumper trucks | 237 no. |
| Piling and concreting works for foundations / piers / ramp superstructure | 570m$^3$ wet concrete | 1,450 tonnes | 6.5m$^3$ concrete trucks assumed | 88 no. |
| Removal of piling spoil | 255m$^3$ excavated material | 780 tonnes (bulk weight) | 1 no. 20 tonne dumper truck<br>1 no. 6 tonne dumper truck on site<br>1 no. excavator | 39 no. |
| Excavation for pilecaps | 284m$^3$ | 869 tonnes (bulk weight) | 1 no. 20 tonne dumper truck | 44 no. |

| Works Element | Quantity of material | Tonnage (t) | Construction vehicles required | Approximate No. of deliveries |
|---|---|---|---|---|
| | | | 1 no. 6 tonne dumper truck on site<br>1 no. excavator | |
| Steel reinforcement deliveries | 91,000kg | N/A | 12m flatbed trucks | 91 no. |
| Precast concrete elements | 12 no. precast concrete elements for portal frame structures | 480 tonnes | Max. 20m long abnormal load delivery trucks | 12 no. |
| Steelwork element deliveries | 9 no. sections of main span in abnormal load deliveries + 800m (linear m) of parapets (delivered in 3x12m lengths per truck) | 55 tonnes (N25 structure) + 33 tonnes (parapets) | Max. 20m long abnormal load delivery trucks + 12m flatbed trucks (parapet deliveries) | 31 no. |
| Removal of Construction surfacing (hard core / crane pads etc.) | 7800$m^2$ of construction surfacing x 1m deep | 23,800 tonnes (bulk weight) | 20 tonne dumper trucks<br>2 no. excavators<br>2 no. 12 tonne dumper | 1,190 no. |

**Table 5.3: Estimated construction traffic – south compound traffic**

| Works Element | Quantity of material | Tonnage (t) | Construction vehicles required | No. of Deliveries |
|---|---|---|---|---|
| Tree removal and vegetation clearance | 2,800$m^2$ minor vegetation clearance and 121 trees removed | N/A | 2 no. 12m flatbed trucks<br>1 no. excavator<br>1 no. mini excavator<br>2 no. 6 tonne dumper trucks | 20 no. |
| Construction surfacing (hard core / crane pads etc.) | 2,800$m^2$ of construction surfacing x 1m deep | 8,600 tonnes (bulk weight) | 20 tonne dumper trucks<br>2 no. excavators<br>2 no. 12 tonne dumper trucks | 430 no. |
| Excavation for footways / embankments | 230$m^2$ of embankment footprint + 580$m^2$ at grade footway / cycleway | 740 tonnes (bulk weight) | 1 no. 20 tonne dumper truck<br>1 no. 6 tonne dumper truck on site<br>1 no. mini excavator | 37 no. |
| Embankment material delivery | 270$m^3$ compacted embankment material | 820 tonnes (bulk weight) | 20 tonne dumper trucks | 41 no. |
| Piling and concreting works for foundations / piers | 600$m^3$ wet concrete | 1,530 tonnes | 6.5$m^3$ concrete trucks assumed | 93 no. |
| Removal of piling spoil | 382$m^3$ excavated material | 1,168 tonnes (bulk weight) | 1 no. 20 tonne dumper truck<br>1 no. 6 tonne dumper truck on site | 58 no. |

| Works Element | Quantity of material | Tonnage (t) | Construction vehicles required | No. of Deliveries |
|---|---|---|---|---|
| | | | 1 no. excavator | |
| Excavation for pilecaps | 284m$^3$ | 869 tonnes (bulk weight) | 1 no. 20 tonne dumper truck<br>1 no. 6 tonne dumper truck on site<br>1 no. excavator | 44 no. |
| Steel reinforcement deliveries | 96,000kg | N/A | 12m flatbed trucks | 96 no. |
| Precast concrete elements | 30 precast concrete elements for portal frame structures | 450 tonnes | Max. 20m long abnormal load delivery trucks | 15 no. |
| Removal of Construction surfacing (hard core / crane pads etc.) | 2,800m$^2$ of construction surfacing x 1m deep | 8,600 tonnes (bulk weight) | 20 tonne dumper trucks<br>2 no. excavators<br>2 no. 12 tonne dumper trucks | 430 no. |

### 5.7.2 Road diversions, restrictions and closures

While there will be some closures of parking areas required, no permanent road closures will be required for the duration of the works due to use of the construction compounds.

