Appendix A5.1
Construction Environmental Management Plan (CEMP)

Contents

1. INTRODUCTION

Córas Iompair Éireann (CIÉ) is applying to An Bord Pleanála (ABP) for a Railway Order (RO) under the Transport (Railway Infrastructure) Act 2001 (as amended and substituted) for the DART+ Coastal North project ("the Proposed Development"). Whilst the application is being made on behalf of CIÉ, it is Iarnród Éireann (IÉ) who has developed the Proposed Development from concept to application stage.

This document sets out the Construction Environmental Management Plan (CEMP) for the Proposed Development and has been prepared by Arup and CIÉ/IÉ.

1.1 Purpose of the CEMP

This CEMP applies to all works associated with the Proposed Development. As a contractor has not yet been appointed, this CEMP has not been formally adopted and further development and commitment to the CEMP will be undertaken following selection of Contractors and before commencement of site works.

It presents the approach and application of environmental management and mitigation measures for the Construction Phase of the Proposed Development. It aims to ensure that adverse effects from the Construction Phase of the Proposed Development, on the environment and the local communities, are avoided or minimised as far as reasonably practicable. It does not describe mitigation measures relating to the Operational Phase and any future decommissioning of the Proposed Development. These are provided in the mitigation sections of the EIAR Chapters in Volume 2 of the EIAR and are summarised in Chapter 27 (Summary of Mitigation and Monitoring Measures).

The CEMP provides the environmental management framework for the appointed Contractors and sub-contractors as they incorporate the mitigating principles to ensure that the work is carried out to reduce adverse effects on the environment. The construction management staff as well as contractors and sub-contractors' staff must comply with the requirements and constraints set out in the CEMP in developing the finalised CEMPs. The key environmental aspects associated with the construction of the DART+ Coastal North project, the appropriate mitigation and monitoring controls, are identified in this CEMP and its supporting documentation.

The implementation of the requirements of the CEMP will ensure that the Construction Phase of the project is carried out in accordance with the commitments made by CIE/IÉ in the Railway Order application process for the Proposed Development, and as required under the Railway Order. Once commenced, the CEMP is considered a living document that will be updated according to changing circumstances on the project and to reflect current construction activities. The CEMP will be reviewed on an ongoing basis during the construction process and will include information on the review procedures.

This CEMP contains the following supporting environmental documents as appendices:

- Appendix A Environmental Impact Assessment Report Chapter 27 (Summary of Mitigation and Monitoring Measures)
- Appendix B Natura Impact Statement – Mitigation Measures
- Appendix C Statutory Planning Consent including any additional Environmental commitments
- Appendix D Environmental Operating Plan (EOP)
- Appendix E Construction and Demolition Waste Management Plan
- Appendix F Incident Response Plan
- Appendix G Construction Traffic Management Plan (CTMP); and
- Appendix H Surface Water Management Plan (SWMP)

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Project Description

The proposed DART+ Coastal North development, referred to hereafter as 'the Proposed Development', will modify the current rail network between Dublin City Centre (north of Connolly Station) and Drogheda MacBride Station. The Proposed Development extends across four local authority areas including Louth, Meath and Fingal County Council, as well as Dublin City Council. The total length of the Proposed Development is approximately 50 kilometres.

A detailed description of the proposed DART+ Coastal North project is provided in Chapter 4 (Description of the Proposed Development) and in Chapter 5 (Construction Strategy) in Volume 2 of the EIAR.

The key infrastructural components of the DART+ Coastal North project include:

- Extension of existing 1500V DC electrification, which currently terminates at Malahide, as far as Drogheda MacBride Station (approximately 37km); this includes
  - The installation of foundations, masts, and overhead wires to supply power to the railway;
  - Undertaking upgrades to existing signalling, telecoms, and power supplies to support the planned increase in train services, including the introduction of new electrical substations at key locations alongside the railway line at
    - Drogheda
    - Bettystown
    - Gormanston
    - Balbriggan
    - Skerries North
    - Skerries South
    - Rush & Lusk (this location also incorporates an overhead line equipment (OHLE) maintenance compound); and
    - Donabate
  - Undertaking improvements / modifications to bridges spanning the railway arising from track reconfigurations and / or meeting required electrical clearances
  - Undertaking localised bridge modifications to enable OHLE to be fixed to bridges carrying the railway
  - Canopy modifications at Drogheda MacBride Station to accommodate OHLE clearances; and
  - Modified railway boundary fences to protect the public from contacting the overhead line
- Infrastructure works to facilitate the increase in service frequency and capacity, in specific areas of intervention as outlined below
  - works around Howth Junction & Donaghmede Station
  - works around Clongriffin Station
  - works around Malahide Station & Viaduct
  - works to the existing user worked level crossing (XB001) south of Donabate; and
  - works around Drogheda MacBride Station
- Modifications to existing depots at Drogheda and Fairview to support the new train fleet, including the provision of additional train stabling at Drogheda

- Ancillary civils, utility diversions, drainage, and power work to cater for the changes

The key interventions in each zone are presented in Table 2-1.

Table 2-1 Key Infrastructural Elements in each Geographic Zone

Zone	Activity
Zone A	This zone from north of Connolly Station to south of Howth Junction & Donaghmede Station includes the following works: • Minor upgrades and internal modifications to Fairview Depot and sidings; and • New drainage connection to combined sewer on Alfie Byrne Road.
Zone B	This zone from south of Howth Junction & Donaghmede Station to and just north of Malahide Viaduct, (including Howth Branch) includes the following works: • Modification of Howth Junction & Donaghmede Station Accesses and Footbridge (OBB17A); • Construction of the Howth Junction & Donaghmede Station Platform 2 Extension; • Construction of a new crossover on the Howth Branch Line at Howth Junction & Donaghmede Station (Howth Junction Turnback); • Construction of two new turnouts on the Up Dublin Line, and a new Loop Line to the east of Clongriffin Station. (Clongriffin Turnback); • Construction of a new retaining wall at Clongriffin Station, utility diversions and associated earthworks; • Construction of new Underbridge UBB19A (Mayne River), UBB18D culvert extension and embankment north of Clongriffin Station; • Construction of a new central turnback line north of Malahide Station, new crossover on the Up Dublin Line and new turnout on the Down Belfast Line. (Malahide Turnback); • Construction of new reinforced earth wall alongside the proposed Broadmeadow Way greenway and embankment widening, north of Malahide Station; • Modification of Underbridge UBB30 (Malahide Viaduct) to support OHLE; • Closure of (user worked) level crossing (XB001); • Construction of a new Otter Crossing, adjacent to the Underbridge UBB31 (River Pill); • OHLE and Signalling, Electrification and Telecoms (SET) modifications at Malahide, Howth and Clongriffin; and • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works north of Malahide Turnback.
Zone C	The zone from just north of Malahide Viaduct to south of Gormanston Station (Fingal boundary) includes the following works: • Construction of Donabate Substation compound; • Modification of Underbridge UBB36 (Rogerstown Viaduct / Estuary) to support OHLE; • Construction of Rush and Lusk Substation and OHLE maintenance compound; • Upgrade of existing station access road junction at Rush and Lusk Station; • Track lowering at Overbridge OBB39 (carrying Station Road / R128); • Track lowering at Overbridge OBB44 (carrying local road in Tyrrelstown Big); • Construction of Skerries South Substation compound; • Construction of Skerries North Substation compound; • Track lowering at Overbridge OBB55 (carrying Lawless Terrace / R127); • Modification of Underbridge UBB56 (Balbriggan Viaduct) to support OHLE; • Construction of Balbriggan Substation compound; • Road overbridge parapet modifications for compliant safety standards to: o OBB32A (carrying the Donabate Distributor Road), o OBB35 (access to Beaverstown Golf Club), o OBB38 (carrying Rogerstown Lane),

Zone	Activity
	o OBB41 (carrying local road in Rathartan), o OBB46 (carrying the L1285 / Baldongan Close), o OBB47 (historic access to Skerries Golf Club), o OBB49 (carrying Golf Links Road), o OBB55 (carrying Lawless Terrace / R127) and o OBB68 (local access adjacent Gormanston Camp). • Pedestrian footbridge parapet modifications for compliant safety standards to: o OBB33A (Donabate Station footbridge), o OBB38A (Rush & Lusk Station footbridge), o OBB51A (Skerries Station footbridge), o OBB54 (The Ladies Stairs) and o OBB57A (Balbriggan Station footbridge). • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Rush & Lusk, Tyrrelstown, Golf Links Road, Baldongan, and Balbriggan; and o Utility diversions.
Zone D	The zone south of Gormanston Station to Louth/Meath border includes the following works: • Construction of Gormanston Substation compound; • Modification of Underbridge UBB72 (Laytown Viaduct) to support OHLE; • Construction of Bettystown Substation compound; • Track lowering at Overbridge OBB78 (carrying Colpe Road); • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Gormanston, Laytown, and Drogheda; • Road overbridge parapet modifications for compliant safety standards to: o OBB68 (Irishtown), o OBB77 (Colpe East), and o OBB78 (carrying Colpe Road). • Pedestrian footbridge parapet modifications for compliant safety standards to: o OBB74A (Laytown Station footbridge); and o Utility diversions.
Zone E	Drogheda MacBride Station and surrounds includes the following works: • Demolition and replacement of triple span Overbridge OBB80/80A/80B (Railway Terrace); • Realignment of Railway Terrace and McGrath's Lane; • Reconstruction of Underbridge UBK01 (R132/Dublin Road Bridge); • Reconstruction of Overbridge OBB81 (Drogheda Station Footbridge); • Modification to existing Platform 1 Station Canopy; • Construction of new Platform 4 (on the Drogheda Freight Sidings) and associated modifications to station car park and connectivity to Drogheda MacBride Station; • Track works on Drogheda Freight Sidings at Drogheda (Drogheda Turnback); • Construction of Drogheda Substation compound; • Civil Works on Light Maintenance Roads, Under Frame Cleaning (UFC) facility and Northern Headshunt; • Reprofiling existing earthwork bund at Drogheda Depot; • Track works on Stabling Roads 7a, 7b; • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Drogheda; and • Utility diversions.

2.2 Construction Phase

The overall Construction Phase of the Proposed Development will be approximately 36 months in duration based on the information available at this time. The construction programme has been developed considering efficiency of works and to reduce the potential for environmental impacts. Further detailed information on the construction programme for the Proposed Development can be found in Chapter 5 (Construction Strategy) in Volume 2 of this EIAR.

2.2.1 Consents and Licenses

A number of consents, permits and licenses will be required during the Construction Phase of the Proposed Development. The Site Environmental Manager (SEM) will maintain a Consents Register which will document all existing consent conditions, record all new applications made and their status.

2.2.2 Pre-construction Surveys

Ecological surveys consisting of invasive species surveys, bat surveys and bird nesting surveys will be undertaken prior to any vegetation clearance, tree felling and/or other demolition works as required for the Proposed Development. The Contractor will comply with the mitigation measures included in Chapter 8 (Biodiversity) in Volume 2 of the EIAR. Vegetation clearance should be programmed as far as is reasonably practicable to avoid the bird nesting season (March to August inclusive). Appendix A in this document summaries any specific ecological survey included in Chapter 8 (Biodiversity).

Prior to construction, a tree survey will be undertaken to record trees near or adjacent to the Proposed Development that will be impacted by the proposed works in accordance with BS 5837 (2012) as recommended in the mitigation measures of Chapter 8 (Biodiversity) and in Chapter 15 (Landscape and Visual) in Volume 2 of the EIAR. A site arborist shall be appointed prior to the commencement of site construction works and will be responsible for the setting up and monitoring of tree protection, liaising with the relevant local authority biodiversity officers (if required) and providing feedback and advice to the construction teams on issues relevant to trees. The site arborist shall be retained for the duration of construction works and should be appointed to carry out a post-construction tree survey/assessment.

Any non-intrusive geophysical surveys noted in Chapter 27 (Summary of Mitigation and Monitoring Measures) that are required prior to construction shall be undertaken by the contractor prior to the commencement of main works. If anomalies are detected, all works within the area are to be immediately stopped prior to archaeological test excavation, which will take place to verify the nature, extent and location of the subsurface feature.

2.2.3 Construction and Demolition Waste

Any surplus excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Regulation 27 of the European Communities (Waste Directive) Regulations 2011. Every effort will be made to re-use as much material as possible.

If the material is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility.

In order to establish the appropriate reuse, recovery and/or disposal route for the surplus soils and stones to be removed off-site, it will first need to be classified. The material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous. Environmental soil analysis will be carried out on a number of representative soil samples for a range of parameters to allow the soil to be accurately classified as hazardous or non-hazardous. In addition, soil analysis will also be carried out in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values for acceptance of waste at landfills based on properties of the waste including potential pollutant concentrations and leachability. (Note: Clean inert soils and stones excavated from greenfield sections of the route would generally not require classification/testing but would require a letter of suitability to be provided to the receiving facility.) The surplus soils and stones may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Further details regarding waste management is included in Appendix E Construction Waste Demolition Plan (CWDP) and operational plans of CIE after consent is given to the development.

2.2.4 Designing for a Circular Economy

Throughout the design and construction of the Proposed Development, solutions will be required to be considered to minimise the consumption of materials and the generation of waste throughout the lifecycle of the Proposed Development. The following non-exhaustive list based on the DMRB LA110 guidance (2019) will be implemented throughout the detailed design and construction of the Proposed Development:

- Design for reuse and recovery: identifying, securing and using materials that already exist on-site, or can be sourced from other projects and ensuring new materials brought onto site have high recycled content
- Design for off-site construction: maximizing the use of pre-fabricated structure and components, encouraging a process of assembly rather than construction
- Design for materials optimisation: through minimising material use, balancing out cut and fill. Maximising the use of responsibly sourced materials and materials with recycled content (e.g. Using material from low carbon or sustainable sources)
- Design for resource efficient procurement: identifying and specifying materials that can be acquired responsibly, in accordance with a recognised industry standard (e.g. consider opportunities for materials to be returned to the supplier for future reuse, such as steel and concrete). Making provision to select the waste contractor who can offer best overall reuse and recycling performance

- Design for the future (deconstruction and flexibility): identifying how materials can be designed to be more easily adapted over an asset lifetime and how deconstruction and demounting of elements can be maximized at end of first life
- Engineering plan configurations and layouts will demonstrate the most effective use of materials and arisings that can be achieved; and
- The Principal Contractor(s) will be responsible for sourcing materials for the construction of the Proposed Development, and where possible, it will seek to use local suppliers and to re-use materials on site to minimise the attendant environmental impact, cost of transport and support the local economy and local communities in line with the proximity principle

2.2.5 Enabling Works

Any enabling works required before the main contract, will be carried out after the Railway Order has been granted, and will facilitate the main construction works. These will include, but are not limited to:

- Surveys
- Application for licenses as required i.e. derogation licence
- Site clearance
- Establishment of site compounds
- Establishment of the main storage and distribution centre
- Establishment of the haulage routes; and
- Utility diversions

2.2.6 Main Construction Works

The main construction works can be summarised as follows:

- Line wide works
    - Substations
    - OHLE foundations, masts and cabling
    - Signalling
    - Testing and commissioning
- Depot works
    - Fairview Depot
    - Drogheda Depot
- Bridge works
    - Over bridges (mainly parapet modifications)
    - Under bridges (including viaducts)
    - Dublin Road (UBK1) Bridge widening
    - Railway Terrace Bridge (OBB80/80a/80b) reconstruction
- Station and turnbacks
    - Howth Junction and Donaghmede Station
    - Malahide Turnback
    - Clongriffin Station (turnback)
    - Drogheda Station (turnback)

2.2.7 Construction Programme and Sequence

The high-level construction programme is presented in Image 2-1 below.

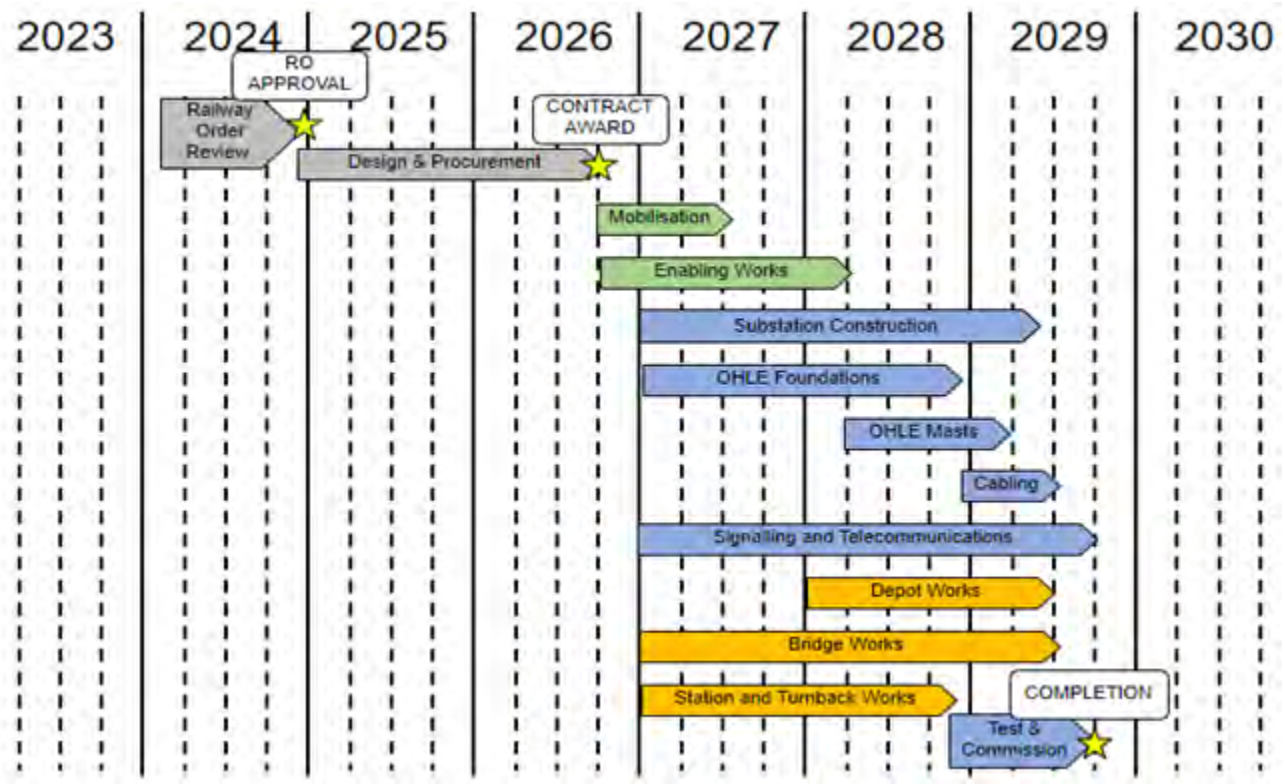

Image 2-1 High-Level Construction Programme

Further detailed information on the construction programme and phasing for the Proposed Development can be found in Chapter 5 (Construction Strategy) in Volume 2 of this EIAR.

2.2.8 Working Hours

A key consideration in the design of the construction strategy and programme is the requirement to reduce the impact during construction, on the operation of the railway line and hence, to maintain rail services for passengers. The construction works range from those that are located outside of the railway boundary (thus, having no impact or minimal impact on train operations) to those that would require a temporary closure of a section of railway line (normally during night-time or weekends (termed night-time or weekend track possessions) to allow construction to proceed while limiting the impact on rail services.

The general daytime construction hours proposed for the project are:

- Monday to Friday 07:00 to 19:00 (12 hours)
- Saturday 07:00 to 13:00 (6 hours)
- Sunday Only when agreed in advance with the local authority and IÉ

Night-time and weekend track possession times will vary, the times listed in the table below are indicative.

Table 2-2 Possession Types and Durations

Possession Type	Duration / Timings
Non-disruptive Weekday night	4 hours / 01:00 to 05:00
Non-disruptive Saturday night	6 hours / 01:00 to 07:00
Disruptive Extended Saturday night	10-12 hours
Disruptive Long Weekend (October and Easter)	3-4 days, twice per year
Disruptive Full weekend (anticipated rarely)	52 hours / Saturday morning at 01:00 to Monday morning at 05:00
Disruptive Bank Holiday weekend (anticipated rarely except October and Easter)	72-76 hours / for example Saturday morning at 01:00 to Tuesday morning at 05:00
Disruptive Single Line working at weekends (anticipated rarely).	This may be feasible in specific locations, especially at Malahide, where design and logistics allow.

Any restrictions to working hours associated with major events in the area of works will be agreed with Local Authorities and An Garda Síochána. In addition, a Noise and Vibration Management and Control Plan will be included as part of the final CEMP by the contractor, and this will include for specific working hours and mitigation measures at identified sensitive locations as identified in Chapter 14 (Noise and Vibration) in Volume 2 of the EIAR.

2.2.9 Construction Compounds

The Construction Compounds are temporary facilities that support the construction of the different elements of the project. Construction compounds are required at specific site locations, such as the proposed substation locations, as well as at locations where structural works are required such as at bridges. These compounds are known as isolated compounds.

There is also a need for Construction Compounds to support line-wide works, known as line-wide compounds. These Construction Compounds will support activities such as the installation of the track, under track crossings (UTXs), overhead line equipment, signalling, communications and power systems. These compounds will be located at selected locations along the railway line over the full route, with a more concentrated number along the route to be electrified (i.e. between Malahide and Drogheda). The line-wide compounds are also located such that isolated works can also be supported from these compounds, where possible, or in locations where there are existing maintenance compounds.

2.2.10 Permanent Maintenance Compounds

In general, existing maintenance compounds will facilitate the ongoing maintenance of the track and OHLE after the construction works. They are not planned to be used to support the project construction works.

2.2.11 Sourcing of Materials

There will be a requirement for construction materials and concrete during the Construction Phase of the Proposed Development. Existing concrete batching plants in the vicinity are expected to be used in the Construction Phase.

Some materials may need to be imported from relatively far away due to their local scarcity.

It is expected that SET/ OHLE materials will be delivered to the line-wide compounds, assembled, and then transported along the railway for installation.