The footpath to the north of the northern amenity park area will be closed during the construction works in the vicinity of the northern construction compound and bridge assembly area. This footpath is local to the park only and does not continue beyond the park area to the east. On the west side, it leads to the car park / recycling area which will also be closed during the works. Therefore, no continuity of route for pedestrian traffic will be lost during the construction works. East / west pedestrian and cycle traffic will instead use the Dunkettle to Carrigtwohill pedestrian and cycle route on the north side of L3004 Glounthaune Road.

A CTMP will be prepared by the contractor in advance of the commencement of the construction works (refer to the CEMP in **Appendix 5.1** in **Volume 4** for further details). The CTMP will be fully implemented to facilitate pedestrian and traffic diversions for the duration of the construction works.

A number of temporary road / lane closures will be required during the construction works, as follows:

- Site clearance: overnight traffic management on N25 junction 2 eastbound off ramp slip lane to allow site clearance;
- N25 span north abutment construction: temporary lane closure of localised section of the eastbound hard shoulder and off ramp slip lane, and surrounding traffic management to allow access and exit from the construction area, and to enable the construction of the N25 span north abutment. This is expected to be in place for 6 – 10 weeks;
- Irish Rail south portal frame span construction: overnight lane closures and traffic management on N25 junction 2 eastbound off ramp slip lanes and adjacent traffic lanes to facilitate erection of south span of the precast concrete portal frame structure over Irish Rail land. It is expected that a single eastbound lane can remain open;
- N25 span steelwork erection: weekend closure of the N25 to allow for steelwork erection of the N25 span; and
- Irish Rail portal frame structures: weekend closure of Irish Rail track in agreement with Irish Rail to allow for construction of the precast concrete portal frame structures.

## 5.8 Site Management

### 5.8.1 Employment

It is anticipated that the Proposed Development will provide onsite employment to approximately 50 people during the Construction Phase.

A breakdown of the estimated number of construction personnel required for the various phases associated with the construction, assembly and erection of the proposed structure and associated links is presented in **Table 5.4**. CCC personnel will have a site presence during the Construction Phase of the Proposed Development.

**Table 5.4: Estimated workforce required during Construction Phase**

| Project stage | Estimated no. of people |
|---|---|
| Site clearance and enabling works | 6 |
| Laying construction surfacing to north bridge assembly area and southern wooded area | 8 |
| Piling works | 8 |
| Northern embankment construction | 6 |
| Southern embankment construction | 4 |
| Northern in-situ concrete works: steelwork fixing (pilecaps, piers, abutments, and north ramp superstructure) | 8 |
| Steelwork fabrication – off site | 12 |
| Steelwork assembly - on site | 12 |
| Steelwork erection | 10 |
| Precast concrete portal frame assembly | 8 |
| Precast concrete south ramp superstructure assembly | 8 |
| Landscaping and tie in footpath work | 8 |

### 5.8.2 Working hours

The timing of construction activities, core working hours and the rate of progress of construction works are a balance between efficiency of construction and minimising nuisance and significant effects.

The core construction working hours for the Proposed Development will be:

- 7am – 7pm: Monday to Friday; and
- 8am – 2pm: Saturday.

The hours above correspond to the current construction programme.

The permissible noise levels are detailed in **Chapter 10**, *Noise and Vibration* where 'daytime' noise limits are defined for the period 7am to 7pm, and lower permissible noise levels are stipulated outside these hours.

The removal of waste material off site by road and regular deliveries to site will be generally confined to daytime hours which are outside of peak traffic hours (i.e., 10am to 4pm).

It may be necessary to undertake certain activities outside of the core construction working hours such as the installation of the main span over the N25, which is anticipated to take place during an overnight or a weekend road closure. Any construction works outside of the core construction working hours will be agreed in advance with CCC and scheduling of such works will have regard to nearby sensitive receptors.

### 5.8.3 Site access

All construction works will be undertaken in a clearly delineated site area which will have specific entry and exit points for construction related traffic onto the public road network. All access points will be temporary and used solely during the Construction Phase.