2.2.12 Fencing

Perimeter Security Purpose (SP) fencing or hoarding will often be installed along the construction site perimeters to secure sites against unauthorised access. Some works to be undertaken on the public road may also be fenced. Where works areas are adjacent to road traffic it is envisaged that vehicle containment barriers will be erected. Site-specific assessments of the security and trespass risk will be undertaken at each construction site and Construction Compound, with appropriate control measures being implemented.

Railway fencing will be installed in coordination with Permanent Way and SET works and shall be removed and/or erected in accordance with IÉ Technical Fencing Specification (CCE-TRK-SPN-037). The construction of the fence will be carried out, where possible, from the tracks to avoid any temporary land acquisition and disruption to stakeholders.

For the construction of the fencing from the tracks, the safe systems of work will be set out as per the IÉ Rule Book. Whenever practicable, the fencing works will be carried out only in a GREEN zone, as defined in the IÉ Rule Book.

To set up a GREEN zone, the contractor must arrange for the site of work to be either:

- SAFEGUARDED by stopping trains on all lines
- SEPARATED from the nearest line open to trains, by a distance of at least 3 metres (10 feet); and
- FENCED from the nearest line open to trains where one or more lines remains open to trains

If it is not practicable to arrange for the works to be carried out in a GREEN zone, the works will be carried out in a RED zone, as defined in the IÉ Rule Book. However, this will be avoided where possible.

2.2.13 Temporary Land Acquisition

Any land temporarily acquired for the Construction Phase of the Proposed Development will be returned to its original state following construction, where possible and in agreement with the landowner.

2.2.14 Lifting Operations

Road mobile cranes and road-rail vehicle cranes/excavators with lifting attachments will be used throughout the works as appropriate. Access to works areas for materials, construction plant and operatives will either be by road or via road rail access points (RRAPs).

During detailed design stage, the designated locations for cranes for relevant working areas will be identified along with lifting plans and crane sizing.

Prior to the commencement of any significant lifting, a survey will be carried out to identify any underground services and utilities. Where applicable, the utilities will be protected in-situ or diverted in consultation with the utility owner. Overhead services will also be identified and will be included in appropriate lifting plans to ensure that they are avoided during the works. The status of all services and utilities will be checked and verified with the utility owner. In the event that cables from these services / utilities remain nearby, appropriate safety notices will be issued to relevant staff members and signage will be erected. Where necessary, a demarcation zone will be implemented to prevent operatives or plant coming into contact with one another.

2.2.15 Concrete Works

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage which has a deleterious effect on water chemistry and aquatic habitats and species. Where the use of in-situ concrete near and in watercourses cannot be avoided the following control measures will be employed:

- When working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable shutter oils shall be used
- Any plant operating close to the water will require special consideration on the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). Care will be exercised when slewing concrete skips or mobile concrete pumps over or near the watercourses
- Placing of concrete in or near the watercourses will be carried out only under the supervision of a suitably qualified Environmental Manager
- There will be no hosing into surface water drains of spills of concrete, cement, grout or similar materials. Such spills shall be contained immediately, and runoff prevented from entering watercourses
- Concrete waste and wash-down water will be contained and managed on site to prevent pollution of the watercourses
- On-site concrete batching and mixing activities will only be allowed at the identified Construction Compound
- Washout from concrete lorries, with the exception of the chute, will not be permitted on site and will only take place at the Construction Compound (or other appropriate facility designated by the supplier)
- Chute washout will be carried out at designated locations only. These locations will be signposted
- The Concrete Plant and all Delivery Drivers will be informed of their location with the order information and on arrival on site; and
- Chute washout locations will be provided with appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks. The clear water from the settlement tanks shall be pH corrected prior to discharge (which shall be by means of one of the construction stage settlement facilities) or alternatively disposed of as waste in accordance with the Contractor's Waste Management Plan

2.2.16 Health and Safety

The Project Supervisor Construction Stage (PSCS) will prepare a Construction Phase Safety and Health Plan in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (as amended). The Plan will be reviewed and approved by CIÉ /IÉ prior to the commencement of the construction works and the Project Supervisor Design Process (PSDP). The Plan will be prepared for each element of the construction works. The Plan will include, and is not limited to the following:

- Appropriate training and information will be provided to personnel working on the construction sites
- Site induction will be provided by the contractors for all site staff and site visitors to ensure that they are aware of the health and safety management measures implemented and of any hazards on sites
- The health and safety measures for construction staff, all persons working at, or visiting the construction site
- The health and safety measures for general public in vicinity of the construction site
- Identify and implement emergency procedures; and
- A Stakeholder Management and Communication Plan (SMCP) will be prepared to establish the means of communication between the members of the public and the project team

3. CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

The CEMP will be further developed by the Contractor to meet the requirements of ISO 14001 and all site works will be undertaken in compliance with the CEMP. The CEMP shall include but is not limited to the topics listed below, further information on which is given in the following section.

- Environmental Policy
- Environmental Aspects Register
- Project Organisation and Responsibilities
- Project Communication and Co-ordination
- Training
- Operational Control
- Checking and Corrective Action
- Environmental Control Measures; and
- Complaints Procedure

The CEMP details all the environmental aspects and impacts associated with this Proposed Development such as waste management, pollution prevention and protection of flora and fauna with particular emphasis on Special Areas of Conservation (SAC), Special Protection Areas (SPA), proposed Natural Heritage Areas (pNHA) as well as water quality in the watercourses. The Register of Impacts provides the framework for identifying the potential environmental impacts generated by construction and the associated works. The Environmental Operational Control Procedures and activity specific method statements will detail the working methods necessary for managing and mitigating these impacts, whether it is by prevention or mitigation. Prior to the commencement of construction activities, the Environmental Operational Control Procedures and activity specific method statements will be completed so as to conform to precise site-specific requirements of the Proposed Development.

3.1 Environmental Policy

The contractor will complete an Environmental Policy with consideration for impacts on the natural and built environment. All project personnel will be accountable for the environmental performance of the Proposed Development and will be made aware of the Environmental Policy at induction. The environmental policy will consider and make commitments with regard to the protection of Natura 2000, pNHA and NHA sites, emissions to the atmosphere, maintenance of water quality, resource usage energy consumption and waste management.

CIÉ /IÉ maintains an Environmental Management Plan (EMP) to provide a commitment to managing and reducing their effects on the environment. The CIÉ/IÉ EMP states that there is “a commitment by IÉ to develop an Environmental Management System (EMS) with existing management systems (Quality, Energy, Safety, etc) for increment benefit”. The final CEMP will comply with CIÉ/IÉ’s environmental policy and the commitments, including ISO 40001:2015 and ISO 9001:2015 international Environmental Management System (EMS) standards which IÉ worked to achieve and maintain.

The contractors will prepare their own project-based EMS in accordance with CIÉ/IÉ's EMP and EMS prior to construction which will be subject to approval by CIÉ/IÉ.

This section of the CEMP will be subject to ongoing review and will be updated as required.

3.2 Environmental Aspect Register

Once appointed, the Contractor will prepare a register of all sensitive environmental features which have the potential to be affected by the construction works, together with details of commitments and agreements made within the Environmental Impact Assessment Report (EIAR) the Contract Documentation, Railway Order, and any conditions identified by Statutory Authorities with regards mitigation of potential impacts.

The Environmental Aspects Register provides the relevant information for the preparation of construction method statements and will be regularly updated during the works. The Environmental Aspects Register will consider sensitive environmental features as listed below - please note this list is not exhaustive and will be required to be amended and expanded upon as appropriate by the contractor.

- Identification of all waterways for protection against ingress of suspended solids or pollutants
- Air emissions
- Asbestos
- Noise and Vibration emissions
- Light emissions
- Waste generation
- Treatment of contaminated materials
- Treatment of non-contaminated materials
- Treatment of hazardous waste materials
- Treatment of invasive alien species
- Use of hazardous materials
- Energy usage
- Water usage
- Discharge of wastewater;
- Traffic generation
- Biodiversity (terrestrial and aquatic ecology);
- Landscape and Visual impacts
- Soils, Geology and Hydrogeology
- Hydrology; and
- Archaeology, Architectural and Cultural Heritage

3.3 Project organisation / Duties and responsibilities

The Contractor's CEMP will define the roles and responsibilities of the project team. The Contractor is responsible to ensure that all members of the Project Team, including sub-contractors comply with the procedures set out in the CEMP. The Contractor will ensure that all persons working on site are provided with sufficient training, supervision, and instruction to fulfil this requirement.

Key staff will be notified of their appointment and confirm that their responsibilities are clearly understood.

The principal environmental responsibilities for key staff can be identified in the following sections.

3.3.1 Project Manager

The Project Managers main duties and responsibilities in relation to the CEMP include liaising with the Project Team in assigning duties and responsibilities in relation to the CEMP to individual members of the main contractor's project staff.

It is the responsibility of the Project Manager to approve key personnel required for employment on the project. The Project Manager will liaise with the SEM. The Project Manager will lead the works on site. The Project Manager will be responsible for the management and control of the activities and will have overall responsibility for the implementation of the CEMP. The Project Manager will be assisted by the SEM who will act as their deputy.

3.3.2 Site Manager

The Site Manager's environmental management responsibilities include, but are not limited to:

- Liaise with the SEM and the Project Team in assigning duties and responsibilities in relation to the CEMP, to individual members of the main contractor's project staff
- Liaising with Site Manager in preparing, reviewing and updating all site-specific method statements for activities where there is a risk of pollution or adverse effects on the environment
- Liaising with the SEM in agreeing site specific Method Statements with Third Parties
- Ensuring that all relevant information on project programming, timing, construction methodology, etc., is communicated from the contractor's Project Team, including the Project Manager, to the SEM in a timely and efficient manner in order to allow pre-emptive actions relating to the environment to be taken where required
- Ensuring that the risk assessments for control of noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site
- Close liaison with the SEM to ensure adequate resources are made available for implementation of the CEMP; and
- Ensuring that the SEM reviews all method statements, performs regular and frequent environmental site inspections and that relevant environmental protocols are incorporated and appended

3.3.3 Environmental Manager

In order to ensure the successful development, implementation and maintenance of the Environmental Management Plan (EOP), the Contractor will be required to appoint an independent Site Environmental Manager (SEM) to provide independently verifiable audit reports. The EOP is a project management tool which outlines procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that can arise during the Construction Phase of developments. The EOP will be developed and updated by the Contractor during the project construction stage. The EOP is included in Appendix A5.1 (CEMP), sub-appendix D, in Volume 4 of this EIAR.

The SEM must possess sufficient training, experience, and knowledge appropriate to the nature of the task to be undertaken, a Level Eight qualification recognised by the Higher Education and Training Awards Council (HETAC), or a university equivalent, or other qualification acceptable to the Employer, in Environmental Science or Environmental Management, Environmental Hydrology, Engineering or other relevant qualification acceptable to the Employer.

Separate from the on-going and detailed monitoring carried out by the contractor as part of the EOP, the SEM shall carry out the inspection/ monitoring regime described below, and report to the Contractor. The results will be stored in the SEM's monitoring file and will be available for inspection/ audit by the Client, National Parks and Wildlife Service (NPWS) or Inland Fisheries Ireland (IFI) staff as requested. All inspections/ monitoring/ results will be recorded on standard forms. The responsibilities of the SEM include, but are not limited to:

- Ensuring that the CEMP is finalised, implemented and maintained
- Liaising with Site Manager in preparing, reviewing and updating all site-specific method statements for activities where there is a risk of pollution or adverse effects on the environment
- Liaising with Site Manager in agreeing site specific Method Statements with Third Parties;
- Being familiar with the information in the pre-construction surveys, construction requirements, An Bord Pleanála decision and all relevant Method Statements
- Being familiar with the contents, environmental commitments and requirements continued within the reference documentation listed in the CEMP
- Being familiar with the baseline data collated during the compilation of the EIAR and the NIS
- Assisting Management in liaising with the Engineers and Iarnród Éireann and the provision of information on environmental management during the construction of the project
- Liaising with the Site Manager and the Project Team in assigning duties and responsibilities in relation to the EOP, to individual members of the main contractor's project staff
- Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil best practice requirements
- Ensuring that all relevant works are undertaken in accordance with the relevant legislation in the Republic of Ireland
- Liaising with the designated licence holders and specific agent defined in the licence with respect to licences granted pursuant to the Wildlife Acts 1976 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011
- Bring any legal constraints that may occur during certain tasks to the attention of management
- Hold copies of all permits and licenses provided by waste contractors
- Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc have appropriate authorisation
- Gathering and holding documentation with respect to waste disposal
- Keeping up to date with changes in environmental practices and legislation and advising staff of such changes and incorporating them into the CEMP
- Liaising with contactors and consultants prior to works
- Procuring the services of specialist environmental contactors when required
- Ensuring that all specialist environmental contactors are legally accredited and proven to be competent
- Coordinating all the activities of the specialist environmental contractors

- Ensuring that environmental induction training is carried out on all personnel on site and ensuring that toolbox talks include aspects of environmental awareness and training
- Respond to all environmental incidents in accordance with legislation, the CEMP and company policy/procedures
- The SEM is responsible for notifying the relevant statutory authority when environmental incidents occur and producing the relevant reports as required
- Ensuring that all relevant works have (and are being carried out in accordance with) the required permits, licenses, certificates and planning permissions
- Carrying out regular documented inspections of the site to ensure that work is being carried out in accordance with the Environmental Control Measures and relevant site-specific Method Statements
- The SEM should prepare and be in readiness to implement at all times the Incident Response Plan (see Appendix F to this CEMP); and
- Responsible for reviewing all environmental monitoring data and ensuring that they all comply with stated guidelines and requirements

For more detailed list of duties refer to the EOP contained in sub-appendix D to this CEMP.

3.3.4 Design Manager

The main duties and responsibilities of the Design Manager include:

- Be familiar with the CEMP and relevant documentation referred to within
- Be familiar with the contents, commitments and requirements contained within the reference documents; and
- Participate in Third Party Consultations and liaising with third Parties through the SEM

3.3.5 Site Agents

The Site Agents are responsible for the following:

- Ensuring Forepersons under their control adhere to the relevant Environmental Control measures and relevant site-specific Method Statements, etc
- Ensuring that the procedures agreed during third party consultations are followed
- Reporting immediately to the SEM any incidents where there has been a breach of agreed environmental management procedures, where there has been a spillage of a potentially environmentally harmful substance, where there has been an unauthorised discharge to ground, water or air, damage to habitat, etc; and
- Attending environmental review meetings and preparing any relevant documentation as required by Management

3.3.6 Forepersons

The forepersons on site are responsible for the following:

- Ensuring personnel under their control adhere to the relevant environmental control measures and relevant site-specific Method Statements
- Reporting immediately to the site agents and SEM any incidents where there has been a breach of agreed procedures e.g. spillages and discharges

3.3.7 Employer's Representative

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Employer's Representative (ER) acts on behalf of the Employer in the course of a construction project. The EOP will be audited by the Employer's Representative to ensure that the Contractor is compliant with the environmental provisions of the Contract Documents.

3.3.8 Project Supervisor Construction Stage

The role of the Project Supervisor Construction Stage (PSCS) is to manage and co-ordinate health and safety matters during the construction stage. The PSCS will be appointed before the construction work begins and will remain in that position until all construction work on the project is completed.

It is the responsibility of the PSCS to ensure that the project:

- is designed and is capable of being constructed to be safe and without risk to health
- is constructed to be safe and without risk to health
- can be maintained safely and without risk to health during subsequent use; and
- complies in all respects, as appropriate, with the relevant statutory provisions

The PSCS will maintain contact with the PSDP throughout the Construction Phase to communicate any health and safety related issues. The PSDP will prepare a written safety file appropriate to the characteristics of the project, containing relevant health and safety information, to be taken into account during any subsequent construction work following completion of the project.

3.3.9 All Project Personnel

All project personnel have the following responsibilities:

- Reporting any operations and conditions that deviate from the CEMP to the Site Agent and SEM. Depending on circumstances it may be appropriate for general operatives and machinery operators to report directly to their Foreperson who will then report to the SEM and Site Agent
- Taking an active part in site safety and environmental meetings
- Ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site; and
- Attend environmental training as required

3.3.10 Ecological Clerk of Works

In order to ensure the successful development and implementation of the CEMP, the Contractor will appoint an independent Ecological Clerk of Works (ECoW). The ECoW must possess training, experience and knowledge appropriate to the role, including:

- An NFQ Level 8 qualification or equivalent or other acceptable qualification in ecology or environmental biology; and

- Demonstrable experience in the protection of European sites

The principal functions of the ECoW are:

- To provide ecological supervision of the construction of the Proposed Development and thereby ensure the full and proper implementation of all the mitigation measures relating to biodiversity prescribed in the EIAR and NIS
- To regularly review the outcome of the specialist hydroacoustic monitoring if being undertaken and, on that basis, make any necessary adjustments to the mitigation; and
- To carry out weekly inspections and reporting on the implementation of the Contractor's Biosecurity Protocol

During the preparation of the Contractor's CEMP, the SEM may, as appropriate, assign other duties and responsibilities to the ECoW.

In exercising their functions, the ECoW will be required to keep a monitoring file, and this will be made available for inspection or audit by Iarnród Éireann, the NPWS or IFI at any time.

3.3.11 Project Archaeologist

A Project Archaeologist with a detailed knowledge of the Proposed Development will be appointed to develop and manage a centralised framework for tracking and managing all archaeological considerations. The Project Archaeologist will oversee the implementation and reporting of all archaeological and cultural heritage mitigation measures.

The role of the Project Archaeologist is to provide a consistent and independent approach throughout the duration of the Proposed Development.

In addition to making consistent recommendations and approving mitigation strategies and ensuring open lines of communication, a Project Archaeologist will provide archaeological training to operators and contractors and provide an advisory role offering practical advice on specific archaeological issues encountered in the field while promoting awareness of archaeological assets.

The effective management of the archaeological component of the project will be achieved through communication and a milestone driven contract process.

The appointment of a Project Archaeologist can ensure the smooth running of a scheme while providing controls on budgets and streamlining the point of communication for all heritage matters. In addition to this, a Project Archaeologist will:

- Review and agree details of the archaeological monitoring and investigation
- Review and agree the details of method statements, license applications and Ministerial Consents
- Manage the archaeological contract and specifically the work of the archaeological contractors
- Oversee the conduct of the archaeological excavations/ investigations
- Review the archaeological requirements as the works proceed. Implement any required changes to the methodology as construction work proceeds
- Certify all archaeological costs

- Oversee all post excavation works and certify all post excavation costs
- Review the content of reports prepared by the Archaeological Contractors and ensure that all the archaeological contractors provide all appropriate reports on their work in accordance with the contract conditions
- Ongoing consultation with the heritage authorities and statutory authorities
- Ensure all work is proceeding according to archaeological licensing or consent requirements
- Identify the requirement for additional investigation, including where necessary recording, survey, testing or excavation works
- Where possible implement time and cost-effective strategies that are in line with best practice guidelines and statutory authority approvals
- Provide advice to Iarnród Éireann
- Provide advice to the design, construction team and relevant contractors

3.3.12 Consultant Archaeologist

Experienced and competent licence-eligible archaeologist(s) will be employed by the appointed contractor to carry out the archaeological work and to advise on archaeological heritage matters during construction, to communicate all findings in a timely manner to the Project Archaeologist and Iarnród Éireann, to acquire any licenses/ consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Development.

Iarnród Éireann will make provision to allow for, and to fund, the necessary archaeological monitoring, inspection, test excavation and excavation works that will be needed on-site during and prior to construction, either directly or indirectly via the appointed contractor.

During the Construction Phase all mitigation measures will be undertaken in compliance with national policy guidelines and statutory provisions for the protection of the archaeological heritage. All methodologies will have to be agreed in advance with the National Monuments Section of the Department of Housing, Local Government and Heritage (DHLGH).

Archaeological mitigation measures can avoid, prevent, reduce or offset negative effects and these are achieved by preservation in-situ (avoidance), by design and / or by record.

Mitigation measures shall be undertaken as directed by the Minister of the DHLGH in compliance with the code of practice, national policy guidelines and statutory provisions for the protection of archaeology and cultural heritage. It is proposed that the following measures will take place as a minimum.

3.3.13 Other

Subject to the environmental commitments / requirements, other environmental specialists will be employed as required during the construction works.

3.4 Training and Induction

3.4.1 Site Induction

All employees and subcontractors involved on site will be given a comprehensive induction prior to commencement of the works. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

This environmental training can be run concurrently with safety awareness training.

Training will include:

- Overview of the Environmental Policy and Construction Environmental Management Plan, goals and objectives
- Awareness in relation to risk, consequence and methods of avoiding environmental risks as identified within the Register of Aspects and with the planning conditions
- Awareness of roles and individual environmental responsibilities and environmental constrains to specific jobs
- Location of and sensitivity of Special Areas of Conservation, Special Protection Areas, protected monuments, structures etc.; and
- Location of habitats and species to be protected during construction, how activities may affect them and methods necessary to avoid impacts

A record will be kept of a signed register on the project files of all attendees of the environmental induction.

Toolbox talks based on specific activities being carried out will be given to personnel by the nominated project representative. These will be based on specific activities being carried out and will include environmental issues particular to the project, including the impact on bird populations and water quality namely:

- Oil/diesel spill prevention and safe refuelling practice
- Storage of materials including oil/diesels and cement
- Emergency response processes used to deal with spills
- Minimising disturbance to wildlife
- Emergency response to include water pollution hotline to the EPA/Irish Rail for regulator response. Identification of registered / accredited spill cleanup company for oil etc
- Consideration of importance of containment of vehicle washing, containments of concrete /cement / grout washout etc., bank protection using hessian to prevent excessive scour and mobilisation of suspended solids, maintenance of vegetation corridors etc.; and
- Invasive Species

3.4.2 Specific Training and Awareness

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor. Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities. A register of completed training is to be kept by the SEM. The Site Manager will ensure that environmental emergency plans are drawn up and the SEM will conduct the necessary training/inductions.

3.5 Project Communication and Coordination

Environmental issues and performance aspects will be communicated to the workforce on a regular basis. Weekly project meetings, which follow a set agenda incorporating Environment, will be held alongside overall management meetings. All staff and sub-contractors involved in all phases of the project will be encouraged to report environmental issues.

3.6 Operational Control

Site works will be checked against the CEMP requirements. Any mitigation measures that have been agreed with the Statutory Authorities, or are part of planning conditions, will be put into place prior to the undertaking of the works for which they are required, and all relevant staff will be briefed accordingly.

Method statements that are prepared for the works will be reviewed / approved by the Client Project Manager and where necessary the relevant Environmental Specialist. All method statements for works in, near or liable to impact on a waterway must have prior agreement with IFI and NPWS.

A Quality Management System (QMS) will also be put into operation for the project. Document control will be in accordance with this QMS and copies of all audits, consents, licences, etc. will be finalised by the SEM and their team and kept on site for review at any time.

3.7 Checking and Corrective Action

Daily inspections of the site and the works will be undertaken to minimise the risk of environmental damage and to ensure compliance with the CEMP. Any environmental incidents are to be reported immediately to the Site Foreman. The SEM will undertake periodic inspections and complete an assessment of the project's environmental performance with regard to the relevant standards/legislation and the contents of the CEMP. Following these inspections, the SEM will produce a report detailing the findings which will be provided to the Client Project Manager and reviewed at the monthly project meeting.

3.8 Environmental Control Measures

Licensing requirements will be in place and specific procedures to manage the key environmental aspects of the project will be developed by the contractor prior to work commencing.

3.9 Complaints Procedure

A liaison officer will be available to allow for member of the pubic or interested parties to make complaints about the construction works. The CEMP will contain details of the complaints procedures and a monitoring system will be implemented to ensure that any complaints are addressed, and satisfactory outcome is achieved for all parties.

4. SCHEDULE OF ENVIRONMENTAL COMMITMENTS

Project environmental mitigation has been set out in the Railway Order application documentation, specifically the EIAR and NIS. These environmental commitments are detailed in Appendix A and Appendix B to this CEMP. The final CEMP will provide a framework for compliance auditing and inspection to ensure that the construction practices and mitigation measures, as set out in the EIAR and NIS as well as the conditions in the planning approval, are adhered to.

Appendix A of this CEMP details the measures in Chapter 27 (Summary of Mitigation and Monitoring Measures) in Volume 2 of the EIAR. Natura Impact Statement (NIS) mitigation measures are contained in Appendix B to this CEMP.

5. STATUTORY PLANNING CONSENT

When the Railway Order application is approved by An Bord Pleanála for the Proposed Development the full statutory approval and any conditions attached will be considered and included as required within the CEMP. The Statutory Planning consent will be inserted as an Appendix (Appendix C) into the final CEMP once statutory planning approval is received and will be carried forward into the Contractors CEMP.

6. ENVIRONMENTAL OPERATING PLAN

An Environmental Operating Plan (EOP) is prepared to outline procedures for delivery of environmental mitigation measures for addressing general day-to-day environmental issues that can arise during the Construction Phase of the Proposed Development. The EOP is a live document and will be further developed and updated by the Contractor during the project construction stage. The EOP is contained in Appendix D to this CEMP.

7. CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN

A Construction and Demolition Waste Management Plan (CDWMP) is prepared to ensure that waste arising during the Construction and Demolition phase of the development on site will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 (as amended) and the associated Regulations are complied with and to ensure that optimum levels of reduction, re-use and recycling are achieved. The CDWMP is contained with Appendix E to this CEMP.

8. INCIDENT RESPONSE PLAN

The Incident Response Plan (IRP) describes the procedures, lines of authority and processes that will be followed to ensure that incident response efforts are prompt, efficient, and appropriate to particular circumstances. The IRP is contained within Appendix F to this CEMP.

9. CONSTRUCTION TRAFFIC MANAGEMENT PLAN (CTMP)

The Construction Traffic Management Plan (CTMP) provides the basis for the management of traffic expected during the Construction Phase of the Proposed Development based on the current planning phase of the Proposed Development. This CTMP will be further developed by the Contractor in advance of the commencement of construction and in close liaison with local authorities and other bodies as necessary, to maximise the safety of the workforce and the public, minimise traffic delays and disruptions, while maintaining access to properties, during the Construction Phase.

In addition to the CTMP, the contractor will prepare a Construction Phase mobility management plan (MMP) to ensure that staff movements and the works have as little impact on the surrounding area as reasonably practicable. The MMP will be implemented throughout the Construction Phase to avoid congestion and thus reduce GHG emissions.

Temporary disruption to traffic signals, footpath access and management of pedestrian crossing points will also be addressed by the CTMP. An appropriate information campaign for the duration of the construction works shall be provided by the contractor.

The Construction Traffic Management Plan (CTMP) is contained within Appendix G of this CEMP.

Appendix A: Environmental Impact Assessment Report Chapter 27 (Summary of Mitigation and Monitoring Measures)

CONTENTS

27. SUMMARY OF MITIGATION & MONITORING MEASURES

27.1 Introduction

The Transport (Railway Infrastructure) Act 2001 (as amended) provides for the making of a Railway Order application (also referred to herein as "the proposed Project") by Córas Iompair Éireann (CIÉ) to An Bord Pleanála. The European Union (Railway Orders) (Environmental Impact Assessment) (Amendment) Regulations 2021 (S.I. No. 743 of 2021) gives further effect to the transposition of the EIA Directive (EU Directive 2011/92/EU as amended by Directive 2014/52/EU) on the assessment of the effects of certain public and private projects on the environment by amending the Transport (Railway Infrastructure) Act 2001 ('the 2001 Act').

Annex IV (7) of the amended EIA Directive (2014/52/EU) requires: *A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the Construction and Operational Phases.*

This chapter presents a summary of the mitigation and monitoring measures identified as a result of the environmental assessments carried out in the preceding chapters of this EIAR.

From the inception of the design and environmental assessment process of the proposed DART+ Coastal North project (referred to hereafter as the 'Proposed Development') the project team has strived to avoid, prevent, and reduce adverse effects which are incorporated into the design drawings and specifications of the project that have been assessed as part of this EIAR.

Avoidance of impacts is most applicable at the earliest stages of a project, whilst prevention has taken place during the design and environmental assessments process between the design team and EIA team. Mitigation is a last resort and can include a remedy or offsetting of adverse effects. For example, this can apply when projects cannot avoid significant effects due to their need to locate on a particular site, etc.

Where likely significant environmental effects have been identified during the environmental impact assessment process, measures have been proposed to mitigate these effects as much as reasonably possible, with any residual effects identified in the relevant chapters of this EIAR. The objective of this chapter is to provide a central location where all measures from the preceding chapters are presented together for both ease of reference and inclusion in the contract documents at a later stage of the project.

All the mitigation and monitoring commitments described below are incorporated into the Construction Environmental Management Plan (CEMP) submitted as part of this Railway Order application; refer to Volume 4, Appendix A5.1.

27.2 Mitigation and Monitoring Measures

Mitigation and monitoring measures have been identified as environmental commitments and overarching requirements which shall avoid, reduce, or offset potential impacts.

Mitigation and monitoring measures specified within the EIAR technical assessments are provided in Chapter 6 to Chapter 24 of this EIAR. The following tables in section 27.2.1 to 27.2.21 summarise the Construction and Operational Phase mitigation and monitoring measures outlined in the relevant EIAR technical assessments, plus the Natura Impact Statement, and should be read in conjunction with the mitigation outlined in the specific chapter and also with the Construction Environmental Management Plan (CEMP) in Volume 4, Appendix A5.1 of this EIAR.

27.2.1 Mitigation and Monitoring Measures for Traffic and Transportation

The table below describes the mitigation and monitoring measures identified in Chapter 6 (Traffic and Transportation).

Table 27-1 Mitigation and Monitoring Measures for Traffic and Transportation

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Traffic and Transportation
Mitigation Measures	
Construction Phase Mitigation	
6.6.1.1	**Impact of Construction Trips** **Construction Traffic Management Plan (CTMP)** The design and development of a Construction Traffic Management Plan (CTMP) will be implemented to be included within the Construction & Environmental Management Plan (CEMP), as outlined in Volume 4, Appendix 5.1 of this EIAR, in order to reduce potential impacts throughout the Construction Phase. Mitigation measures include: • Routing of heavy goods vehicles (HGVs) away from sensitive areas such as schools, residential areas, and areas sensitive in terms of air quality. • Use of sufficient clear signage to ensure that construction vehicles use only designated routes, such that HGVs refrain from using New Street within Malahide. • Scheduled arrival of bulk deliveries and large loads to ensure that traffic congestion does not result from vehicles arriving simultaneously. • Provision of holding areas to reduce congestion impacts along local roads. • Scheduling deliveries before AM peak traffic times, or throughout the day between AM and PM peak traffic periods. • Encouraging construction workers to access sites via sustainable modes of transport to reduce the capacity of cars on street and surrounding the compounds, especially in rural construction areas with reduced availability of car parking. • Facilitating on-site recycling of materials to reduce vehicle movements for importing and exporting. • Keeping access routes clear of construction debris that may create trip hazards for workers and pedestrians. • Implementation of wheel washing facilities to prevent deposition of materials and construction related dirt to be deposited on the surrounding road network. • Implementation of appropriate traffic management measures to ensure that compound access does not create major disruption.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Traffic and Transportation
	• Ensure appropriate vehicles for importing and exporting goods are acquired to minimise environmental impacts and vehicular capacity on the surrounding access roads. • A reduction in speed limits in the vicinity of the site may be managed with the use of appropriate signage and will maintain a consistent flow of traffic, especially within the areas of Malahide, Donabate and Drogheda MacBride Stations. • All vehicles should be suitably serviced and maintained to avoid leaks of spillages of oil, petrol, diesel, as well as other carbon emissions and combustible materials. • Provision of safe footways and cycleways where current infrastructure has been impacted by construction works and vehicular access. Physical barriers and segregated pedestrian movements should be retained throughout the construction process. **Mobility Management Plan (MMP)** A MMP will be implemented for the duration of construction and the measures detailed below and will be further developed by the Contractor, in liaison and with the agreement of the relevant local authorities. The Construction Traffic Management Plan (CTMP) (included in the CEMP in Appendix A5.1 of Volume 4 of this EIAR) references the need for a detailed MMP. This MMP will manage trips associated with construction staff. The MMP is set out to achieve the following objectives: • To reduce and discourage the use of the private car as the primary means of travel when accessing the Construction Compounds as far as possible within daytime working hours. • Promote the use of sustainable modes of transport such as walking, cycling and public transport when travelling to and from the Construction Compounds. • To liaise with the Local Authorities, National Transport Authority and Iarnród Éireann to encourage and facilitate staff active travel take up. • To create a unified network of stakeholders to support the constraints outlined within the mitigation measures while accessing the Construction Compounds. • To Coordinate with adjacent construction projects in relation to forming a combined and supported Mobility Management Plan.
6.6.1.2	**Impact of Road Closures** A Traffic Management Plan (TMP) will be established to coordinate traffic diversions whenever road closures are necessary, such as the ones in Harbour Road, which will be closed over-night on several occasions or Dublin Road bridge, where work on abutments will require the reduction to a single lane of traffic. Traffic management will be established based on latest regulations to ensure the safety of all road users (including cyclists), pedestrians and mobility impaired people. A safe route will be established as well where footpaths or off-road cycle tracks are affected.
6.6.1.3	**Impact on Car Parking** The contractors and construction workers' vehicles will be parked within the designated areas associated with each compound. While the use of sustainable modes of transport is encouraged, the Mobility Management Plan (MMP) will establish initiatives to manage parking throughout the construction period. It must be ensured that there is no construction related parking on public roads or in areas designated for use by the public. In order for train stations to maintain parking efficiency for rail users, Iarnród Éireann will continue to monitor the amount of parking, where there will be an increased capacity for public parking at the latter stages of construction. Public car parking spaces will be lost at a number of stations, with this temporary loss of car parking primarily in the areas of the railway to be electrified between Malahide and Drogheda. The greatest loss of commuter car parking will occur at Donabate station followed by Drogheda MacBride Station as a result of the Construction Compounds in these facilities.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Traffic and Transportation
	At the Drogheda MacBride Station it is recommended that the contractor be limited to only occupy a maximum of 110 spaces at any one time during the overall period of works, these to be within one or both of the two compounds. The contractor will make every effort to reduce the footprint of the compound as the construction programme progresses in order to maximise the number of car parking spaces available to the public.
6.6.1.4	**Impact on Rail Network** Replacement bus services will be provided where rail services are impacted during construction. The functionality of the railway lines is planned to be retained during the works, limiting services to one track at a time (as opposed to full closure) where safe to do so.
6.6.1.5	**Impact on Bus Network** Bus routes impacted in Drogheda (D4, D5, 101, 101X) will be impacted as a result of the proposed bridge modification works and subsequent road closures. Where relevant, bus stops will be temporarily relocated to continue the bus service.
Operational Phase Mitigation	
6.6.2	Impacts on vehicular traffic and public transport during abnormal highly trafficked days, with potential blocking back of queues from Kilbarrack (Baldoyle Road) and Sutton Level Crossing, are proposed to be mitigated with yellow box markings, which are already provided at all major junctions along Sutton Road and Baldoyle Road. Pedestrians and cyclists may also be impacted, for example at Cosh Level Crossing near Burrow Beach. Law enforcement officials will ensure efficient operations on highly trafficked days. Commuters living in close proximity to the railway station are encouraged to travel to and from via sustainable transport modes, assisted by good quality infrastructure and an increase in cycle parking facilities and bike lockers.
Monitoring	
	No specific monitoring is required.

27.2.2 Mitigation and Monitoring Measures for Population

The table below describes the mitigation and monitoring measures identified in Chapter 7 (Population).

Table 27-2 Mitigation and Monitoring Measures for Population

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Population
Mitigation Measures	
Construction Phase Mitigation	
7.6	In addition to the design measures included in Chapter 4 (Description of the Proposed Development) and Chapter 5 (Construction Strategy), and to the mitigation proposed in the specialist chapters for Chapter 6 (Traffic and Transportation), Chapter 14 (Noise and Vibration), and Chapter 15 (Landscape and Visual), the following mitigation measures are proposed to be implemented as far as reasonably practicable during the Construction Phase: • Portmarnock Walking and Cycle Way - provide flag man at R123 Moyne Road crossing at times of most construction traffic movement;

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Population
	• Howth Junction and Donaghmede - use access points east of tracks where possible to avoid undue impacts on residential estate in Donaghmede; • Malahide Village - Adherence to the CTMP, including low limits on HGV speed. Construction traffic access will take place between 10am and 4pm and avoid nighttime; • Sea Road, Caves Strand, Yellow Walls Road. Adherence to the CTMP, including low limit on HGV speed. Construction traffic access will take place between 10am and 4pm and avoid nighttime; • Information signage should be provided for the duration of the construction works to provide appropriate information on the nature and duration of works, for cyclists and pedestrians using the Broadmeadow Greenway in the vicinity of works at Malahide; • Skerries North, Ardgillan - avoid use of local road by construction traffic during summer weekends and holiday periods where possible; • Balbriggan Viaduct - avoid simultaneous closure of both viaduct walkways; • Balbriggan - temporarily close playpark during the busier period for construction traffic. • Station works - Howth Junction and Donaghmede and Drogheda Stations - provide clear directional signage and access facilities for passengers during works internal to the station, bearing in mind the needs of more sensitive subsets and people with disabilities; and • Drogheda - St Mary's Primary School, Meadow View - during term time, provide for facilitated crossing of school children if local road is being used as a diversion for Dublin Road during UBK1 bridge works.
Operational Phase Mitigation	
7.6	Operational Phase mitigation measures include: • Provide visible security measures within Howth Junction and Donaghmede Station and on the platform extension, for example good lighting, CCTV and panic buttons.
Monitoring	
	No project specific monitoring is proposed in relation to the Population effects.

27.2.3 Mitigation and Monitoring Measures for Biodiversity

The table below describes the mitigation and monitoring measures identified in Chapter 8 (Biodiversity).

Table 27-3 Mitigation and Monitoring Measures for Biodiversity

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Biodiversity
Mitigation Measures	
Construction Phase Mitigation	
8.9.1	**Roles and Responsibilities (Framework Measures)** A suitably experienced and qualified ecologist (Ecological Clerk of Works (ECoW)) will be employed by the appointed contractor to advise on ecological matters during construction, communicate all findings in a timely manner to the IÉ and statutory authorities, acquire any licences or consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Development.
8.9.1.1	**Designated Areas of Nature Conservation**

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8.9.1.1.1	**European Sites** The mitigation measures that are required to ensure that the Proposed Development will not adversely affect the integrity of the European sites within the ZoI are presented in the NIS. The following mitigation measures were developed to address potential impacts that were identified: • Measures to protect surface water quality during construction; • Measures to prevent the spread of non-native invasive species to downstream European sites; • Measures to prevent disturbance and displacement of QI/SCI species from European sites; and • Measures to prevent habitat degradation as a result of changes to air quality.
8.9.1.1.2	**National Sites** The mitigation measures in relation to potential impacts arising from the Proposed Development on pNHAs within the ZoI are as per those for European sites as the boundaries coincide with the SACs and SPAs.
8.9.1.2	**Habitats**
8.9.1.2.1	**Habitats Degradation – Surface Water Quality** A Surface Water Management Plan (SWMP) is included as part of the Construction Environmental Management Plan (CEMP), this includes measures relating to: • A requirement for a Pollution Incident Response Plan; • Construction Compound management including the storage of any fuels and materials; • Control of Sediments; • Use of concrete; and • Management of vehicles and plant including refuelling and wheel wash facilities, etc. As well as these generic mitigation measures, other specific mitigation and/or monitoring measures may be required, which will include, but will not be limited to: • Works in Flood Zones A and B are avoided where possible. In these areas, the Contractor will be required to provide a method statement for the removal of materials and personnel to minimise sediment discharge into the river and risk to personnel during flood events; • Construction works in areas prone to flooding are to take place during dry seasons. The Contractor must follow the weather forecast prior to commencing instream works and concrete pouring. It is noted that track levels for the entirety of the development are well above flood levels. • Works areas to be kept dry at all times through the use of bunds of non-erodible material adjacent to watercourses to avoid contaminated water entering the watercourse. • Settlement tanks, silt traps/bags and bunds will be used where required to remove silt from surface water runoff. Sizing of the tanks will be based on best available guidelines, CIRIA (2006). Any construction work within a 10m buffer zone must be provided with these measures to minimise sediment discharge to a watercourse; • Refuelling of all plant, machinery, and vehicles will be undertaken only in designated areas where leaks and spills are can be contained relatively easily. Spill kits will be made available on all temporary and permanent construction sites. Refuelling areas must be kept at least 50m away from any watercourse, including, but not limited to; estuarine, transitional, and coastal waterbodies; • Construction materials to be managed in such a way as to effectively minimise the risk posed to the aquatic environment; • Construction Compounds and haul roads will avoid high flood risk zones as much as possible and maintain a minimum buffer of 50m from surface watercourses, and

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Biodiversity
	• Excavated material to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses.
8.9.1.2.2	**Habitat Degradation – Groundwater** The following mitigation measures will be implemented with regard to pollution of soil and groundwater: • Good construction management practices as outlined in the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) will be employed by the appointed contractor to minimise the risk of transmission of hazardous materials as well as pollution of adjacent watercourses and groundwater. The construction management of the site will take account of these recommendations to minimise as far as possible the risk of soil, groundwater and surface water contamination; • Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures; • Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, (e.g., by a roll-over bund, raised kerb, ramps or stepped access); • The location of any fuel storage facilities will be considered in the design of the Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice at the time of construction and will be fully bunded; • Good housekeeping on site (daily site clean-ups, use of disposal bins, etc.) will be applied during the entire Construction Phase; • All concrete mixing and batching activities will be located in areas away from watercourses and drains; • Potential pollutants will be adequately secured against vandalism in containers in a dedicated secured area; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control will be implemented during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and • Spill kits will be provided and will be kept close to the storage area and staff will be trained on how to use spill kits correctly.
8.9.1.2.3	**Habitat Degradation – Air Quality** Standard measures to control nuisance dust such as inspection and cleaning of public roads, measures for stockpiling of materials within the Construction Compound, water misting / spraying, vehicle coverings, and hoarding (2.4m in height) around the Construction Compounds and noise sensitive receptors.
8.9.1.2.4	**Habitat Degradation – Non-native Invasive Plant Species** A confirmatory pre-construction non-native invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and/or extent of all Third Schedule non-native invasive species within the footprint of the Proposed Development. The following mitigation measures will be implemented, as required: • Where a pre-construction non-native invasive species re-survey has confirmed the presence of previously identified Third Schedule non-native invasive species, or identified newly established non-native invasive species within the footprint of the Proposed

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Biodiversity
	Development, the ISMP produced will provide a detailed description of the infestations (e.g., approximate area of the respective colonies (m2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, will include calculations of volumes of infested soils to be excavated; • The ISMP will be updated following the pre-construction survey as advised by a suitably qualified specialist, with regard to the guidance, on The Management of Invasive Alien Plant Species on National Roads (Technical Guidance) (TII 2020a; 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary; and • IÉ will ensure that all control measures specified in the ISMP will be implemented by a suitably qualified and licensed specialist prior to the construction of the Proposed Development to control the spread of non-native invasive species within the footprint of the Proposed Development. Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Development.
8.9.1.3	**Mammals**
8.9.1.3.1	**Bats** **Protection of Bats during Vegetation Clearence** The following mitigation measures will be implemented by the appointed contractor: • Retained trees will be fenced off at the outset of works (i.e., at compounds and substations), and for the duration of construction to avoid structural damage to the trunk, branches, or root system of the tree which could disturb roosting bats. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist; • Where fencing is not feasible due to insufficient space, protection for the tree will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk and strapping stout buffer timbers around it; • The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils, and chemicals). The storage of hazardous materials (e.g., hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows, and tree lines; • A qualified arborist engaged by the appointed contractor will assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Development footprint but whose RPA is impacted by the works; and • All trees and vegetation to be retained within and adjoining the works area will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 ‘Trees in relation to in relation to design, demolition, and construction - Recommendations’ (BSI 2012). • Works required within the root protection area (RPA) of trees to be retained will follow a project-specific arboricultural methodology for such works, which will be prepared by a professional qualified arborist. • In addition to the above the following bat specific mitigation measures (in relation to vegetation clearance) will be implemented by the appointed contractor:

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	• Where the qualified arborist engaged by the appointed contractor is required to assess the condition of, and advise on any repair works necessary to, any trees which are to be retained, these will be notified to the appointed ecologist to be surveyed to confirm if these trees have potential roost features (PRFs) or have developed PRF(s) during the interim between the surveys and grant of planning. Where trees with PRF(s) require works including removal for example due to poor condition, they will be subject to mitigation as described below, under the PRF Re-Appraisal; and • There will be no additional lighting within 5m of any tree with PRFs during the Construction Phase of the Proposed Development to avoid potential disturbance to roosting bats, as far as reasonably p ractical, but will not involve direct lighting on any roost features. **Roost Loss** Where reasonably practicable the removal of trees, and modifications of bridges (i.e., parapet modifications, or any other structural works), with PRFs, will occur only between April – May, and September – October to avoid the most sensitive time periods for bats (i.e., during breeding season and hibernation). However, to ensure the protection of bats and if the project timeframe does not allow for this, the following mitigation will be undertaken. *PRF Re-Appraisal (First Step of Pre-Construction Survey)* A pre-construction survey of all trees being removed, and of all bridges with bat roosting potential, to rechecked for PRFs will be undertaken by an experienced bat specialist/ecologist engaged by the IÉ as part of the pre-construction surveys. The survey will: • Confirm trees due for removal with PRFs; • Confirm PRFs identified in bridges are still suitable for roosting bats and have not become unsuitable in the meantime (i.e., become inundated with water or filled etc.). *Pre-Construction Survey for trees* In the event that additional PRFs are detected during the pre-construction survey, it is recommended that: • In advance of any clearance, all trees deemed to contain PRFs which are subject to felling / clearance will be checked for the presence of bats by a suitably qualified / licensed bat specialist (using an endoscope); • In the event that bats are found on the Proposed Development site during construction works such as vegetation clearance, works will immediately cease in that area and the local NPWS Conservation Ranger will be contacted; • An application will then be made to the NPWS for a derogation licence seeking to permit actions affecting bats or their roosts that would normally be prohibited by law; • After licence approval from the NPWS (which may include the necessity for additional mitigation measures to those recommended here) bats may be removed by a bat specialist licensed to handle bats and released in the area in the evening following capture; and • Only then will PRF trees be felled, and this should be undertaken 'in sections' where the section can be handled to avoid sudden movements or jarring of the sections. *Pre-Construction Survey for Bridges* Bridges where proposed works are being undertaken, i.e., demolition at bridge OBB80/80A/80B, parapet modifications, and track lowering beneath bridges, and that have been deemed to have the potential for roosting bats (as described above) by virtue of having potential bat roosting features, will require a pre-construction survey. The following mitigation measures will be followed for the aforementioned bridges with bat roosting potential: • The night prior to the start of works, a bat activity survey will be undertaken to ensure no roosting bats are present. A suitably qualified and experienced ecologist must carry out

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	one bat emergence and one bat re-entry survey during the active bat season (generally taken as mid-April to mid-September inclusive). • Where a bat roost is encountered, all relevant works will cease and an application for a derogation licence shall be submitted by the suitably qualified/licenced bat specialist to the NPWS to seek permission for the removal of the roost. **Habitat Loss and Fragmentation** Where practicable, habitats of importance to bats such as scattered trees and parkland, tree line and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Development, that are not directly impacted by the Proposed Development will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. **Disturbance of Flight Patterns / Foraging Routes as a result of Lighting Impacts** The appointed contractor in liaison with the suitably qualified licensed ecologist(s) will ensure that lighting at the Construction Compounds, and active work areas in proximity to known bat activity, will be designed, and installed to minimise light spill and be cognisant of light-spill onto these areas. Mitigation measures to reduce light spill will include the following: • The use of sensor / timer triggered lighting; • LED luminaires to be used where practicable due to their sharp cut-off, lower intensity, good colour rendition and dimming capability; • Column heights to be considered to minimise light spill; and • Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed. Where night-time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works.
8.9.1.3.2	**Badger** **Disturbance/Displacement** Pre-confirmatory pre-construction check will be required of all suitable badger habitat, completed within 12 months prior to any construction works commencing. **Protection of Badgers from Accidental Harm during Construction (Excavations)** To protect badgers from indirect harm during construction, where practicable, open excavations will be covered when not in use and backfilled as soon as practicable by the appointed contractor. Excavations will also be covered at night, or fenced off where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow badgers to safely exit should they fall in.
8.9.1.3.3	**Otter** Otters are known to occur in the vicinity of the Proposed evelopment, likely across some watercourses in the vicinity of the Proposed Development. Given the ecological sensitivity of these watercourses in particular, the appointed contractor will engage a suitably qualified and/or licensed ecologist to oversee and advise works at watercourse crossings during construction to communicate all findings in a timely manner to IÉ and statutory authorities, to acquire any licences or consents required to conduct the work, and to supervise and direct the ecological measures associated with the Proposed Development. Where a newly established otter holt is encountered, within 150 meters (up and downstream) of a watercourse crossing, the qualified ecologist(s) will consult with the NPWS in conjunction with IÉ and the appointed contractor. The qualified ecologist will review method statements; oversee works; provide instruction to the appointed contractor(s), deliver toolbox talks and temporarily halt works, if, and as, necessary, having conferred with IÉ.

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	Loss of Breeding/Resting Sites IÉ will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed by a suitably qualified ecologist within 12-month period prior to any construction works commencing. Where any new active holts/couches are recorded within 150m of the Proposed Development the appointed ecologist will ensure that adequate mitigation is provided in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (TII, 2006), and a derogation licence is sought from the NPWS where necessary. *Precautionary Mitigation measures for new active holts/couches recorded within 150m of the Proposed Development* Until such time as otters have been successfully evacuated from active holts, the following provisions will apply to all construction works: No works will be undertaken within 150m of any holts at which breeding females or cubs are present. Until consultation with NPWS, works closer to such breeding holts may take place - provided appropriate mitigation measures detailed below are in place; No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence; and The prohibited working area associated with otter holts will where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Fencing will be in accordance with Clause 303 of the TII's Specification for Roadworks (TII 2011). Appropriate awareness of the purpose of the enclosure will be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt. **Habitat Degradation/Reduced Prey Availability – Water Quality** A SWMP has been prepared (provided in Appendix A5.1 – CEMP in Volume 4 of this EIAR), 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 Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 10 (Water). **Disturbance/Displacement** Security lighting in active works areas in close proximity to watercourses with known otter activity will be designed in conjunction with a suitably qualified ecologist to minimise light spill. Similarly, where any new or amended lighting design is required at a watercourse crossing, it should be cognisant of downward light-spill onto watercourses. Measures to reduce light spill may include the following: The use of sensor/timer triggered lighting; LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability; Column heights should be considered to minimise light spill; and Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed. To prevent otter mortality/injury during operation, an otter tunnel will be constructed in Malahide Estuary, where the River Pill/Turvey flows under the railway line. During construction, there is potential for disturbance/displacement of otters from this location and in the surrounding area. To prevent disturbance and/or displacement of otters, the above mitigation (i.e., pre-construction checks along the watercourse for any active holts/resting place, and subsequent mitigation should they be identified), will apply in this case.

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	Direct Injury/Mortality To prevent otter mortality/injury during operation, an otter tunnel will be constructed in Malahide Estuary, where the River Pill/Turvey flows under the railway line. During construction, there is potential for disturbance/displacement of otters from this location and in the surrounding area. To prevent disturbance and/or displacement of otters, the above mitigation (i.e. pre-construction checks along the watercourse for any active holts/resting place, and subsequent mitigation should they be identified), will apply in this case. Full details of the construction of this pipe are include in Section 5.5.7 of Chapter 5 of the EIAR, Construction Strategy. The proposed otter crossing in Malahide where the River Pill/Turvey flows under the railway, will comprise a 600mm diameter pipe (as per TII guidance 2006c) which will pass beneath the railway close to Underbridge UBB31. The pipe will have a crossfall over its length and the pipe has been set at a level to avoid flooding from high tides. At either end of the pipe, an otter-proof fence will extend for at least 100m in each direction, to encourage the otters to make use of the crossing. The fence is partially buried to prevent the otters from burrowing beneath.
8.9.1.3.4	**Marine Mammals** **Habitat and Food Source Degradation – Water Quality** A SWMP has been prepared (provided in Appendix A5.1 – CEMP in Volume 4 of this EIAR), 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 Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 10 (Water).
8.9.1.3.5	**Other Mammals** The Construction Phase of the Proposed Development is not deemed to affect the local populations of other small, protected mammal species and will not result in a significant negative effect, at any geographic scale. No additional mitigation is proposed other than the following: • A SWMP has been prepared (provided in Appendix A5.1 – CEMP in Volume 4 of this EIAR), 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 Development. Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality are described in Chapter 10 (Water). • Where possible, habitats of importance providing refuge / shelter to other protected mammals such as scattered trees and parkland, scrub, tree line and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Development, that are not directly impacted will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Similar to the mitigation for breeding birds, tree removal, particularly where understorey vegetation is abundant will be undertaken outside of the bird nesting season, but as late in the wintering season (e.g., February) so as to give small resting mammals such as hedgehog that might be hibernating a chance at moving.
8.9.1.3.6	**Birds** **Breeding Birds** *Habitat Loss and Fragmentation* Where possible, habitats of importance to breeding birds such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Development, that are not directly impacted will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Planting of treeline, hedgerow and grassland habitats within the Proposed Development footprint will be carried out by the appointed contractor, as detailed in the landscape drawings.

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	Mortality Risk Where reasonably practicable, vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between the 01 March and the 31 August, to avoid potential direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within three days of the nest survey, otherwise repeat surveys will be required. Vegetation clearance will not commence where nests are present, works will resume when birds have fledged, and nests are no longer in use. *Disturbance/Displacement* Vegetation clearance undertaken in the appropriate time (i.e. outside of the breeding bird season) should ensure that breeding birds have adequate time in which to identify alternative vegetation in which to establish nests. To minimise disturbance and/or displacement to breeding birds from noise and vibration activities the relevant mitigation measures as described in Chapter 14 (Noise & Vibration) will be implemented by the appointed contractor. **Wintering Birds** *Measures to Prevent Disturbance and Displacement Impacts to non-SCI Birds Due to Vegetation Loss During Construction* Where practicable, the removal of screening or overhanging vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will be undertaken outside of the breeding bird season (01 March to the 31 August) and before the arrival of the wintering birds at the start of October. This is particularly relevant for areas of highly suitable habitat for wintering birds, i.e., the estuaries along the Proposed Development (Malahide Estuary, Rogerstown Estuary, Nanny Estuary). However, where the construction programme does not allow these seasonal restrictions to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of wintering birds prior to clearance. Where wintering birds are observed the suitably qualified ecologist will, in discussion with the appointed the contractor, advise how works will be appropriately undertaken. Where a site Construction Compound is required, its location relative to the Proposed Development is likely to be adjacent to the potential foraging areas. The appointed contractor will undertake the establishment of the following Construction Compounds outside of the wintering bird season (October to March): • CC-16100 Malahide (Caves Strand) • CC-15900W Malahide (Bissets Strand) • CC-52050, CC-51800, CC-51900 Drogheda Substation/Compounds • CC-44900 Laytown Construction Compound • CC-32200 Skerries Substation/Compound • CC 40200 Gormanston Construction Compound In addition, the Construction Compound in Malahide (CC-16100 Caves Strand), and the utilities compound in Laytown (CC- 44390E) will only be in use outside of the wintering bird season (October to March, inclusive) to ensure there are no disturbance related impacts to wintering birds foraging and roosting in the surrounding habitats. As a further precautionary measures, the design of the lighting will ensure that light-spill will not occur in the direction of any adjacent fields. Mitigation measures to reduce light spill will include the following: • The use of sensor/timer triggered lighting; • LED luminaires to be used where practicable;

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	• Column heights to be considered to minimise light spill; and • Accessories such as baffles, hoods or louvres to be used to reduce light spill and direct it only where needed.
8.9.1.3.7	**Reptiles** No reptile species were recorded during the multi-disciplinary surveys carried out along the Proposed Development. The Construction Phase of the Proposed Development is not deemed to affect the local reptile population and will not result in a significant negative effect, at any geographic scale. However, mitigation is provided to avoid harm/injury to reptiles that may be using the railway line and verges. **Temporary Fencing** Temporary fencing (such as bitumen felt, tin, carpet tiles, or bitumen onduline) can be used to deter reptiles from moving into areas where development could cause damage to them. The fencing should be structured to ensure that reptiles cannot pass under, over, or through the fence, by ensuring the fencing is buried deep into the ground, and is high enough so reptiles cannot jump over. Temporary fencing is only required in areas where extensive works are taking place (i.e. where OHLE supports are being installed within railway ballast). **Capture Methods** Prior to reptile mitigation methods, such as translocation, reptiles may need to be captured if they do not leave the area on their own accord. The best time to capture reptiles is between March and September and they should not be captured during autumn, in extreme weather conditions, or when they are hibernating. Capturing heavily gravid reptiles will also be avoided. Reptiles will be moved to an area of suitable reptile habitat not at risk from the works outside of the reptile fencing. Capture methods can involve the following: • Use of artificial refuges, such as roofing felt; • Reduction of the amount of suitable habitat. This will help to concentrate the reptiles into specific areas to make it easier to capture them; and • Using dismantled rubble, rock, or wood piles as refuges to capture the reptiles. **Translocation** Translocation should be undertaken as a last resort and involves moving the reptiles to an alternative location. The new receptor site should be suitable for reptiles and should be as close as possible to the original development site. The receptor site should also be at least the same size as the original habitat, and better quality, where possible. If the receptor site has an existing species of reptiles, a small number of reptiles may be introduced to the existing population as long as the habitat has been improved to be able to support the additional reptiles.
8.9.1.3.8	**Amphibians** *Habitat Degradation – Surface Water Quality* A SWMP has been prepared (provided in Appendix A5.1 – CEMP in Volume 4 of this EIAR), 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 Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 10 (Water).
8.9.1.3.9	**Fish** *Habitat Degradation – Surface Water Quality* A SWMP has been prepared (provided in Appendix A5.1 – CEMP in Volume 4 of this EIAR), 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

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Biodiversity
	the Proposed Development. Specific mitigation measures which the appointed contractor will implement in relation to surface water quality are described in Chapter 10 (Water).
Operational Phase Mitigation	
8.9.2.1	**Designated Areas for Nature Conservation**
8.9.2.1.1	**European Sites** • Measures to protect surface water quality during operation; • Measures to prevent the spread of non-native invasive species to downstream European sites; and • Measures to prevent direct injury/mortality.
8.9.2.1.2	**National Sites** The mitigation measures outlined in Section 8.9.1.1.1, and as detailed in the NIS (which accompanies the application for a Railway Order), will prevent the Proposed Development resulting in a significant negative effect on these pNHAs and NHAs.
8.9.2.2	**Habitats**
8.9.2.2.1	*Habitat Degradation – Surface Water Quality* Measures to control the risk of flooding and contamination to local waterbodies and the hydrological environment have been included within the design of the Proposed Development. Maintenance of the railway and substations will be on-going to ensure the risks are minimised during the Operational Phase.
8.9.2.2.2	*Habitat Degradation – Groundwater* In the Operational Phase the infrastructure will be maintained by IÉ and will be subject to their management procedures to ensure that the correct measures are taken in the event of any accidental spillages, and this will reduce the potential for any impact.
8.9.2.2.3	*Habitat Loss* Whilst the habitat loss of the Proposed Development was not deemed to be significant at any geographic scale during the Construction or Operational Phase, an area of habitat adjacent to the Proposed Development (to the east of the existing user worked level crossing (XB001) in Malahide Estuary which is being closed – i.e. no future access to third parties). This area will be left as a wildlife refuge during construction and operation and will no longer be used for agricultural use. As some management is required so the area does not become overcome with rank and fast-growing grasses, less intensive maintenance will be required on a yearly basis, such as: • Staggering cutting regime to allow small mammals to move freely through the site; • Once a year mowing of grassland to reduce the dominance of rank, perennial grass species which will encourage more plant diversity to develop, and allow flowering and seed heads to be retained for pollinators; • Some areas left in winter in order to provide cover and food sources for local birds; • No use of pesticides and herbicides. More details on the management of this area can be found in Appendix A8.9 in Volume 4 of this EIAR.
8.9.2.3	**Mammals**

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Biodiversity
8.9.2.3.3	**Otter** *Habitat Degradation – Surface Water Quality* For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality on otter, refer to Section 8.9.2.1.1. *Direct Injury/Mortality* The proposed otter crossing in Malahide where the River Pill/Turvey flows under the railway, will comprise a 600mm diameter pipe which will pass beneath the railway close to Underbridge UBB31. The pipe will have a crossfall over its length and the pipe has been set at a level to avoid flooding from high tides. At either end of the pipe, an otter proof fence will extend for 100m in each direction, to encourage the otters to make use of the crossing. The fence is partially buried to prevent the otters from burrowing beneath.
8.9.2.3.4	**Marine Mammals** *Habitat Degradation – Surface Water Quality* For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality on marine mammals, refer to Section 8.9.2.1.1.
8.9.2.3.6	**Birds** **Breeding Birds** *Habitat Degradation – Surface Water Quality* For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality on breeding birds, please refer to Section 8.9.2.1.1. **Wintering Birds** *Habitat Degradation – Surface Water Quality* For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality on wintering bird species, please refer to Section 8.9.2.1.1. *Direct Injury/Mortality* For mitigation to avoid the effects of direct injury/mortality to wintering bird species, please refer to Section 8.9.2.1.1. **Amphibians** *Habitat Degradation- Surface Water Quality* For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality on amphibians, please refer to Section 8.9.2.1.1. **Fish** *Habitat Degradation – Surface Water Quality* For mitigation to avoid the effects of habitat degradation as a result of impacts on surface water quality on fish, please refer to Section 8.9.2.1.1.
Monitoring	
	Ongoing long term maintenance of and management of an area of habitat north of Malahide/ south of Donabate is required as per Appendix A8.9 in Volume 4 of this EIAR.

27.2.4 Mitigation and Monitoring Measures for Land and Soils

The table below describes the mitigation and monitoring measures identified in Chapter 9 (Land and Soils).

Table 27-4 Mitigation and Monitoring Measures for Land and Soils

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Land and Soils
Mitigation Measures	
Construction Phase Mitigation	
9.8.1	A Construction & Environmental Management Plan (CEMP) as outlined in Volume 4, Appendix A5.1 of this EIAR, will be updated by the successful Main Contractor. The CEMP will set out the Contractor's overall management and administration of the construction project. It will be prepared by the Contractor during the pre-Construction Phase to ensure commitments included in the statutory approvals are adhered to and that it integrates the requirements of the CEMP including management of Construction & Demolition Waste. The mitigation measures will be implemented by the appointed Main Contractor(s). These include the best practice measures and the site-specific mitigation measures outlined below.
9.8.1.1	**Loss or Damage of Topsoil** During the Construction Phase, mitigation measures will include: • Excavated topsoil's will be stockpiled using appropriate methods to minimise effects of weathering; • Minimization of dust generation, groundwater infiltration and generation of runoff; • Topsoil and subsoil to be assessed for re-use ensuring appropriate handling, processing, and segregation of material; and • All excavated material and imported material to be classified using the same methodology allowing opportunity for reuse of materials on site.
9.8.1.2	**Effect on the surrounding ground** All earthworks and piling works will be undertaken in accordance with project-specific engineering specifications ensuring that all works are completed to the design requirements, including: • Particular piling specification: this document will set out particulars of all piling works associated with the construction of the proposed works. In particular minimum criteria for piling, acceptable materials and testing will be specified. • Particular earthworks specification: this document will set out the requirements during the Construction Phase in relation to any excavation or filling activities for the project. In particular minimum criteria for earthwork formations, acceptable materials and material disposal will be specified. • Particular instrumentation and monitoring specification; where excavation or piling works may affect the alignment of the operational railway tracks or the condition of the surrounding structures/assets, instrumentation will be installed, and monitoring completed during the works to confirm the ground response such that appropriate actions can be carried out during the construction stage to maintain movements within the acceptable design limits.
9.8.1.3	**Excavation of Potentially Contaminated Ground** Once construction works start, excavations will be kept to a minimum, using shoring or trench boxes where appropriate. Excavation of contaminated ground will be minimised with excavation support measures in accordance with all relevant guidelines. The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse. Suspected contaminated ground will be tested for contamination during ground investigation and ground excavated in the area disposed of to a suitably licensed or permitted site in accordance with Irish Waste Management legislation.