Where works are to be undertaken adjacent to the existing roads, temporary traffic barriers will be erected to separate the construction works from the public, to create a safe working space for the contractor and to clearly define the areas within which construction will be undertaken.

All site access routes will be connected to the existing local road network. Minor road works may occur such as the removal of existing kerbs, paving and a small amount of excavation prior to the replacement of paving and realigned kerbs within the Eastgate Business Park, the Little Island train station area and the L3004 Glounthaune Road.

Site access to the northern construction compound will be via the existing car park entrance off the Little Island train station access road.

Site access to the northern bridge assembly area will be via a temporary access directly off the L3004 Glounthaune Road.

Site access to the southern construction compound will be via the western end of the Radisson Blu Hotel car park, which is accessibly from Eastgate Way and the Radisson Blu Hotel local access road. The southern construction compound will be located in a dedicated area of the car park, with parking restrictions and management measures implemented within the car park as necessary to ensure that the functioning of the car park is maintained and to avoid any site parking overspill issues.

### 5.8.4 Utilities and services

Only minor service diversions are required. Surface and sub-surface infrastructure services and utilities which may be temporarily affected during the construction works are as follows:

- Surface water drainage;
- Electricity; and
- Water mains.

Effects on surface and sub-surface infrastructure services and utilities are addressed in **Chapter 18**, *Material Assets*.

### 5.8.5 Hoarding

A site boundary in the form of hoarding or fencing (2.4m in height) will be established around each of the construction compounds and the bridge assembly area, as well as any associated working areas, before any significant construction activity commences.

The site hoarding will also perform an important function in relation to minimising nuisance and effects including:

- Noise emissions (by providing a buffer);
- Visual impact (by screening the working areas, plant and equipment); and
- Dust minimisation (by providing a buffer).

The hoarding will be typical to that provided on most construction sites. Mounting posts will be erected by using a mini-digger and the posts will be set in concrete. The size and nature of the posts and hoarding will depend on the requirements for any acoustic mitigation as well as preferences that the contractor may have. However, given the location of the Proposed Development, the type of hoarding to be used will include mesh fence or solid hoarding which will be positioned appropriately within the working areas to minimise the noise transmitted to nearby receptors from plant, equipment and vehicles entering or leaving the working areas.

Where practicable, hoarding and fencing will be retained and re-configured and re-used between working areas as the construction activities progress.

### 5.8.6 Site lighting

Site services will be installed in parallel with the rearrangement and diversion of existing utilities, where relevant. The working areas will be powered by mains supplies or diesel generators where an electrical supply is not available.

Site lighting will typically be provided by tower mounted 1000W metal halide floodlights that will be cowled and angled downwards to minimise spillage to surrounding properties. Lighting will be powered off during night-time hours to minimise the additional light spillage onto surrounding properties.

### 5.8.7 Deliveries to site

Deliveries of construction materials will be planned and programmed to ensure that the materials are delivered only as they are required to the working areas. Works requiring multiple vehicle deliveries, such as concrete pours, will be planned so as to limit congestion and disruption to the public road networks. Deliveries will be limited to outside of peak hours.

### 5.8.8 Cranage

The construction works will require the use of mobile cranes on site.

Various sized cranes will be required for the moving of building materials on site and lifting structures into place i.e., the main bridge span and approach spans. Heavy machinery transport on the road network to and from working areas will be restricted to outside of peak hours.

Refer to Section 5.6.7 for details of the proposed mobile cranes to be used during the Construction Phase.

### 5.8.9 Community liaison during construction

CCC recognises the importance of effective community liaison in order to reduce nuisance to residents during the works, to ensure public safety and welfare and to help ensure the smooth running of construction activities. Important issues in ensuring good relations are:

- Providing information for the public during the Construction Phase (particularly nearby sensitive receptors);
- Providing the correct points of contact and being responsive; and
- Ensuring good housekeeping in all aspects of the operations.

A ‘good neighbour’ policy will be implemented, as far as possible. Key aspects of this policy include:

- Early implementation of the policy i.e., from the commencement of construction;
- Reduction of nuisance factors;
- Maintaining access to public areas and amenities;
- Clear and concise information; and
- Undertaking timely liaison with stakeholders.