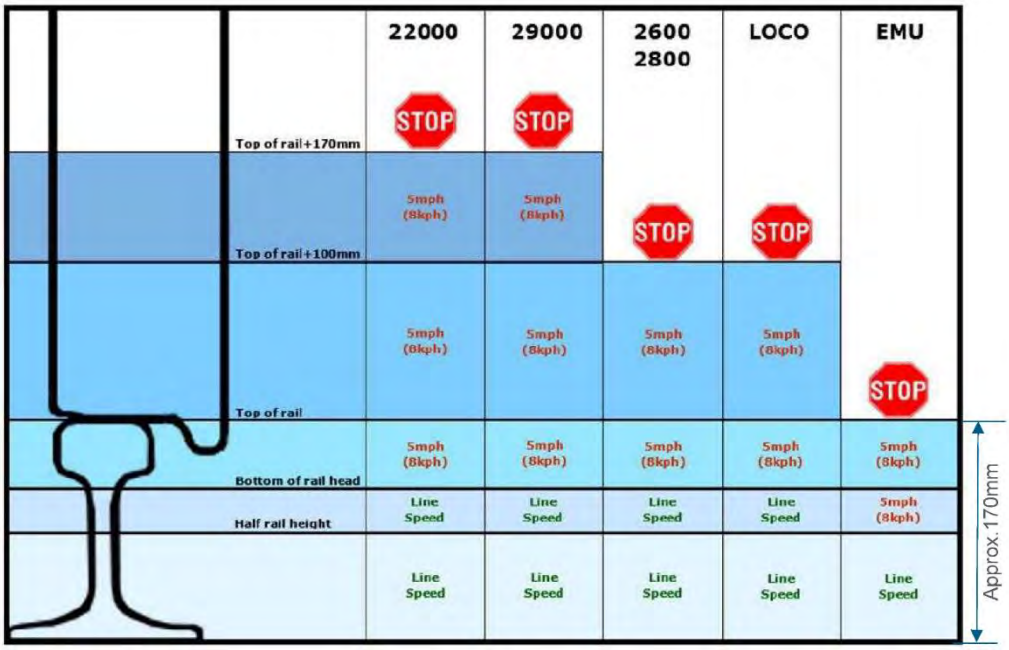
EIAR Section Reference	Description of Mitigation and Monitoring Measures for Land and Soils
	The appointed contractor shall issue copies of all waste disposal receipts/records to the Employers Representative/IÉ for the duration of works.
9.8.1.4	**Pollution of Soil** Mitigation measures will be implemented to minimise potential soil and water pollution by the implementation of good construction practises such as: • Good housekeeping (daily site clean-ups, use of disposal bins, etc.); • All activities involving the use of potential pollutants or hazardous materials such as concrete, fuels, lubricants, and hydraulic fluids will be carefully handled and stored to avoid spillages; • Adequate bunding for oil containers, wheel washers and dust suppression on site roads; and • Regular plant maintenance. An Emergency Response Plan will be drawn prior to commencement of works, identifying the actions to be taken in the event of a pollution incident. Further detail can be found in the CEMP in Appendix A5.1 in Volume 4 of this EIAR. The Emergency Response Plan will include: • Secure oil and chemical storage in over-ground bunded areas, limited to the minimum volume required to serve immediate needs with specified delivery and refuelling areas; • No refuelling or fuel storage within 50m of waterways and only on a sealed surface; • Emergency spill kits will be retained at sensitive locations, with portable kits provided to plant and equipment operators; • Cessation of work and development of measures to contain and/or remove pollutant should an incident be identified; • Silt traps will be employed and maintained in appropriate locations; • Temporary interception bunds and drainage ditches will be constructed up slope of excavations to minimise surface runoff ingress and in advance of excavation activities; and • Excavation and earthworks will be suspended during and immediately following periods of heavy rainfall to minimise sediment generation and soil damage.
Operational Phase Mitigation	
9.8.2	No additional mitigation measures for land and soils are considered necessary for the operation of the Proposed Development. In the Operational Phase the infrastructure will be maintained by Iarnród Éireann and will be subject to their management procedures to ensure that the correct measures are taken in the event of any accidental spillages. This will reduce the potential for any impact.
Decommissioning Phase Mitigation	
9.8.3	The mitigation measures outlined for the Construction Phase, will be applied as appropriate, during any future decommissioning (as appropriate).
Monitoring	
9.8.1.2	Monitoring measures include the use of a qualified person to ensure that any hotspots of possible encountered contamination, regarding excavations made in ground, are properly identified, segregated, and disposed of appropriately. Care will be taken ensuring that no cross-contamination occurs on clean soils throughout the site.

27.2.5 Mitigation and Monitoring Measures for Water (including Hydrology & Flood Risk)

The table below describes the mitigation and monitoring measures for Chapter 10 (Water (including Hydrology and Flood Risk)).

Table 27-5 Mitigation and Monitoring Measures for Water (including Hydrology and Flood Risk)

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Water (including Hydrology and Flood Risk)
Mitigation Measures	
Construction Phase Mitigation	
10.9.1.1	**Generic Mitigation Measures** A Surface Water Management Plan (SWMP) will be included as part of the Construction Environmental Management Plan (CEMP), refer to Appendix A5.1 in Volume 4 of this EIAR. Mitigation measures include: • A requirement for a Pollution Incident Response Plan; • Construction Compound management including the storage of any fuels and materials; • Control of sediments; • Use of concrete; • Management of vehicles and plant including refuelling and wheel wash facilities, etc. Other specific mitigation measures may be required, such as: • Works in Flood Zones A and B are avoided where possible. In these areas, the Contractor will be required to provide appropriate mitigation measures within a method statement for the removal of materials to minimise sediment discharge into the nearest watercourse; • Construction works in areas prone to flooding are to take place during dry seasons. The Contractor must follow the weather forecast prior to commencing instream works and concrete pouring. It is noted that track levels for the entirety of the development are well above flood levels. • Works areas will be kept dry as far as reasonably practicable; • Bunds of non-erodible material will be used adjacent to watercourses to avoid contaminated water entering the watercourse as far as reasonably practicable; • Settlement tanks, silt traps/bags and bunds will be used where required to remove silt from surface water runoff. Sizing of the tanks will be based on best available guidelines, CIRIA (2006). Any construction work within a 10m buffer zone must be provided with these measures to minimise sediment discharge to a watercourse; • Weather conditions to be checked by the Contractor and coordinated with any planning construction activities in order to minimise surface water runoff from the site. • Refuelling of all plant, machinery, and vehicles will be undertaken only in designated areas where leaks and spills are can be contained relatively easily. Spill kits will be made available on all temporary and permanent construction sites. Refuelling areas must be kept at least 50m away from any watercourse; • Construction materials to be managed in such a way as to effectively minimise the risk posed to the aquatic environment; • Construction Compounds and haul roads will avoid high flood risk zones as much as possible and maintain a minimum buffer of 50m from surface watercourses, and • Excavated material to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Water (including Hydrology and Flood Risk)
Operational Phase Mitigation	
10.9.2	Maintenance of the railway and substations will be on-going to ensure the risks are minimised during the Operational Phase. Maintenance activities will be in accordance with Iarnród Éireann best practice procedures to ensure that no additional risks to waterbodies are encountered. Iarnród Éireann flood risk management operational procedures will be implemented, these include: • CCE-TMS-311 - Irish Rail Weather Management Procedures (2017); • CCE-TEB-2014-05 - Guidance On Alerts And Service Restrictions During Adverse Weather Events; and • CME-TMS-001-008 - Operation Of IE RU Rolling Stock On Flooded Track (2016). These procedures specify how Iarnród Éireann: • Monitors and disseminates applicable weather warnings from Met Éireann; • Prepares and implements local weather management plans for predicted adverse weather events; • Sets out recommended flood level limits for their rolling stock passing over flooded tracks; and • Sets out actions to be undertaken by duty managers, drivers, signallers etc when high water alerts are issued. Operational limits on flooded tracks have been specified for the different rolling stock (i.e., types of trains) within their fleet, as shown in Image 27-1. The limits have been set to avoid damage to critical onboard equipment and to mitigate against the risk of a train becoming disabled in a flooded area. The limits are also subject to change depending on the track and weather conditions. It is important to note that no trains may operate over flooded track until permitted to do so by Iarnród Éireann's Infrastructure Department. The maximum limit identified within the procedure for the EMU is the top of the railway track. A typical railway track is approximately 170mm deep from ground level.
	 **Image 27-1 Iarnród Éireann RU Rolling Stock Operating Procedure on Flooded Track Condition**

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Water (including Hydrology and Flood Risk)
Monitoring	
10.9.3	Water quality monitoring should be undertaken in the surface water bodies located in the proximity of construction works and sensitive watercourses. Monthly samples have been taken as a baseline prior to commencement of the Construction Phase. Sampling should continue from the start of the Construction Phase until at least 12 months post-completion. Additional sampling points can be added if required, determined by the Site Environmental Manager. The results of the water quality monitoring programme will be reviewed by the Site Environmental Manager on an ongoing basis during the Construction Phase. In the event of any non-compliance with regulatory limits for any of the water quality parameters monitored, an investigation will be undertaken to identify the source of this non-compliance and corrective action will be taken where this is deemed to be associated with the Proposed Development. It is expected that the OPW and EPA will continue to monitor water levels in the 11no. waterbodies listed below in Table 27-6. The Marine Institute also has a tidal gauge at Dublin Port which can be monitored. Sea level rise and freeboard have been assessed and accounted for in the design, however, any unforeseen changes identified in continued monitoring can be used to inform and update the scheme design and considered on a case-by-case basis. The drainage systems including new underground attenuation tanks serving the Proposed Development must continue to function as designed. Maintenance of the new underground attenuation tanks and other drainage features will be in accordance with manufacturer recommendations.

Table 27-6 Watercourses where water quality sampling was undertaken

No.	Water Body Name	Monitoring Location
1	Balcunnin	Balcunnin Featherbed Lane, Co. Dublin
2	Betaghstown	Ardmore Ave, Betaghstown, Co. Meath
3	Betaghstown	Betaghstown, Ministown. Co. Meath
4	Boyne River	River Boyne, Drogheda
5	Matt/Bracken River	Matt/Bracken River Balbriggan Harbour, Balbriggan
6	Mayne River	Mayne River Grange, Co. Dublin
7	Nanny River	Nanny River Nanny Car Park, Corballis, Laytown
8	Palmerstown	Palmerstown House. Horsetown
9	Palmerstown	Palmerstown Effelstown Farm, Lusk, Co. Dublin
10	Pill/Turvey River	River Pill/Turvey
11	Tolka River	Tolka River, E Wall

27.2.6 Mitigation and Monitoring Measures for Hydrogeology

The table below describes the mitigation and monitoring measures for Chapter 11 (Hydrogeology).

Table 27-7 Mitigation and Monitoring Measures for Hydrogeology

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Hydrogeology
Mitigation Measures	
11.8	A Construction & Environmental Management Plan (CEMP) as outlined in Volume 4, Appendix A5.1 of this EIAR, will be updated by the successful Main Contractor. The CEMP will set out the Contractor's overall management and administration of the construction project. It will be prepared by the Contractor during the pre-Construction Phase to ensure commitments included in the statutory approvals are adhered to and that it integrates the requirements of the CEMP including management of Construction & Demolition Waste. The mitigation measures will be implemented by the appointed Main Contractor(s). These include the best practice measures and the site-specific mitigation measures as they relate to hydrogeology are outlined below.
Construction Phase Mitigation	
11.8.1	**Damage to the aquifer or sites designated for environmental protection including hydro-ecology due to accidental spills** Good construction management practices will be employed to minimise the risk of transmission of hazardous materials and subsequent pollution of adjacent watercourses or groundwater. Mitigation measures will include: • Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures; • Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system; • The location of any fuel storage facilities shall be considered in the design of the Construction Compound; • Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase; • All concrete mixing and batching activities will be located in areas away from watercourses and drains; • Potential pollutants to be adequately secured against vandalism; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control during the entire Construction Phase to ensure that any spillage is identified at an early stage and subsequently effectively contained and managed; and • Spill kit to be provided and to be kept close to the storage area. Staff to be trained on how to use spill kits correctly. An Environmental Incident Response Plan, as outlined in Volume 4, Appendix A5.1 of this EIAR, will be implemented to help identify the actions to be taken in the event of a pollution incident. It will address such aspects as: • Containment measures; • Emergency discharge routes; • A list of appropriate equipment and clean-up materials; and • Notification procedures to inform the relevant environmental protection authority. Sediment control methods will be outlined in the Surface Water Management Plan found in Appendix A5.1: (CEMP) and implemented by appointed contractor.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Hydrogeology
Operational Phase Mitigation	
11.8.2	With the implementation of the proposed design, no additional mitigation measures for hydrogeology are considered necessary for the operation of the Proposed Development. In the Operational Phase the infrastructure will be maintained by Iarnród Éireann and will be subject to their management procedures to ensure that the correct measures are taken in the event of any accidental spillages, and this will reduce the potential for any impact.
Monitoring	
11.10	No monitoring is required for the Construction or Operational Phases.

27.2.7 Mitigation and Monitoring Measures for Air Quality

The table below describes the mitigation and monitoring measures for Chapter 12 (Air Quality).

Table 27-8 Mitigation and Monitoring Measures for Air Quality

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Air Quality
Mitigation Measures	
Construction Phase Mitigation	
12.6.1.1	**Dust** Before commencing relevant works, an air quality management plan will be prepared by the contractor and submitted for approval to the relevant planning authority. The plan must include all appropriate dust and emissions mitigation measures, applicable to the circumstances of the relevant site, based on the local authority requirements and industry best practices. Dublin City Council (DCC) guidance document titled Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition (DCC 2016) will be taken into consideration with respect to mitigation dust measures. The plan will be developed by the contractor and for each worksite shall include: • An inventory and timetable of activities which may give rise to emissions or dust; • Alert levels; • Alert system to be used (including notification process); • Details of control measures; and • Details of dust monitoring arrangements, including the location of sensitive receptors, monitoring locations, and monitoring equipment to be used.
12.6.1.2	**Air Quality reporting requirements** A pre-construction dilapidation survey of all bridge structures requiring demolition will be required prior to commencement of the Construction Phase. There are no buildings which have shown potential for asbestos containing material, however, a fully intrusive asbestos-containing materials survey, will be completed if asbestos potential is indicated in the pre-construction dilapidation survey. Prior to commencement of the demolition works, all asbestos containing materials identified by the Asbestos Survey and Refurbishment and Demolition Survey will be removed by a suitably trained and competent person. Asbestos-containing materials will only be removed from site by a suitably permitted/licensed waste contractor and will be brought to a suitably licensed facility. The Health and Safety Authority will be contacted where needed in relation to the handling of asbestos and material will be dealt with in accordance with the Safety, Health, and Welfare at Work (Exposure to Asbestos) Regulations 2006, as amended and associated approved Codes of Practice.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Air Quality
	In summary, the measures which will be implemented will include: • Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods; • Liaison with local authorities and community groups; • Hoarding will be provided around the construction compounds; and • It is anticipated that methods of collecting rainwater and recycling for general site use, will be adopted where reasonably practical. Strict dust prevention will always be in place, to minimise any potential emissions and these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.
12.6.1.3	**Traffic** The modelling of road traffic for impacts on human and ecological receptors has found no significant impacts that require mitigation measures with respect to the modelling of emissions. However, some mitigation measures will be put in place to minimise emissions as far as reasonably practicable: • Implement a policy which prevents idling of vehicles both on and off-site including HGV holding sites; • Construction Phase traffic should be monitored to ensure construction vehicles are using the designated haul routes; • The contractor must adhere to defined traffic routes as noted in the Construction Traffic Management Plan; • Efficient scheduling of deliveries to minimise number of truck movements; and • Construction vehicles should conform to the current EU emissions standards and where reasonably practicable, their emissions should meet upcoming standards prior to the legal requirement date for the new standard. This will ensure emissions on haul routes are minimised. Mitigation measures are required for the control of dust with respect to HGV movements onsite and deliveries to/from the site: • HGV traffic leaving site will pass through a wheel wash; • Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary. If public roads are deemed to require additional cleaning where possible a suction device for road cleaning will be utilised to access spaces around cars and other street furniture more effectively; and • During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
Operational Phase Mitigation	
12.6.2	As the Operational Phase of the development will result in positive impacts, no specific Operational Phase mitigation measures are required.
Monitoring Measures	
Construction Phase Monitoring	
12.7.1	Monitoring of construction dust deposition to occur at nearby sensitive receptors to ensure mitigation measures are working satisfactorily. The Bergerhoff method to be used in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collection vessel and a stand with a protecting gauge. The collection vessel is

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Air Quality
	secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350mg (m^2/day) during a monitoring period between 28-32 days. Consistent implementation of good dust minimisation practices will ensure that the likely effects from construction dust is short-term, localised, reversible, and not significant when considered with respect to the EPA description of effects (EPA 2022).
Operational Phase Monitoring	
12.7.2	No monitoring is proposed for the Operational Phase.

27.2.8 Mitigation and Monitoring Measures for Climate

The table below describes the mitigation and monitoring measures for Chapter 13 (Climate).

Table 27-9 Mitigation and Monitoring Measures for Climate

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Climate
Mitigation Measures	
Construction Phase Mitigation	
13.6.1.1	**Embodied Carbon** • Ground Granulated Blast-furnace Slag (GGBS) to be used in replacement of standard concrete to reduce carbon footprint (savings of approximately 680 tonnes CO_2); • Steel to be sourced from continental Europe where a high proportion of it is made from recycled materials. Iarnród Éireann will pursue procurement of the highest recycled steel content that is available for the particular steel usage; • Minimisation of wastage of materials due to poor timing or over ordering on site with direct impact on the reduction of embodied carbon footprint of the site; • Waste management strategy according to the accepted waste hierarchy set out in the Waste Framework Directive (2008/98/EC) giving precedence to prevention, minimisation, reuse, and recycling over disposal with energy recovery and final disposal to landfill. Assumption made that all waste that is not guaranteed to reused on site will be sent to landfill.
13.6.1.2	**Road Traffic** A Construction Traffic Management Plan (CTMP) (See Appendix A5.1 – Appendix G in Volume 4 of this EIAR) and a Mobility Management Plan (MMP) will be implemented throughout the construction stage to avoid congestion and thus reduce GHG emissions. All plant and machinery will be maintained and serviced regularly. The following mitigation measures will be put in place in order to minimise possible GHG emissions due to road traffic: • Implement a policy which prevents idling of vehicles both on and off-site including HGV holding sites; • Construction Phase traffic should be monitored to ensure construction vehicles are using the designated haul routes; • All plant and machinery will be maintained and serviced regularly; • Efficient scheduling of deliveries to minimise number of road trips required; and

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Climate
	• Construction vehicles will conform to the current EU emissions standards and where reasonably practicable, their emissions should meet upcoming standards prior to the legal requirement date for the new standard. This will ensure emissions on haul routes are minimised.
Operational Phase Mitigation	
13.6.2.1	**Embodied Carbon** The Maintenance Phase GHG emissions will primarily consist of the maintenance of materials which were used in construction. No specific mitigation is set out however where possible, materials should be replaced in the most sustainable manner available. This may mean different materials used in replacement during the Operational Phase.
13.6.2.2	**Rail** • Using timetable optimisation and driver training; • Fuel consumption telematics for older rolling stock; • Auto-Shut down for a significant portion of the fleet; • Matching train sizes to customer demand; • Elimination of Temporary Speed Restrictions (TSRs) arising from infrastructure renewals; and • Use of a Corporate Power Purchase Agreement (CPPA) to ensure an energy mix of 80% renewables in the Operational Phase electricity use. In addition, a number of fuel efficiency programs are currently in progress / on-trial (Iarnród Éireann 2021). These include the trial replacement of ICR gearboxes, replacement of ICR diesel engines with hybrid drives, Envirox fuel additive to increase fuel efficiency and to keep diesel engine DP filters clean and replacement of diesel vans with electric road vehicles supported by charging points at depots and stations.
13.6.2.3	• Compliance with relevant ISO and national NSAI energy and environmental standards; • Contributing to transport sector decarbonisation including improving fleet and buildings fuel / energy performance, fleet hybridisation, phased network electrification and promoting and facilitating a shift to rail; • Recycling of 70% of all waste; • Near Zero Energy Building standard in all new buildings, and upgrades of 140 existing buildings to minimum BER B; • Reduction in overall carbon emissions by 51% between 2021 to 2030; • Improving operations, infrastructure and fleet climate change resilience including partnership approach to emergency responses and wide-ranging mitigation measures including coastal protection; • Reducing environmental impacts including LEAN management, waste and water management, green procurement in support of the circular economy and site decontamination; and • Protecting habitats and promoting biodiversity in a partnership approach. The above actions and others within the Iarnród Éireann Sustainability strategy will be implemented as part of Iarnród Éireann's future mitigation and this includes the Proposed Development mitigation.
Monitoring Measures	
13.7	No monitoring measures are proposed for the Operational Phase.

27.2.9 Mitigation and Monitoring Measures for Noise & Vibration

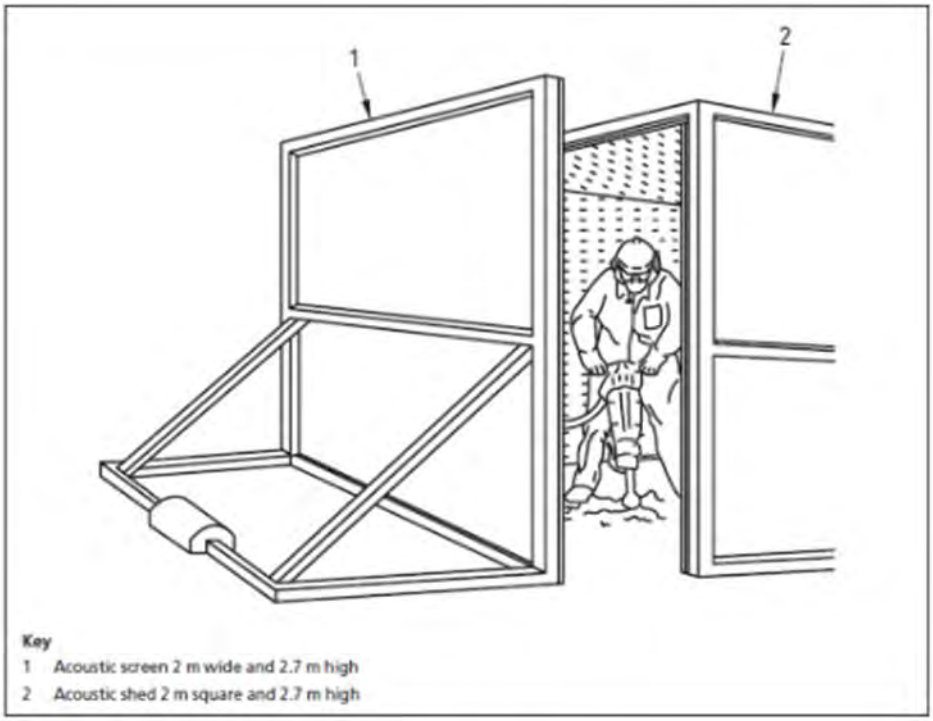
The table below describes the mitigation and monitoring measures for Chapter 14 (Noise and Vibration).