With regard to liaison, the contractor will be required to prepare a Community Liaison Plan, which will include details of how the local community, road users and affected residents will be notified in advance of the scheduling of major works, any temporary traffic diversions and the progress of the construction works.

This plan will typically include details of the following:

- Contractor’s community relations policy;
- Personnel nominated to manage public relations;
- A methodology for processing observations, queries and complaints from the general public, relevant authorities, the media and emergency services; and
- The strategy for project-wide liaison with all relevant parties.

A liaison manager will be appointed by the contractor and will be responsible for managing such tasks as the following:

- Briefing neighbours on progress and issues as necessary;
- Liaison with CCC and emergency services as appropriate;
- Liaison with local Gardaí, particularly in relation to traffic movements and permits where necessary; and
- Contact details for the liaison manager will be posted on all construction site notice boards and on any other information or correspondence, which may be distributed from time to time.

## 5.9 Materials Management

### 5.9.1 Site clearance waste and excavated materials

It is estimated that approximately 415 tonnes of cleared vegetation will be generated as a result of the Proposed Development.

Excavated material generated as part of the construction works will generally consist of:

- Made ground;
- Topsoil and subsoil; and
- Spoil from piling.

In total, it is estimated that the construction of the Proposed Development will require the excavation of approximately 5,950 tonnes (bulk weight) of material.

It is estimated that approximately 300mm will need to be excavated under the proposed embankments and tie ins at grade footways / cycleways to allow for competent formation layers to be placed. The total amount of material estimated to be generated from these works will be approximately 2,260 tonnes (bulk weight).

Where practicable and subject to the material being suitable for re-use, excavated topsoil will be stored in an appropriately designated area in the bridge assembly area on site for use in the landscaping works. All material will be stored in accordance with the principles set out in Section 5.9.3. Refer to **Chapter 15**, *Resources and Waste*, for further details.

In addition to the excavated topsoil, it is estimated that approximately 1,950 tonnes (bulk weight) of piling spoil material and approximately 1,740 tonnes (bulk weight) of excavated material for the pile caps will be generated. This material will be removed from site.

Following the completion of the construction works, it is estimated that approximately 32,400 tonnes of construction surfacing material will be removed from site.

Surplus excavation material will be removed off site by a waste collection permit holder and delivered to an authorised waste facility (i.e., a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence). Where feasible and subject to testing, this material is likely to be used as a by-product in construction, provided the material itself and its proposed end use complies with the provisions of Article 27. A review will be undertaken by the contractor for suitable construction projects for reuse of this material in accordance with Article 27 e.g., projects requiring materials specified in Transport Infrastructure Ireland Series 600 Specification for Earthworks.

In the event that an Article 27 declaration is not feasible for all or part of the surplus excavation material, it will be delivered for recovery or disposal to a facility authorised in accordance with the Waste Management Act, 1996.

Should excavated material containing hazardous substances be discovered as part of the Proposed Development, this will be delivered to a facility authorised to accept hazardous wastes in accordance with the terms of an Industrial Emissions Licence or Waste Licence or exported from Ireland for treatment, recovery or disposal in accordance with current industry practice and the provisions of the Waste Management (Shipments of Waste) Regulations, 2007 S.I. No. 419 of 2007.

To ensure that there will be no queuing of trucks on public roadways, the transport of material to and from site will be managed in accordance with the measures outlined in the CEMP (refer to **Appendix 5.1** in **Volume 4** of this EIAR).

The contractor will further develop and implement the mitigation measures as outlined in the Construction Resource and Waste Management Plan (CRWMP) which is included as **Appendix 15.3** in **Volume 4** of this EIAR.

### 5.9.2 Main construction materials

The Proposed Development will have a requirement for imported materials, primarily concrete, crushed stone, embankment build-up, footway / cycleway paving materials, steelwork, reinforcement steel and precast concrete sections.

These materials will be imported to site during the construction works, when required. A breakdown of the type and quantity of materials is presented in **Table 5.5**.