Table 27-10 Mitigation and Monitoring Measures for Noise and Vibration

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Noise and Vibration
Mitigation Measures	
Construction Phase Mitigation	
14.6.1	During the course of construction, the procedures outlined in Iarnród Éireann operation procedure CCE-QMS-008-002 Noise Management – CCE Activities as well as the DCC GPG (DCC 2016) will be implemented. The Iarnród Éireann and DCC documents include the following noise mitigation measures: • The Community Liaison Officer (or other nominated person) will notify affected residents in advance of any planned works commencing with a letter drop in the relevant area. • Where planned work occurs over a 72hr weekend shutdown there will be a noise management plan submitted to the local authority. • The following measures will be implemented where feasible during construction activities: o Carry out as much preparatory work in daylight as practicable (for example, pre-sawing or drilling rails). o Inspect the worksite in daylight if practicable and look for the best location to position generators, which maximises existing screening. o Position generators and lighting away from residential dwellings. o Take advantage of natural barriers such as vegetation, walls or embankments that can offer noise screening to adjacent neighbours. o Where necessary, use noise attenuation screens. The screens must be located as close to the receiver or source as possible. o Consider using additional supply cables and structures so that the generators can be positioned as far away from housing as practicable. o Where possible, use low-noise plant. Any unsuitable plant should be replaced by higher quality low noise plant or contained by the use of mufflers/silencers. o Do not leave equipment or vehicles running/idling unnecessarily. o Do not shout work instructions when working in residential areas at night unless absolutely necessary. o Plan effectively to ensure timely deliveries of materials.
14.6.1.1	**Communication with Neighbours** The Contractor will be proactive in engaging with the occupants of neighbouring properties in relation to individual and particular concerns that may arise and will notify them of any works forecast to generate appreciable levels of noise, explaining the nature and duration of the works. A designated noise liaison will be appointed by the contractor for the duration of the construction works. This person will log any issues and follow up in a prompt fashion. Night-works in particular have the potential to generate the most significant noise effects. All affected sensitive locations will be notified of planned works in advance of the works progressing. The notification will include a description of the works, the expected duration and details of how to contact the contractor to log complaints.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Noise and Vibration
14.6.1.2	**Noise & Vibration Monitoring** The following ongoing noise monitoring programme is proposed in relation to demolition and construction activities: Noise Monitoring Terminals (NMT), number and locations to be agreed, to be installed with the following specifications (or similar approved): • Logging of two concurrent periods, e.g. 15-minute & hourly. • Daily CIC automated calibrations. • E-mail alert on threshold exceedance. • E-mail alert on low battery and low memory. • Remote access to measured data. • Live display of noise levels. Vibration monitoring stations will continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with BS ISO 4866: 2010: Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures. The mounting of the transducer to the vibrating structure will need to comply with BS ISO 5348: 1998: Mechanical vibration and shock – Mechanical mounting of accelerometers. In summary, mounting conditions should have consideration to the following: • The transducer and its mountings should be as rigid as possible. • The mounting surfaces should be as clean and flat as possible. • Simple symmetric mountings are best. • The mass of the mounting should be small in comparison to that of the structure under test. • The monitoring equipment should be set to monitor vibration in 5-minute periods. • E-mail alert on threshold exceedance. • E-mail alert on low battery and low memory. • Remote access to measured data. • Live display of vibration levels. In addition, it is proposed that spot check noise & vibration measurements are conducted on a monthly basis. These spot checks can be organized to coincide with works that have potential to generate high levels of noise or vibration on site in order to confirm the potential extent of effects. A monthly noise and vibration monitoring report will be prepared by the contractor. Reports will identify any exceedances above nominal limit values and attempts to clarify the causes etc. Where remedial measures are required and identifiable, these will also be clearly stated.
14.6.1.3	**Noise Control Audits** It is proposed that noise control audits be conducted at regular intervals throughout the construction programme. Consideration will be given to issues such as the following (note that this list is not intended to be exhaustive): • Hours of operation being correctly observed. • Opportunities for noise control “at source”. • Optimum siting of plant items. • Plant items being left to run unnecessarily. • Correct use of proprietary noise control measures. • Materials handling.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Noise and Vibration
	• Poor maintenance. • Correct use of screening provided and opportunities for provision of additional screening.
14.6.1.4	**Hours of Work** In order to maintain services during the day, the majority of on track construction works along the railway line itself will take place at night. Works outside of the live railway corridor can progress during the day (i.e. the construction of depots, substations, Construction Compounds). Every effort will be made to avoid, reduce, and/or mitigate negative effects, however, there is likely to be some disturbance experienced for those in close proximity to the railway line caused by noise, lighting or fencing/hoarding erected associated with the construction activities. Consideration will be given to the scheduling of activities in a manner that reflects the location of the site and the nature of neighbouring properties. Each potentially noisy event/activity should be considered on its individual merits and scheduled according to its noise level, proximity to sensitive locations and possible options for noise control. Depending on the noise emission levels experienced and associated noise effects, the contractor will be flexible and able to conduct certain works at hours which reflect periods when the neighbouring properties have lower sensitivities to noise. Furthermore, every effort will be made to schedule the noisiest works to take place during the less sensitive daytime working hours.
14.6.1.5	**Selection of Quiet Plant** Careful consideration will be given to the noise emission levels of plant items when they are being considered for use on the site. This practice is proposed in relation to sites with static plant such as compressors and generators. It is proposed that these units be supplied with manufacturers' proprietary acoustic enclosures where possible. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.
14.6.1.6	**Control of Noise Sources** If the use of low noise plant or replacing a noisy item of plant are not viable or practicable options, consideration should be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods, often in consultation with the supplier. The following outline guidance in relation to specific considerations is provided below: • For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant will be switched off when not in use and not left idling. • For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover. • For percussive tools such as pneumatic concrete breakers, rock drills and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries. • For all materials handling ensure that materials are not dropped from excessive heights and drop chutes/dump trucks are lined with resilient materials. • For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Noise and Vibration
	• Demountable enclosures can also be used to screen operatives using hand tools and may be moved around site as necessary. • All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures. • Where practicable, metal on metal or rock on metal impacts will be avoided during night works. This can be achieved through the use of rubber mallets or impact linings etc. on site. • White noise reverse alarms will be utilised on vehicles where practicable to reduce potential annoyance of tonal noise emissions from site.
14.6.1.7	**Screening** The use of screens can be effective in reducing the noise level at a receiver location and will be employed as a complementary measure to all other forms of noise control.  Key 1 Acoustic screen 2 m wide and 2.7 m high 2 Acoustic shed 2 m square and 2.7 m high Table B.4 **Measured sound reduction given by types of partial enclosure** Type of enclosure (see Figure B.3) / Reduction dB(A): Facing the opening(s) / Sideways / Facing rear of shed Open-sided shed lined with absorbent material; no screen: 1 / 9 / 14 Open-sided shed lined with absorbent material; with reflecting screen in front: 10 / 6 / 8 Open-sided shed lined with absorbent material; with absorbent screen in front: 10 / 10 / 10 **Image 27-2 Typical acoustic screen/shed detail.** It is acknowledged that for some worksites it will not be practicable to install localised screens due to the constrained nature of the work area. However, where practicable screens will be installed by the contractor.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Noise and Vibration
14.6.1.8	**Vibration** Limit values have been provided for the following building types: • Soundly constructed residential and commercial properties. • Protected structures and sensitive buildings such as those with no or minimal foundations. Consideration will be given to the following methods to further mitigate the vibration levels from bored piling: • Minimise obstructions between the vibration source and the sensitive receiver, e.g. old basement floors, old foundations etc., which exacerbate the transmission of vibration. • Reduce the resistance to bored piles by "mudding in". This technique involves lubricating the borehole with a small amount of bentonite slurry.
14.6.1.9	**Pilling** Piling programmes will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. Noise reduction can be achieved by enclosing the driving system in an acoustic shroud. For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover. Steel driven piles can utilise acoustic wrapping mitigation to reduce noise levels at source. Screening by barriers and hoardings is less effective than total enclosure but can be a useful adjunct to other noise control measures. For maximum benefit, screens will be close either to the source of noise (as with stationary plant) or to the listener. Removal of a direct line of sight between source and listener can be advantageous both physically and psychologically. In certain types of piling works there will be ancillary mechanical plant and equipment that may be stationary, in which case, care will be taken in location, having due regard also for access routes. When appropriate, screens or enclosures will be provided for such equipment. Contributions to the total site noise can also be anticipated from mobile ancillary equipment, such as handling cranes, dumpers, front end loaders etc. All mechanical plant will be well maintained throughout the duration of the piling works. Piling works will be managed in accordance with the project criteria where works durations will not exceed: • Ten or more days or nights in any 15 consecutive days or nights; and • A total number of days exceeding 40 in any six consecutive months.
14.6.1.10	**OHLE specific mitigation** There is the potential for significant adverse noise and vibration impacts to arise during the catenary system installation due to the piling requirement, the nighttime nature of the works and the proximity of sensitive receptors. In accordance with the project criteria, noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding: • Ten or more days or nights in any 15 consecutive days or nights; and • A total number of days exceeding 40 in any six consecutive months. As the works are of a brief duration and will move linearly along the track, it is not expected that these durations will be exceeded, i.e. no moderate or major impacts will arise for a duration greater than the periods defined. In addition, the screening of the installation works will be implemented to minimise the noise impacts at sensitive receptors.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Noise and Vibration
14.6.1.11	**Eligibility of Temporary Accommodation** Given the proximity of construction activity to some noise sensitive locations and the occasional intensity of works, the mitigation measures proposed may not be sufficient to fully mitigate the noise impact. Temporary accommodation will be offered to eligible owners/occupiers where the construction of the proposed development causes, or is expected to cause, a measured or predicted airborne construction noise level that exceeds either of the following at property lawfully occupied as a permanent dwelling: A noise level 10 dB above any of the trigger noise levels presented in: • Table 14-4 (in Section 14.3.6.2) for the corresponding times of day; • A noise level 10 dB or more above the existing pre-construction ambient noise level for the corresponding times of day; and • Whichever level is the higher; and for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months.
Operational Phase Mitigation	
14.6.2.3	**Maintenance** During the course of ongoing maintenance, the procedures outlined in Iarnród Éireann operation procedure CCE-QMS-008-002 Noise Management – CCE Activities will be implemented. This document outlines the following noise mitigation measures: • The Community Liaison Officer (or other nominated person) will notify affected residents in advance of any planned works commencing with a letter drop in the relevant area. • Where planned work occurs over a 72hr weekend shutdown there will be a noise management plan submitted to the local authority. • All attempts to avoid, prevent or reduce the harmful effects of exposure to environmental noise. • arising from CCE work activities must be practical and appropriately risk assessed before • implementation. The following measures should be implemented where feasible during maintenance activities: • Carry out as much preparatory work in daylight as possible (sawing or drilling rails). • Inspect the worksite in daylight if possible and look for the best location to position generators. • Position generators and lighting away from residential dwellings. • Take advantage of natural barriers such as vegetation, walls or embankments that can offer noise screening to adjacent neighbours. • Where necessary, use noise attenuation screens. The screens must be located as close to the receiver or source as possible. • Consider using additional supply cables and structures so that the generators can be positioned as far away from housing as practicable. • Where possible, use low-noise plant. Any unsuitable plant should be replaced by higher quality low noise plant or contained by the use of mufflers/silencers. • Do not leave equipment or vehicles running/idling unnecessarily. • Do not shout work instructions when working in residential areas at night unless absolutely necessary. • Plan effectively to ensure timely deliveries of materials.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Noise and Vibration
Monitoring	
	See Section 4.6.1.2 for monitoring during the Construction Phase. No specific monitoring is required during the Operational Phase.

27.2.10 Mitigation and Monitoring Measures for Landscape & Visual Amenity

The table below describes the mitigation and monitoring measures for Chapter 15 (Landscape and Visual Amenity).

Table 27-11 Mitigation and Monitoring Measures for Landscape and Visual Amenity

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Landscape and Visual Amenity
Mitigation Measures	
Construction Phase Mitigation	
15.6.2	• A series of mitigation measures are proposed to avoid, reduce, and remediate, relevant significant negative landscape (townscape) and visual effects of the Construction Phase of the Proposed Development. These measures include: • An Arboricultural Survey will be produced for the area of the Proposed Development prior to commencement of works, as well as for any adjoining areas where trees are likely to be impacted by the works, in accordance with British Standard Institution (BSI) British Standard (BS) 5837:2012 'Trees in relation to in relation to design, demolition and construction - Recommendations' (BSI 2012); • All trees and vegetation to be retained within and adjoining the works area will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 'Trees in relation to in relation to design, demolition, and construction - Recommendations' (BSI 2012). Works required within the root protection area (RPA) of trees to be retained will follow a project-specific arboricultural methodology for such works, which will be prepared by a professional qualified arborist; • Wherever possible, trees and vegetation will be retained within the Proposed Development. Trees and 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 a professional qualified arborist. • The Arboricultural Assessment to be prepared as part of mitigation for the Proposed Development will be fully updated at the end of the Construction Phase and made available to the landowner (IÉ, planning authority, other as appropriate), with any recommendations for on-going monitoring of retained trees during the Operational Phase; • Where properties are subject to permanent and / or temporary acquisition, an inventory of existing boundary details and accesses, planting, paving, and other features that may be disturbed or removed will be prepared by the contractor prior to commencement of construction works; and • Where properties are subject to permanent and / or temporary acquisition, appropriate measures will be put in place to provide for protection of features, trees and vegetation to be retained, and for continued access during construction, for adequate security and screening of construction works. All temporary acquisition areas will be decommissioned and reinstated at the end of the Construction Phase.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Landscape and Visual Amenity
	• In addition to the above measures, construction works will be managed in accordance with the Construction Environmental Management Plan (CEMP) - refer to Appendix A5.1 in Volume 4 of this EIAR. This provides the environmental management framework to be adhered to during the Construction Phase of the Proposed Development.
Operational Phase Mitigation	
15.6.3	**General Mitigation Measures** Mitigation measures are proposed to avoid, reduce, or remediate, wherever possible significant negative landscape and visual effects of the Operational Phase of the Proposed Development. In addition to the management of all Operational Phase activities in accordance with best methodologies and practice, that following general measures are proposed for the mitigation of landscape / townscape and visual impacts: • Where existing trees, hedges, and/or plantings are removed, new planting will be provided in replacement of those removed; • The Proposed Development will provide for the planting of new trees and shrubs both for mitigation of tree removal and for screening of proposals particularly substations. Species selected shall be appropriate to the characteristics of the specific location; • Proposals for the treatment of the public realm within the streetscape effected by the Proposed Development will have regard to the existing character of the street or location, to emerging policies, objectives and proposals for the public realm and to opportunities for enhancement of the public realm and the streetscape. Proposals will have regard to historic details and features, to the quality of existing and proposed materials, to the reduction of visible elements, ease of legibility, and management and maintenance requirements; • The materials and finishes used for proposed substation buildings and associated fencing will be sympathetic to the context; • New lighting to use modern fittings with directional horizontal cut-off cowling; • Landscape proposals will have regard to the recommendations of: Chapter 8 (Biodiversity) in relation to opportunities for enhancement of biodiversity; Chapter 20 (Archaeology and Cultural Heritage) and Chapter 21 (Architectural Heritage) in relation to opportunities for enhancement of cultural and architectural heritage; and Chapter 10 (Water) in relation to opportunities for incorporation of Sustainable Urban Drainage Systems (SuDS); • Maintenance and monitoring of reinstatement works in public areas will ensure that any defective materials or workmanship will be made good within a period of 12 months from completion of all construction works in any given area. Thereafter, responsibility for maintenance and monitoring of the area will revert to the landowner (e.g. local authority); • All aspects of the Proposed Development within public areas will revert to on-going management and maintenance in accordance with normal operational practices by the landowner / tenant. This will include hard and soft landscape works and townscape measures, new and reinstated tree and other planting, new and reinstated surfacing and paving, etc.; • Unless otherwise requested by the property owner, maintenance and monitoring of reinstatement and hard and soft landscape works and reinstated and new boundaries in private areas (i.e. temporary acquisition areas) will ensure that any defective materials or workmanship will be made good within a period of 12 months following completion of the works in property. Thereafter, responsibility for maintenance and monitoring of private areas will revert to the landowner.
15.6.3	**Specific Landscape Mitigation Measures** • The design of the proposed railway bridge over the Mayne River to use materials and finishes which are appropriate to the form and setting of the existing protected structure. Potential access for a future greenway to be maintained as far as possible;

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Landscape and Visual Amenity
	• Provision of coastal wildflower mix to the side slope of Malahide Turnback with species suitable for coastal situation; • Provision of cascading plants (e.g. Hedera helix) to the top of proposed retaining wall along edge of Broadmeadow Greenway to help soften the new wall for views from the greenway and the Estuary. • At Donabate Substation, appropriate native planting will be proposed to the perimeter to screen the proposals from the surrounding High Amenity designation; • Provision of replacement planting where necessary to reinstate sections of existing perimeter hedgerows removed for substation at Rush and Lusk; • Replacement planting for hedgerow removed as part of the Rush and Lusk Station entrance road works. Native hedgerow / shrub planting to be provided to the west of the removed hedgerow location on land currently occupied by the existing entrance; • Provision of replacement planting along Golf Links Road and new native tree and shrub planting to the perimeter of Skerries South Substation, to limit effects on amenity of road, adjacent residential property and Skerries Golf Course; • Provision of perimeter planting to Skerries North Substation, to limit effects on surrounding residential receptors; • Reinstatement of planned Public Realm Redevelopment at Quay Street and Environs, Balbriggan, including reinstatement of planting and other landscape features; • Offset of access road to sub-station at Balbriggan to retain / augment field boundary hedgerow; • Provide space for new screen planting around north, west and south of sub-station at Balbriggan North including around infiltration basin; • Replacement of hedgerow / trees at Irishtown Road, Gormanston, and around perimeter of substation, to limit effects on nearby residential receptors; • Replanting of screening planting at setback alignment to residential property undergoing landtake south of Gormanston Station; • Replacement of any trees or other vegetation damaged or lost at designated open space (woodland) by works at Laytown Station compound; • Replanting of tree planting to either side of access road to Bettystown substation and provision of tree and shrub planting along boundary with residential areas, to restore screening between nearby residential areas and screen the substation from residential properties; • Replanting of screening planting at setback alignment to residential property undergoing landtake at St Mary's Villas; and • Replanting of woodland area adjacent to Dublin Road rail bridge / Railway Terrace, Drogheda, as far as reasonably practicable.
Monitoring	
	No specific monitoring is required.

27.2.11 Mitigation and Monitoring Measures for Material Assets: Agricultural Properties

The table below describes the mitigation and monitoring measures for Chapter 16 (Material Assets: Agricultural Properties).

Table 27-12 Mitigation and Monitoring Measures for Material Assets: Agricultural Properties

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Agricultural Properties
Mitigation Measures	
Construction Phase Mitigation	
16.6.1	**Temporary Land take** • A landowner liaison officer (LLO) will be identified by the contractor during the Construction Phase to facilitate communications between affected landowners and to facilitate the management of farm enterprises with landowners during critical times; • Prior to works commencing each affected landowner will be met by a member of the project team to inform them of the expected start date on their lands, duration of works and to agree on specific issues of access, presence of livestock, etc. pertaining to the Proposed Development; • Following completion of relevant construction work, lands temporarily acquired will be reinstated to the existing agricultural condition. All materials and waste will be removed and disposed of appropriately. • The landowner will be provided with access to all separated land parcels during the Construction Phase of the Proposed Development where reasonably practicable. Where temporary disruptions to this access occur landowners will be notified in advance, and access will be restored as soon as possible. Temporary or replacement access will be provided at a suitable location, and where possible, in agreement with the landowner; • Where existing water and electricity supplies are disrupted during the Construction Phase an alternative water source or electricity supply will be made available. If access to surface drinking water sources are permanently restricted alternative groundwater supplies will be provided (or compensation provided to enable landowner to drill his own well); • Suitable boundary fencing will be erected to delineate the line of the Proposed Development boundary and prevent straying livestock; • Landowners with lands adjoining sites where either rock breaking, piling takes place will be notified in advance of these activities. • If the Proposed Development boundary interferes with access to agricultural land the contractor will facilitate the movement of livestock and agricultural machinery to minimise disturbance; • A re-instatement programme for the construction compounds will be agreed with each land owner. This programme will apply best practice to the storage of top soil, maintenance of land drainage and re instatement of land; • The impacts on water quality will be minimised by way of a programme of mitigation measures for surface and ground water sources as described in Chapter 10 (Water); • The spread of dust onto adjoining lands would be minimised by way of mitigation measures set out in Chapter 12 (Air Quality) and Appendix A5.1 (Construction Environmental Management Plan). Typically, the effect of dust on agricultural grazing livestock is not significant; and • Where drainage outfalls are temporarily altered, or land drains blocked or damaged an adequate drainage outfall will be maintained and land drains will be repaired.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Agricultural Properties
Operational Phase Mitigation	
16.6.2	• The loss of agricultural land due to the construction of the Proposed Development will be a permanent loss which cannot be mitigated except through compensation; • Where existing water and electricity supplies to fields or farmyards are severed, the supply would be reinstated by provision of ducting where possible. Alternatively, where ducting is not feasible a permanent alternative water source or electricity supply would be made available. Compensation payments would enable farmers to replace power and water supplies; • The drainage design of the Proposed Development will connect with existing field drainage systems and carry the drainage water to suitable outfalls; • The loss of shelter would be addressed by the proposed landscaping plan (see Chapter 15 (Landscape and Visual Amenity). Landscaping along the Proposed Development will minimise the visual impact on farms, and • The Proposed Development boundary will prevent trespass of livestock onto the adjoining railway development.
Monitoring	
16.7	No specific monitoring is required.

27.2.12 Mitigation and Monitoring Measures for Material Assets: Non-Agricultural Properties

The table below describes the mitigation and monitoring measures for Chapter 17 (Material Assets: Non-Agricultural Properties).

Table 27-13 Mitigation and Monitoring Measures for Material Assets: Non-Agricultural Properties

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Non-Agricultural Properties
Construction Phase Mitigation	
17.7.1.1	**Temporary Land-take** Following the completion of relevant construction works, lands temporarily acquired will be fully reinstated and returned to the landowner.
17.7.1.2	**Access to Property** Access will be maintained to all affected property as far as reasonably practicable and if interruption is necessary, it will be pre-notified to the property owner / occupant and it will be restored without unreasonable delay. Traffic management measures will be put in place during the Construction Phase where temporary or minor diversions are required.
17.7.1.3	**Noise and vibration** Timing of works and noise and vibration limit values are amongst the main measures to mitigate noise impacts on sensitive receptors. These measures are detailed within Chapter 14 (Noise and Vibration) in Volume 2 of this EIAR.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Non-Agricultural Properties
17.7.1.4	**Dust** Dust suppression measures to mitigate generation and spread of dust are detailed within Chapter 12 (Air Quality) in Volume 2 of this EIAR. Mitigation measures will be implemented by the contractor during the Construction Phase to minimise the potential impacts to nearby sensitive receptors to reduce undue disturbance due to dust.
17.7.1.5	**Disturbance of Field Drainage** In cases where drainage is impeded during the Construction Phase and causes obvious difficulty to a particular property owner, temporary measures will be considered on a site-specific basis. This may include allowing waters to drain to less critical areas, so as to minimise the impact.
17.7.1.6	**Disturbance of Utility Services** Where required, an alternative source of water / electricity will be provided to ensure that disruption is minimised during the Construction Phase. Further measures relating to utilities are detailed within Chapter 18 (Material Assets: Utilities) in Volume 2 of this EIAR.
Operational Phase Mitigation	
17.7.2	The following general mitigation measures will be provided: • Access will be maintained to all affected properties as far as reasonably practicable and if interrupted will be restored without unreasonable delay. • Where part of the curtilage of a property is to be permanently acquired, the acquiring authority will hold discussions with the property owner and generally agree to replace boundaries on a like-for-like basis where possible, subject to safety considerations. Permanent boundary treatment will consist of a boundary that is comprised of one of the following: a) Replacement boundary on a like-for-like basis. b) Concrete post and wire. c) Timber post and wire. d) 2.4m Security Purpose (SP) Palisade fencing. e) 2.4m Security Purpose (SP) Paladine fencing. • Any services that are interfered with as a result of the Proposed Development will be repaired / replaced without unreasonable delay. • The new drainage system will be designed to ensure that there will be no increased risk of flooding as a consequence of the Proposed Development.
Monitoring	
Monitoring	No specific monitoring is required.

27.2.13 Mitigation and Monitoring Measures for Material Assets: Utilities

The table below describes the mitigation and monitoring measures for Chapter 18 (Material Assets: Utilities).

Table 27-14 Mitigation and Monitoring Measures for Material Assets: Utilities

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Utilities
Mitigation Measures	
Construction Phase Mitigation	
18.6.1	A Construction & Environmental Management Plan (CEMP) has been prepared and is included in Volume 4, Appendix A5.1 of this EIAR. The CEMP will be updated by the successful Main Contractor. The CEMP will set out the Contractor's overall management and administration of the construction project. It will be prepared by the Contractor during the pre-Construction Phase. The mitigation measures will be implemented by the appointed Main Contractor(s). These include the best practice measures as outlined below: • Agreements have been put in place with various utility providers in order to maintain connections, or at least minimise downtimes, to public and private entities during the construction of the Proposed Development. These agreements include the provision of temporary diversions which will enable providers to reroute their service during non-peak periods to maintain connections to customers; • All existing services will be located by the appointed contractor and confirmed with relevant utility providers using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence; • Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage, in accordance with best practice methodologies in line with the requirements of the utility companies whose assets are present in the area, where practicable; • Where diversions, or modifications, are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and/or community property may be unavoidable. Where this is the case, it will be planned in advance by the appointed contractor. Required service interruptions will generally not be continuous for full days at a time. Prior to works commencing, advance notification will be given to all impacted properties (including vulnerable customers). This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruption. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised in so far as is practicable; • Safety procedures will be put in place to minimise the risk to utility provider personnel and the general public during works on services. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity; • Traffic management plans will be implemented to minimise the effect of utility diversion works for commuters; and • Collaboration with each utility provider will ensure safe practise when working on services and will minimise the time required for such works.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Utilities
Operational Phase Mitigation	
18.6.2	• Substations providing power to the OHLE will need to be maintained to ensure the new DART line remains operational. The substations will be required to have unimpeded vehicular access 24 hours per day from the public road network for maintenance staff from both Iarnród Éireann and ESB Networks; • The substation must be located at ground level in order to facilitate the installation or replacement of heavy electrical equipment; the immediate area around the substation should be level; • Any major utility infrastructure implemented in the reconfiguration of utilities to enable the Proposed Development will require periodical maintenance, such as foul pumping stations; and • Any overhead assets (such as electrical cables) relocated underground for the Proposed Development will require different procedures by the utility provider in order to be maintained. Collaboration with each utility provider will ensure their maintenance requirements have been considered and that the appropriate wayleaves have been put in place.
Monitoring	
	No specific monitoring is required.

27.2.14 Mitigation and Monitoring Measures for Material Assets: Resource & Waste Management

The table below describes the mitigation and monitoring measures for Chapter 19 (Material Assets: Resource and Waste Management).

Table 27-15 Mitigation and Monitoring Measures for Material Assets: Resource and Waste Management

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Resource and Waste Management
Mitigation Measures	
Construction Phase Mitigation	
19.6.1	**Waste Management** A Construction Demolition Waste Management Plan (CDWMP) has been prepared and is included in Appendix A5.1 (CEMP), sub-appendix E, in Volume 4 of this EIAR. This has been prepared and will be implemented by the appointed Contractor in line with the 'Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects' (EPA, 2021b). The CDWMP outlines how waste arising during the Construction Phase of the Proposed Development will be managed in a way that ensures compliance with the provisions of the Waste Management Acts, 1996, as amended. Mitigation measures are set out as follows: • Where waste generation cannot be avoided, waste disposal will be minimised; • Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Development; • Possibilities for reuse of clean non-hazardous excavation material as fill on the site will be considered following appropriate testing to ensure material is suitable for its proposed end use; • Where non-hazardous excavation material cannot be reused within the Proposed Development works, material will be sent for recycling or recovery; • Excavations of made ground will be monitored by an appropriately qualified person to ensure that any hotspots of possible contamination are properly identified, with the contaminated material segregated and disposed of appropriately; • Any identified contaminated material will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross contaminate clean soils elsewhere throughout the site; • If encountered, any potential asbestos during the Construction Phase will be managed using standard health and safety measures as outlined in 'Asbestos-containing Materials (ACMs) in Workplaces: Practical Guidelines on ACM Management and Abatement' (HSA, 2013); • The site will be maintained to prevent litter and regular litter picking will take place throughout the site; • 'Just-in-time' delivery will be used to minimise material wastage; • Paints, sealants and hazardous chemicals will be stored in secure, bunded locations; • All staff on-site will be trained on how to minimise waste (i.e., training, induction, inspections and meetings); • Materials on-site will be correctly and securely stored;

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Material Assets: Resource and Waste Management
	• Where possible, metal, timber, glass, and other recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation; • On-site office and food waste arising will be source separated at least into dry mixed recyclables, biodegradable and residual wastes; • Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate; • Segregated skips will be used within a designated waste segregation area to be located in the on-site Construction Compound (particularly for hazardous, gypsum, metal, timber, inert waste and general waste); • The appointed Contractor will record the quantity in tonnes and types of waste and materials leaving the site during the Construction Phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, which is recycled, and which is disposed of; • Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility; • The appointed Contractor will ensure that any off-site interim storage facilities for excavation material have the appropriate Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence in place; • Where Regulation 27 notifications are required in relation to the Proposed Development, the appointed Contractor will complete and submit these Regulation 27 notifications to the EPA for by-product reuse; and • The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence).
Operational Phase Mitigation	
19.6.2	CIÉ will re-use and recycle materials throughout the site, to the maximum extent possible, and make use of local suppliers when importing materials to site during the Operational Phase, thereby minimising potential impacts. The sustainable resource and waste management principles detailed in Section 19.2.3 will be implemented to ensure that the waste hierarchy is adhered to. As the effect of Operational Phase waste is predicted to be not significant, no further mitigation measures are required.
Decommissioning Phase	
19.6.3	The DART+ Coastal North project is providing rail infrastructure which will enable an increase in frequency and capacity on the Northern Line and the Howth Branch in the coming years. It is not intended that this infrastructure will be decommissioned, but rather, as the infrastructure reaches the end of its design life, it will likely be refurbished or renewed to enable continued operation of the railway. Any such future renewal or refurbishment may require additional construction works, which would be similar to, but of a much lesser impact (in terms of extent and duration) than, the Construction Phase associated with the DART+ Coastal North project. The mitigation measures outlined herein for the Construction Phase, will be applied as appropriate, during any future decommissioning.
Monitoring	
	No specific monitoring is required.

27.2.15 Mitigation and Monitoring Measures for Archaeology & Cultural Heritage

The table below describes the mitigation and monitoring measures for Chapter 20 (Archaeology and Cultural Heritage).

Table 27-16 Mitigation and Monitoring Measures for Archaeology and Cultural Heritage

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Archaeology and Cultural Heritage
Mitigation Measures	
20.6.1	**Project Archaeologist** A Project Archaeologist with a detailed knowledge of the Proposed Development will be appointed to develop and manage a centralised framework for tracking and managing all archaeological considerations. The Project Archaeologist will oversee the implementation and reporting of all archaeological and cultural heritage mitigation measures. The role of the Project Archaeologist is to provide a consistent and independent approach throughout the duration of the Proposed Development. In addition to making consistent recommendations and approving mitigation strategies and ensuring open lines of communication, a Project Archaeologist will provide archaeological training to operators and contractors and provide an advisory role offering practical advice on specific archaeological issues encountered in the field while promoting awareness of archaeological assets. The effective management of the archaeological component of the project will be achieved through communication and a milestone driven contract process. The appointment of a Project Archaeologist can ensure the smooth running of a scheme while providing controls on budgets and streamlining the point of communication for all heritage matters. In addition to this, a Project Archaeologist will: • Review and agree details of the archaeological monitoring and investigation. • Review and agree the details of method statements, license applications and Ministerial Consents. • Manage the archaeological contract and specifically the work of the archaeological contractors. • Oversee the conduct of the archaeological excavations/ investigations. • Review the archaeological requirements as the works proceed. Implement any required changes to the methodology as construction work proceeds. • Certify all archaeological costs. • Oversee all post excavation works and certify all post excavation costs. • Review the content of reports prepared by the Archaeological Contractors and ensure that all the archaeological contractors provide all appropriate reports on their work in accordance with the contract conditions. • Ongoing consultation with the heritage authorities and statutory authorities. • Ensure all work is proceeding according to archaeological licensing or consent requirements. • Identify the requirement for additional investigation, including where necessary recording, survey, testing, or excavation works. • Where possible implement time and cost-effective strategies that are in line with best practice guidelines and statutory authority approvals. • Provide advice to Iarnród Éireann. • Provide advice to the design, construction team and relevant contractors.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Archaeology and Cultural Heritage
20.6.2	**Consultant Archaeologist** Experienced and competent licence-eligible archaeologist (s) will be employed by the appointed contractor to carry out the archaeological work and to advise on archaeological heritage matters during construction, to communicate all findings in a timely manner to the Project Archaeologist and Iarnród Éireann, to acquire any licenses/ consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Development. Iarnród Éireann will make provision to allow for, and to fund, the necessary archaeological monitoring, inspection, test excavation and excavation works that will be needed on-site during and prior to construction, either directly or indirectly via the appointed contractor. During the Construction Phase all mitigation measures will be undertaken in compliance with national policy guidelines and statutory provisions for the protection of the archaeological heritage. All methodologies will have to be agreed in advance with the National Monuments Section of the Department of Housing, Local Government and Heritage (DHLGH). Archaeological mitigation measures can avoid, prevent, reduce or offset negative effects and these are achieved by preservation in-situ (avoidance), by design and / or by record. Mitigation measures shall be undertaken as directed by the Minister of the DHLGH in compliance with the code of practice, national policy guidelines and statutory provisions for the protection of archaeology and cultural heritage. It is proposed that the following measures will take place as a minimum.
20.6.2.1	**Archaeological Test Excavation** Archaeological testing will be guided by the results of the geophysical survey. In areas where geophysical survey could not take place due to unsuitable ground conditions and access issues, archaeological testing will take place in advance of construction, to confirm the design approach. While there are no recorded monuments within these areas, and field inspection or an analysis of historic maps and aerial photography did not reveal any newly identified sites, these areas were put forward for assessment as they were considered to be of an archaeological potential given their greenfield nature, previously undisturbed soils and/ or proximity to designated monuments. Testing will also take place to verify the results of the geophysical survey. The purpose of testing is to determine the location, date, nature and extent of any previously unknown archaeological site. As such, it is proposed to test excavate the following areas: Zone B — Maynetown, County Dublin — AAP4 Zone C — Corballis County Dublin — AAP7 Zone C — Tyrrelstown, County Dublin — AAP13 Zone C — Hacketstown, County Dublin — AAP15 Zone C — Barnageeragh, County Dublin — AAP18 Zone C — Hampton Demesne, County Dublin — AAP20 Zone C — Bremore, County Dublin — AAP22 Zone D — Gormanston 1, County Meath — AAP26 Zone D — Irishtown, County Meath — AAP27 Zone D — Colp East (S), County Meath — AAP34 Zone E — Newtown/Lagavooren, County Meath/ County Louth — AAP37 The archaeological test trenching strategy shall entail mechanical excavation of a 2m wide (or at least a 1.8m wide) trench (es) within the above specified areas. The frequency and pattern of the trenching layout is not prescribed, and the testing array may vary from one area to another, with the agreement of the Project Archaeologist and the DHLGH, to take account of local topographic factors.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Archaeology and Cultural Heritage
	It is proposed that any archaeological features revealed by the test trenching, which will be directly impacted by the proposed works, will be mitigated prior to and during the construction of the Proposed Development in agreement with the DHLGH. On the basis of the geophysical survey and test excavation results, the National Monuments Service may require preservation in the form of in situ (by avoidance or design) or resolution by archaeological excavation. All mitigation practices will be carried out in accordance with the requirements of the statutory authorities. The process of archaeological excavation, recording and publication of results ensures that all the features are recorded and excavated in advance of development. Excavation results in the removal of archaeological remains from their natural environment. Archaeological excavation ensures that this removal is systematically and accurately recorded, drawn and photographed, providing a paper and digital archive and adding to the archaeological knowledge of a specified area. The detailed technical reports arising from this will form part of the national archive of archaeological data in the Sites and Monuments record curated by the DHLGH.
20.6.2.2	**Protection of newly revealed archaeological remains** Measures will be put in place to protect all archaeological features that are revealed prior to backfilling. This generally involves placing a geotextile protective membrane over any archaeological features identified during the test excavation exercise. Other measures such as the provision of hardboard over fragile remains must be used where appropriate. This is in accordance with the Code of Practice between the IÉ and the Minister for AHG, 2012 (NMS).
20.6.2.3	**Archaeological Monitoring** Archaeological monitoring will be undertaken in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits, features or sites that may be present within the land-take of the Project. If archaeological features are identified, provision (time and funding) will be made available for the full recording and, if necessary, excavation of the archaeological material in compliance with any measures that the DHLGH and the relevant local authority deem appropriate. All construction work such as the clearance of land, new drainage track storage, the widening of culverts, the placement of maintenance tracks and topsoil stripping within the permanent and temporary land-take will be monitored. All other activities such as drainage, landscaping, access and maintenance roads and the provision of services, the diversion of utilities and placement of compounds associated with the improvement of the railway will also have to be monitored by a licensed archaeologist. Monitoring includes all groundwork associated with the development including the placement of Construction Compounds, access and maintenance roads, landscaping, drainage and topsoil stripping within the permanent and temporary land-take to ensure that no previously unknown and buried archaeological features are damaged or removed without proper recording. Archaeological monitoring will be carried out under licence to the Department of Housing, Local Government and Heritage (DHLGH) and the NMI, and will ensure the full recognition of, and the proper excavation and recording of, all archaeological soils, features, finds and deposits which may be disturbed below the ground surface. The licensed archaeologist will have provision to inspect all excavation to the formation level for the proposed works and to temporarily halt the excavation work, if and as necessary. They will be given provision to ensure the temporary protection of any features of archaeological importance identified until a decision has been made by the statutory authorities as to whether or not avoidance and preservation in situ can be achieved or if preservation by record (ie excavation) is warranted. The archaeologist will be afforded sufficient time and resources to record and remove any such features identified.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Archaeology and Cultural Heritage
	Archaeological excavation ensures that the removal of any archaeological soils, features, finds and deposits is systematically and accurately recorded, drawn and photographed, providing a paper and digital archive and adding to the archaeological knowledge of a specified area (i.e. preservation by record). As archaeological excavation involves the removal of the archaeological soils, features, finds and deposits, following this mitigation measure there is no further impact on the archaeological heritage.
Construction Phase Mitigation	
20.6.3.1	**Zone A – North of Connolly Station to Howth Junction & Donaghmede Station (including Fairview Depot)** There is only one area of archaeological potential identified within Zone A (AAP1 Fairview Park) and the proposed works are determined to be not significant and imperceptible as works are proposed in made ground within the depot and railway line.
20.6.3.2	**Zone B – South of Howth Junction & Donaghmede Station (including Howth Branch) to north of Malahide Viaduct** Five areas of archaeological potential have been identified in Zone B (AAP2-AAP6), four of which have been identified as having a general greenfield and /or brownfield archaeological potential. Full time licenced archaeological monitoring will take place during earthmoving works located in AAP2-AAP4 where there is a general below ground archaeological potential. Due to challenging ground conditions, it was not possible to carry out the geophysical survey at AAP4 in Maynetown. It is proposed to carry out test excavation in this area. If features are detected, a decision will be made as to whether or not preservation by record or insitu will be required. This assessment is to take place prior to construction within the footprint of the proposed ground breaking works. No mitigation measures are necessary at AAP6, Malahide Viaduct where there will be no impact to the estuarian soils as there are no in water works anticipated.
20.6.3.3	**Zone C – North of Malahide Viaduct to south of Gormanston Station (Fingal boundary)** No mitigation measures are required for AAP17 (Townparks) and AAP22 (Balbriggan) as no impact is anticipated. At Donabate Station in Beaverstown townland (AAP9) works are to take place to the east of the rail line and a Construction Compound is proposed in an area of hardstanding and an overgrown, previously disturbed vegetated area (a brownfield area). Full time licenced archaeological monitoring of all earthmoving works will be carried out. At AAP8 in Corballis townland, AAP10 in Rogerstown, AAP14 in Ballykea, AAP19 in Kilmainham/ Barnageeragh and AAP23 in Knocknagin townlands, utility diversions are proposed in greenfield and roadside environments. Full time licenced archaeological monitoring will take place for all earthmoving and or excavation associated with these activities to ensure the identification of discrete archaeological features (if present). Seven areas occur in greenfield environments, (AAP7, AAP11, AAP13, AAP15, AAP20, AAP18 and AAP22). Geophysical survey took place at AAP11, AAP18, AAP20. Due to challenging ground conditions and issues with access, it was not possible to carry out the survey in all the proposed areas. It is proposed to carry out test excavation at Corballis (AAP7), Tyrrelstown (AAP13), Hacketstown (AAP15), Barnageeragh (AAP18) and at Hampton Demesne (AAP20) and Bremore (AAP22). A programme of archaeological test trenching will be designed in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits that may be present within the landtake of these areas of archaeological potential (AAPs).