**Table 5.5: Estimated quantities of construction materials**

| Material type | Estimated quantity (bulk weight) |
|---|---|
| Concrete | 3,000 tonnes |
| Clause 804 hardcore | 32,400 tonnes |
| Reinforcing steel | 187,000 kg |
| Structural steelwork | 55 tonnes N25 span + 33 tonnes parapets |
| Precast concrete elements | 930 tonnes |
| Embankment fill | 5,560 tonnes |
| Link footway / cycleway surfacing | 1,930 tonnes |

### 5.9.3 Materials storage

Construction compounds will be the primary locations for storage of materials, plant and equipment, site offices, welfare facilities and construction staff car parking. No stockpiling will be permitted in any other areas, aside from the bridge assembly area. Surplus excavation material will be removed off site by an authorised waste contractor to an appropriately licensed / permitted waste facility.

A SWMP will be prepared and implemented by the contractor as part of the CEMP. The measures included will prevent any silt-laden run-off, including that from stockpiles, entering nearby watercourses.

Site drainage will be provided to collect surface water runoff, which will be directed into a site water treatment facility before being discharged to the local drainage network. As the construction works will be carried out close to sensitive watercourses, silt traps will also be required.

As detailed in the CEMP (refer to **Appendix 5.1** in **Volume 4** of this EIAR), specific controls / mitigation measures will be put in place to manage sediment runoff, erosion and minimise pollution to receiving waterbodies during the Construction Phase. Further details on same are also provided in **Chapter 16**, *Water* and **Chapter 17**, *Land, Soils, Geology and Hydrogeology*.

The following construction management measures will be implemented at the two construction compounds and the bridge assembly area:

- Any containers of potential polluting materials such as fuels and oils will be stored in appropriately bunded containment areas designed to retain spillages;
- All bulk fuel storage will be integrally bunded or kept within a bunded area; and
- A designated bunded refuelling area on an impermeable surface will be provided.

Spill-kits and hydrocarbon absorbent packs will be stored at the two construction compounds and the bridge assembly area, as well as in the cabin of each vehicle. All operators will be fully trained in the use of this equipment.

## 5.10 Landscaping Works

Landscaping is described in more detail in **Chapter 8**, *Landscape and Visual*. Landscaping will generally comprise the following:

- Reinstatement of the northern amenity park area with additional compensatory tree and vegetation planning;
- Provision of additional amenity footpaths; and
- Reinstatement of wooded area below and surrounding Irish rail spans, and the southern wooded area, including compensatory planting of new trees and vegetation surrounding the structure.

## 5.11 Maintenance Works

Bridge structures in Ireland are designed and detailed to Eurocode Standards, which typically provide a 120-year design life. The durability and maintenance requirements of bridges is particularly important due to the long design life and the environment that bridge structures are exposed to. This is particularly relevant for structures in marine environments, where the increased quantity of chlorides due to coastal waters present an additional corrosion risk.

Concrete structures have been proposed for many elements throughout this crossing with the exception of the steel elements of the N25 network arch crossing and parapets. Parapets and tension elements of the N25 crossing will be of stainless steel construction to minimise maintenance requirements.

A maintenance schedule will be put in place by CCC to undertake routine inspection and maintenance / cleaning of all elements of the structure.

Key maintenance and inspection activities to allow the structure to reach its design life are as follows:

- Regular bridge cleaning;
- Annual routine visual inspection;
- Detailed Principal Inspection at maximum 6-year intervals;
- Minor paint maintenance to steelwork after 10-15 years;
- Major paint maintenance to steelwork after 20-25 years;
- Bearing replacement after approximately 40 years;
- Repair of bridge deck surfacing after 10 years; and
- Replacement of bridge deck surfacing after approximately 20 years.

Maintenance works associated with the Proposed Development will involve routine maintenance comprising the following elements:

- Bridge steelwork;
- Bridge cables;
- Reinforced concrete structures;
- Embankments;
- Bridge bearings;
- Lighting; and
- Deck surfacing.

### 5.11.1 Bridge steelwork

Bridge steelwork as part of the N25 bridge crossing is a key element that requires maintenance in order for the overall crossing to achieve its 120-year design life.

Maintenance works associated with the bridge steelwork will involve routine maintenance such as the application of a protective coat of paint to ensure that the steel structure remains in a satisfactory condition over its lifetime. Typically, a steel structure requires protective coating to be re-applied every 20 to 25 years.

Repainting of bridge elements above deck level are proposed to be completed from the bridge deck level.

For repainting of the bridge soffit elements, a section of the highway will need to be closed for overnight closures in a sequential fashion to allow for the maintenance works to take place. Whilst this may cause network disruption, it is expected painting could take place in a staged fashion during the overnight closures of sections of the road and using traffic management. This will minimise disruption levels.

An alternative method to painting is the use of weathering steel which does not require the application of a protective coating system or repainting. This type of material is not generally suitable for coastal environments. However, it is possible to justify its use with suitable testing for chloride levels in the air. A painted steel structure will be more onerous for its environmental impacts due to the requirements for repainting. This will therefore be assessed in this EIAR.

### 5.11.2 Bridge cables

It is anticipated that network rail arch tension ‘cables’ will be of stainless steel Macalloy bar construction. Maintenance of these elements is not expected. However, regular inspection of the stainless steel elements will be conducted to ensure that no corrosion takes place, particularly at locations close to the tension members connections with the bridge steelwork, due to the potential for bimetallic corrosion. Inspection and maintenance works are expected to take place from deck level.

### 5.11.3 Reinforced concrete structures

Reinforced concrete structures can last their entire 120-year design life without any significant maintenance works required, if detailed correctly. Regular inspection of reinforcement concrete structures will take place to identify any concrete defects or reinforcement corrosion early and to allow for corrective action to take place.

### 5.11.4 Embankments

Embankments are typically low maintenance and if detailed correctly can outlast the adjacent structures without significant maintenance works required. Regular inspection of embankments will take place to identify defects and to allow for corrective actions to take place. If planting is used on embankments, maintenance of the landscaping works will be required.

### 5.11.5 Bridge bearings

The use of bridge bearings will be minimised where possible to reduce the maintenance works required. Bearings will be required on the N25 span. The bridge abutments have been designed to allow the inspection of bearings from the roadside. However, it will also be possible to inspect the bearings from the bridge deck with the use of cameras and drone technology. Bearings have a lower lifespan than the structure and will likely need to be replaced. The bridge abutment will be designed to allow jacking of the structure locally and replacement of the bearings. This would be conducted with the use of traffic management and a lane closure on the N25.

### 5.11.6 Lighting

Lighting of the proposed structure and embankments will be integrated into the parapets. Lighting will be directional, anti-glare and functional to avoid light spill off the structure whilst maintaining a safe feel for users. Lighting will be designed to be inspected and maintained from the structures deck and will not interfere with the adjacent woodland or stream areas. For approach footways / cycleways off the structures and embankments where no parapets are required, lighting will be provided from lighting poles where existing lighting sources is not adequate.

### 5.11.7 Deck surfacing

Deck surfacing is to consist of either:

- A combination of bituminous paving on embankments and elevated ramp structures; and / or
- An approved combined bridge deck waterproofing and surfacing system.

Surfacing will require regular sweeping with CCC's normal cycle path sweeping equipment. Intermittent washing with high pressure water washing will also take place to remove any potential moss or vegetation formation, particularly in wooded and shaded areas. No chemicals are required for deck cleaning and water run-off will be prevented from entering the adjacent watercourses by the bridge drainage system.

Ramp and bridge deck surfacing has a lower design life when compared to the structures themselves, with it typically being 15-25 years. Therefore, the surfacing will need to be replaced throughout the lifespan of the Proposed Development. Replacement works will be completed by licenced contractors with suitable proposals being developed and approved to ensure that any waste products are recycled or disposed of appropriately and to prevent any contamination of the surrounding environment during the works.

### 5.11.8 Parapet infill

The mesh parapet infill system, if used, will be maintained and / or replaced as required over the lifetime of the Proposed Development. This can be done from deck level and will not require any construction interaction with the surrounding environment.

## 5.12 References

British Standard BS 5228 – (2009 +A1 2014). Code of practice for noise and vibration control on construction and open sites – Noise.

Construction Industry Research and Information Association (CIRIA) (2015). Environmental Good Practice on Site C692 (fourth edition) (C762).

CIRIA (2001). Control of Water Pollution from Construction Sites, guidance for consultants and contractors, CIRIA, London.

Environmental Protection Agency (EPA) (2021). Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects.

Irish Rail (2010). Requirements for Track and Structures Clearances. I-PWY-1101.

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

Transport Infrastructure Ireland Series 600 Specification for Earthworks.

Waste Management (Shipments of Waste) Regulations, 2007.

Waste Management Act, 1996.