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Archaeology and Cultural Heritage
	Should any subsurface archaeological stratigraphy associated with this constraint be encountered, an appropriate ameliorative strategy will be implemented. This will entail avoidance by design or licensed archaeological excavation in full or part of any identified archaeological remains (preservation by record). This assessment will take place prior to construction within the footprint of the proposed ground breaking works, for example, the construction of a Construction Compound, substation and permanent access tracks etc. Utility diversions are proposed at AAP12 in proximity to an enclosure (DU008-011) and at AAP16 in Milverton townland where burials have been revealed in the same townland. Works have been minimised in both these areas. At AAP12 in Effelstown, full time licenced archaeological monitoring will take place for the installation of the single ESB pole and to ensure the identification of discrete archaeological features (if present). At Milverton, geophysical survey took place at AAP16 and no clear archaeological responses were detected. Archaeological monitoring will take place during the construction works to ensure the identification of discrete archaeological features (if present).
20.6.3.4	**Zone D – South of Gormanston Station (Fingal border) to County Meath/County Louth border** Thirteen areas of archaeological potential (AAP24, AAP36) have been identified in Zone D, as listed in Table 20-23. Nine areas (AAP24, AAP25, AAP26 - Gormanston, AAP27 - Irishtown, AAP30, AAP31 – Ninch, AAP32 – Sevitsland (area has been topsoil stripped and is disturbed) and AAP34 and AAP35 Colp East) have been identified as having a general greenfield archaeological potential. It was proposed that a non-invasive geophysical survey take place within these areas. This was carried out, apart from Irishtown, where it was determined that the area was not suitable due to magnetic disturbance. Geophysical anomalies of probable archaeological derivation were detected at Gormanston (AAP26) and this area will be subject to test excavation to verify the nature and extent of the subsurface features. It is proposed to carry out test excavation at Gormanston (AAP26), Irishtown (AAP27), Colp East (AAP34), A programme of archaeological test trenching will be designed in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits that may be present within the landtake of these areas of archaeological potential (AAPs). Should any subsurface archaeological stratigraphy associated with this constraint be encountered, an appropriate ameliorative strategy will be implemented. This will entail avoidance by design or licensed archaeological excavation in full or part of any identified archaeological remains (preservation by record). At AAP224 (Gormanston) anomalies were detected but this area of interest will not be impacted by the proposed localised works and it is proposed to condition any future works in this area) to take place under archaeological supervision. Archaeological monitoring will take place at AAP25, AAP27, AAP28, AAP29, AAP30, AAP31, AAP, 32, AAP33, AAP34, AAP35 and AAP36). For overhead diversions that will require the relocation of poles with overhead cables which will result in localised disturbance and for underground diversions involving trench excavation at AAP25, AAP30, AAP33 archaeological monitoring will take place of any earthmoving works as a result of this Proposed Development. At Colp West (AAP36), the lands to the north of the railway have largely been previously archaeologically investigated and as a result of this, it is now proposed to apply a mitigation measure of full time licenced archaeological monitoring for any earthmoving activities within these lands. The lands to the south of the railway, will require tree clearance before any archaeological investigation can take place. Tree clearance and the removal of tree roots will be carried out under archaeological supervision.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Archaeology and Cultural Heritage
	Two areas have experienced previous disturbance, AAP28 – Corballis, AAP29 River Nanny/ Ninch as such full time licenced archaeological monitoring will take place during earthmoving works associated with these areas of archaeological limited potential. At Corballis (AAP28) trenching is required on either side of the existing railway track and this will be archaeologically monitored.
20.6.3.5	**Zone E – Drogheda Station and surrounds** Large scale earthmoving activities are to take place around Drogheda Station in greenfield and brownfield environments and throughout the existing infrastructure and railway lands. Archaeological geophysical survey and test excavation has taken place throughout the agricultural fields to the north of the station where Construction Compounds are proposed. As a result of these surveys, archaeological excavation took place of a newly revealed archaeological site that included an enclosure and four graves located to the east of the proposed Construction Compound along the tree lined boundary with the wastewater treatment plant. No sites were revealed within the proposed Construction Compound areas. In greenfield and brownfield areas within and surrounding Drogheda MacBride Station that have not been previously disturbed or investigated, the appropriate level of archaeological investigation will take place in order to identify and provide certainty as to the below ground potential in advance of construction. Full time licenced archaeological monitoring will take place during earthmoving and excavation works associated with works at McBride Station. At Newtown, Co Meath and Lagavooren Co Louth (AAP37), a geophysical survey could not take place due to the overgrown nature of the site. Archaeological test excavation is proposed to assess the below ground archaeological potential of these greenfield areas. There are no recorded monuments in the immediate vicinity. AAP38 is the site of a well, annotated on the 25-inch OS map (1910) in Newtown townland, overhead wires are located adjacent to this area. Once these wires have been diverted, the area can be cleared from the existing vegetation under archaeological supervision. Archaeological monitoring prior to construction, can then take place to examine if the site of the well exists within this area. If it does exist, it will be archaeologically examined, recorded (drawn and photographed) and digitally located.
20.7	A suitably qualified archaeologist will monitor the areas outlined above during the Construction Phase to ensure that all archaeological heritage remains are identified and recorded.
Operational Phase Mitigation	
20.6.4	No operational mitigation measures are envisioned in relation to archaeology during the Operational Phase of the Proposed Development.
Monitoring	
20.7	A suitably qualified archaeologist will monitor the areas outlined above during the Construction Phase and all areas requiring excavation works to ensure that all archaeological heritage remains are identified and recorded.

27.2.16 Mitigation and Monitoring Measures for Architectural Heritage

The table below describes the mitigation and monitoring measures for Chapter 21 (Architectural Heritage).

Table 27-17 Mitigation and Monitoring Measures for Architectural Heritage

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Architectural Heritage
Mitigation Measures	
Construction Phase Mitigation	
21.7.1	Proposed mitigation measures for architectural heritage features are outlined below and detailed in Appendix A21.1 in Volume 4 of this EIAR. The methodology has been prepared in accordance with the Architectural Heritage Protection: Guidelines for Planning Authorities (DEHLG 2011).
21.7.1.1	**Direct Impacts** Five locations were identified where the Proposed Development would directly impact on sensitive architectural heritage fabric and where there will be a moderate impact in the unmitigated case. • The works associated with the Clongriffin Turnback require a new loop line to be installed to the east of the existing tracks. The East Loop over the Mayne River will require a new bridge adjacent to BH-24 (UBB19-UBB19A) to cross the river and adjacent path. The existing railway bridge (UBB19-UBB19A) at this location comprises a twin masonry arch structure with a dividing wall between the arches. The bridge is listed as a protected structure in Fingal County Council's Development Plan 2023-2029 (FCC RPS 0919). The proposed bridge will directly adjoin the existing and comprises a low profiled reinforced concrete arch structure. The direct impact is on the embankment rather than the stone bridge structure. Mitigation includes recording the existing fabric in position prior to the works. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee works in the vicinity of the masonry bridge. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A21.1 in Volume 4 of this EIAR. • OHLE support works are to be carried out on UBB36, Rogerstown Viaduct (BH-61), a Protected Structure of medium sensitivity. The deck of the bridge has previously been replaced with a concrete structure. Direct impacts will be on the deck. The end piers, which are of heritage interest will also require alteration to facilitate the OHLE masts. Mitigation includes recording the existing fabric in position prior to the works. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The masonry is to be salvaged for repair and conservation works on the scheme. • A new substation (north Skerries) is proposed at Barnageeragh. An access gate is proposed which will result in the removal of a section of walling associated with the small early 19th century settlement at Barnageeragh (BH-88). The proposed Mitigation includes recording the existing fabric in position prior to the works. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. Following the creation of the 20m gate, the wall on either side of the gate shall be repaired. The masonry from the removed section is to be salvaged for repair and conservation works to the retained portions of the wall. • OHLE support works are to be carried out on the UBB56, Balbriggan Railway Viaduct (BH-101), a Protected Structure of medium sensitivity. Mitigation includes recording the existing fabric in position prior to the works and labelling the affected masonry and fabric. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any labelling, taking down and reinstatement of the affected masonry.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Architectural Heritage
	• OHLE support works are to be carried out on the UBB72, Laytown Railway Viaduct (BH-129), a Protected Structure of medium sensitivity. Mitigation includes recording the existing fabric in position prior to the works and labelling the affected fabric. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any labelling, taking down and reinstatement of the affected fabric. • It is proposed to remove and replace OBB80/OBB80A/OBB80B (BH-141) which are of architectural heritage interest as they are noted on historic maps. Because there is limited scope for mitigation where bridges are being removed in their entirety, the magnitude of impact remains high. The canopy over the south platform Drogheda MacBride Station (BH-146) is to be altered to accommodate the proposed overhead wires. Mitigation includes recording the existing fabric in position prior to the works and labelling the affected masonry and fabric. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee any labelling, taking down and reinstatement of the affected masonry.
21.7.1.2	**Indirect Impacts** • A Construction Compound is proposed to the North and south of the UBB19, Mayne River Cattle Pass (BH-24), a Protected Structure of medium sensitivity. A new bridge is also proposed to the east There is potential for damage to the bridge during construction. Mitigation to offset the risk of damage will include recording, protection, and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase. • OHLE support works are to be carried out on the UBB30, Malahide Viaduct (BH-45), a Protected Structure of medium sensitivity. There is potential for damage to the piers during the works the magnitude of which is medium. Mitigation to offset the risk of damage will include recording, protection, and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase. • A construction compound is proposed at UBB56, Balbriggan Railway Viaduct (BH-105), Which is of medium sensitivity. There is potential for damage to the bridge during construction. Mitigation to offset the risk of damage will include recording, protection, and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase. • It is proposed to replace the deck of the Bridge UBK1 with a wider structure on the Dublin Road Drogheda (BH-144) in order to facilitate the new platform, stabling line and turnback facility. The deck is a 20th century steel structure of low sensitivity but rests on 19th century pier abutments which are of architectural heritage interest and noted on historic maps. The pier abutments are of medium sensitivity. The pier abutments will also be modified or extended southward to allow space for the new platform as part of the works. There is potential for damage to the pier abutments during the Construction Phase. The design of the new bridge abutments will be sympathetic to the existing abutments to ensure that the bridge design has less of a visual impact on the bridge and station. Mitigation to offset the risk of damage will also include recording, protection, and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase. • Works are proposed to replace OBB81, a pedestrian footbridge (BH-146), in Drogheda MacBride Station (DB 055, 396-9). It is also proposed to alter the canopy on the south platform. The erection of OHLE infrastructure, excavation, and stabling works and Construction Compounds in the grounds of the Station all have the potential to indirectly impact the station buildings, particularly the station building and the stairs to the bridge. Mitigation to offset the risk of damage will include recording, protection, and monitoring of the sensitive fabric prior to, and for the duration of the Construction Phase.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Architectural Heritage
Operational Phase Mitigation	
21.7.2	Considering the measures that have been inherently included in the design of the Proposed Development to reduce or to avoid impacting on the settings of the identified sites, buildings and features, all pre-mitigation impacts during the Operational Phase are Slight or Not Significant and therefore no mitigation measures are required during the Operational Phase.
Monitoring	
	No specific monitoring is required.

27.2.17 Mitigation and Monitoring Measures for Electromagnetic Effects & Stray Current

The table below describes the mitigation and monitoring measures for Chapter 22 (Electromagnetic Effects and Stray Current).

Table 27-18 Mitigation and Monitoring Measures for Electromagnetic Effects and Stray Current

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Electromagnetic Effects and Stray Current
Mitigation Measures	
22.6.1	**Overline Structures** During the ongoing design of the proposed railway electrification project in the Northern Line, the assessment is done to determine the need to bond overline structures to the traction return system using a Voltage Limiting Device (VLD) and/or utilize traction bonded flashover plates. The need for these measures mainly depends on the following factors: • The material of the structure, such as stone, brick, steel, etc. • The clearance planned between the bridge soffit and the contact wire.
22.6.3	**Buried Services (Electrical Cables)** The presence of buried electrical cables that are typically insulated mitigates the risk of increased stray current flow. Insulation acts as a barrier, preventing the unwanted flow of current into the surrounding environment. As a result, the likelihood of stray current causing significant issues such as corrosion or damage to railway and third-party assets is reduced. The insulation effectively contains the electrical currents within the cables, minimizing their impact on nearby structures and underground metallic services.
22.6.4	**Buried Services (Gas/Water/Sewage Mains)** The presence of underground metallic services may increase the occurrence of stray current flow from the DC traction return system, which can potentially cause corrosion or damage to railway and third-party assets. To mitigate this issue, the following measures have been taken into consideration in the ongoing Design Phase, as well as for the specification of construction requirements: • Renewing pads between tracks and sleepers to enhance the rail-to-earth resistance, if determined by an assessment of the conditions of the existing pads. This can help limit the flow of stray current through the rail system. • Whenever deemed appropriate, implementing collection mats, which are designed to collect and redirect stray current away from sensitive areas. These mats provide an alternative path for the current, reducing the risk of corrosion or damage to assets.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Electromagnetic Effects and Stray Current
	• Whenever deemed appropriate, using sacrificial anodes, which are designed to corrode over time instead of the metallic assets they are protecting. These anodes can help divert stray current and protect vulnerable structures from corrosion. It is also worth mentioning that the Proposed Development has set a requirement for the D&B Contractor to provide rail fasteners with a high insulation level that counteract as much as possible the loss over time of the insulation level of the rail fasteners due to mechanical, thermal, and chemical aging of materials, as well as the pollution due to intensive use of tracks.
Monitoring	
22.7	A stray current monitoring system will be implemented at each traction substation in the DART+ Coastal North project. This system will enable continuous monitoring of the rail-to-earth potential along the railway line. Dedicated monitoring locations, typically located at the traction substations, will be used to measure the rail potential (electrical potential of the rails with respect to earth). The purpose of this monitoring is twofold: • To ensure that the electrification system does not generate excessive levels of stray current that could cause issues or disruptions. • To verify that the mitigation measures implemented by the design and construction teams are functioning correctly and are compliant with the EN 50122-2 standard. For the DART+ Coastal North project, a centralized data acquisition system is anticipated to be utilized for the stray current monitoring. This will facilitate the transfer of monitoring data to the IÉ SET (Signalling, Electrification and Telecommunications) Department for analysis and further evaluation.

27.2.18 Mitigation and Monitoring Measures for Human Health

The table below describes the mitigation and monitoring measures for Chapter 23 (Human Health).

Table 27-19 Mitigation and Monitoring Measures for Human Health

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Human Health
Mitigation Measures	
Construction Phase Mitigation	
26.6.1	No additional human health mitigation measures are proposed other than those outlined in other chapters of this EIAR.
Operational Phase Mitigation	
23.6.2	No additional human health mitigation measures are proposed other than those outlined in other chapters of this EIAR.
Monitoring	
Construction Phase Monitoring	
23.7.1	No additional human health monitoring measures are proposed other than those outlined in other chapters of this EIAR.
Operational Phase Monitoring	
23.7.2	No additional human health monitoring measures are proposed other than those outlined in other chapters of this EIAR.

27.2.19 Mitigation and Monitoring Measures for Major Accidents and Disasters

The table below describes the mitigation and monitoring measures for Chapter 24 (Major Accidents and Disasters).

Table 27-20 Mitigation and Monitoring Measures for Major Accidents and disasters

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Major Accidents and disasters
Mitigation Measures	
Construction Phase Mitigation	
24.5.3 (Table 24-8)	**Major Road Traffic Accidents** • A Construction Traffic Management Plan (CTMP) has been prepared and will be further developed in consultation with Iarnród Éireann and the respective local authority prior to the commencement of the Construction Phase and implemented during the Construction Phase. • A Mobility Management Plan has been included and will be further developed as part of the CTMP and will address all modes of transport and travel required to deliver the project during the Construction Phase. This will include details regarding construction workers travelling to site, car-parking, haulage routes and construction compounds to reduce potential effects (incl. traffic accidents) caused due to construction traffic and residential neighbourhoods. • All accesses to the worksite and the compounds will be signposted, and anyone outside the work will be prohibited, installing the necessary perimeter fences and the necessary warning signs. • The necessary traffic signs will be placed outside the work to warn pedestrian and vehicle traffic of the risks involved in the work. Similarly, the necessary protections and notices will be placed, in specific cases in which the circulation through the annexed streets is affected. • All HGV drivers will be provided with appropriate safety awareness training.
24.5.3 (Table 24-8)	**Collapse/Damage to Structures** • Stakeholder consultations with owners of sensitive structures / buildings. • Monitoring of existing historic / sensitive structures during construction to ensure their stability and durability. • Where appropriate, sensitive structures at risk from construction works will be protected. • A CEMP and an Incident Response Plan (IRP) have been prepared and will be further developed and implemented during construction so as to manage the risk of collapse / damage to structures. • Mitigation measures in relation to vibration identified in EIAR Chapter 14 (Noise & Vibration) will be adhered to.
24.5.3 (Table 24-8)	**Ground Collapse** • A CEMP and an Incident Response Plan (IRP) have been prepared and will be further developed and implemented during construction, so as to manage the risk of collapse/ damage to structures.
24.5.3 (Table 24-8)	**Fire/Explosion** • The risk is managed through the CEMP and IRP. • Hot Work Permit procedure will be followed. • All construction compounds and construction sites will have 24/7 security.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Major Accidents and disasters
	• Explosive materials will not be stored on construction site /compounds overnight. • Transportation of explosives will be subject to prior agreement. When transportation of these materials is required, appropriate security measures will be implemented such as escort by An Garda Síochána.
24.5.3 (Table 24-8)	**Industrial Accidents (works near Seveso site)** • The Proposed Development cannot provide offsite mitigation measures however, TII's protocols for the management of major accidents will be followed in an event there is an incident at a nearby Seveso sites.
24.5.3 (Table 24-8)	**Extreme Weather (Flooding) Events** • As is normal practice with infrastructure projects a Construction Environmental Management Plan (CEMP) has been prepared for the Proposed Development. This will be further developed prior to construction and will be fully implemented during the Construction Phase. • Monitoring of weather forecasts to ensure that necessary actions will be implemented in time at construction sites prior to prolonged / extreme weather events. • An emergency response plan may be drawn up including appropriate response measures for such Extreme Weather (Flooding) situations.
24.5.3 (Table 24-8)	**Spillage or long-term seepage of pollutants into a watercourse** • As is normal practice with infrastructure projects, a CEMP has been prepared for the Proposed Development. This will be further developed prior to construction and will be fully implemented during the Construction Phase. An Incident Response Plan is included as part of the CEMP detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous wastes, non-compliance with any permit or license, or other such risks that could lead to a pollution incident, including flood risks. • The Environmental Manager will prepare Method Statements for construction works as detailed in the CEMP to be undertaken on, over or near water in consultation with Inland Fisheries Ireland (IFI) and other relevant authorities as necessary. • Mitigation measures identified in Chapter 8 (Biodiversity), Chapter 10 (Water), and Chapter 11 (Hydrogeology) in Volume 2 of this EIAR will be fully implemented. • During construction, cognisance will have to be taken of the following guidance documents for construction work on, over or near water: o Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board). o Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers. o CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors. o CIRIA C648 Control of Water Pollution from Constructional Sites. Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (TII, 2006).
24.5.3 (Table 24-8)	**Human Disease** • The contractor will provide site operatives with appropriate first aid material. All site operatives will be advised to wear steel toe cap boots with trousers to be tucked inside along with appropriate PPE such as gloves and headwear. All site operatives should be advised of the importance of washing hands before eating to avoid the risk of contracting Weils disease and other water borne diseases.

EIAR Section Reference	Description of Mitigation and Monitoring Measures for Major Accidents and disasters
	• Government and HSE health and safety guidelines will be adhered to in relation to Covid-19 in workplaces to reduce the spread of the virus amongst the construction workers.
Operational Phase Mitigation	
24.5.3 (Table 24-8)	**Train Derailment** • Appropriate training will be provided to all relevant staff members for operation of the electrified train fleet. • All relevant staff members shall familiarise themselves with Section Z Electrified Lines of the IÉ Rule Book prior to operating the fleet. • Operation and maintenance manuals will be made available to staff as early as possible. • A dedicated Major Incident Response Plan has been developed by Iarnród Éireann for the DART+ Coastal North project to identify the appropriate emergency response plans in event of an incident. • Appropriate back up procedures will be prepared and implemented in an event of an incident. • Periodic inspections and maintenance (as required) of the rail line in accordance with Iarnród Éireann (IÉ) Standards which include, but not limited to, the following: o IÉ CCE-TMS-363 Requirements for the Rail Testing Vehicle. o IÉ CCE-TMS-360 Track and Structures Inspection Requirements. o IÉ CCE-TMS-320 Track Quality Standard. o International Union of Railways (UIC) Code 712 R Rail Defects • Design measures for the DART+ Coastal North project have been accepted by the Commission for Railway Regulation (CRR) in order for licence to be granted.
24.5.3 (Table 24-8)	**Building/Failure Fire** • Fire Safety Strategies outlining measure to be implemented in the event of a fire will be prepared for the proposed substations and be submitted for approval to the relevant authorities.
24.5.3 (Table 24-8)	**Extreme Weather (Flooding) Events** • Ongoing consultation and cooperation with local authorities and the Office of Public Works (OPW). • Inspections and maintenance (as applicable) of the drainage system and the compensatory storage areas. • A dedicated Major Incident Response Plan has been developed by Iarnród Éireann for the DART+ Coastal North project to identify the appropriate emergency response plans in event of flooding.
24.5.3 (Table 24-8)	**Industrial Accidents – Seveso sites** • The Proposed Development cannot provide offsite mitigation measures however, TII's protocols for the management of major accidents will be followed in an event there is an incident at a nearby Seveso sites.
Monitoring	
	No specific monitoring is required.

27.2.20 Interactions

Interactions occur between many of the environmental factors. The assessments for each of the environmental factors undertaken in this EIAR have considered, and taken cognisance of these direct, indirect, cumulative, and synergistic interactions during both the Construction Phase and the Operational Phase of the Proposed Development. The individual environmental assessments have identified appropriate mitigation measures to address these interactions to avoid, reduce or mitigate likely significant environmental effects which are described, and residual effects identified in the respective specialist chapters of this EIAR. Therefore, no additional mitigation is proposed in this chapter.

27.2.21 Natura Impact Statement

In addition to the mitigation and monitoring measures included in the EIAR, specific mitigation is identified within the Natura Impact Statement (NIS) which accompanies the Railway Order application, in order to ensure that there are no significant effects on European sites[1] as a result of the Proposed Development. For completeness, mitigation and monitoring measures included in the NIS are detailed below.

Table 27-21 Mitigation and Monitoring Measures from the Natura Impact Statement

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
Mitigation Measures	
Construction Phase Mitigation	
7.1	**Malahide Estuary SAC [000205], Rogerstown Estuary SAC [000208], North Dublin Bay SAC [000206], South Dublin Bay SAC [000210] and Baldoyle Bay SAC [000199]**
7.1.12	**Mitigation Measures**
7.1.12.1	**Measures to Protect Surface Water Quality during Construction** Surface water protections are included within the Construction Environmental Management Plan (CEMP) which outlines appropriate mitigation measures for the Construction Phase (See Appendix 1.7). This includes measures relating to: • A requirement for a Pollution Incident Response Plan; • Construction Compound management including the storage of any fuels and materials; • Control of Sediments; • Use of concrete; and • Management of vehicles and plant including refuelling and wheel wash facilities, etc.

[1] The Natura 2000 network of sites are defined under the Habitats Directive (Article 3) as a European ecological network of special areas of conservation, composed of sites hosting the natural habitat types listed in Annex I and species listed in Annex II, and special protection areas classified pursuant to the Birds Directive (2009/147/EC). The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats. In Ireland, these sites are designed as *European sites* – as defined under the Planning and Development Acts and/or Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs).

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	As well as these generic mitigation measures, other specific mitigation and/or monitoring measures may be required, which will include, but will not be limited to: • Works in Flood Zones A and B are avoided where possible. In these areas, the Contractor will be required to provide a method statement for the removal of materials and personnel to minimise sediment discharge into the river and risk to personnel during flood events; • Construction works in areas prone to flooding are to take place during dry seasons. The Contractor must follow the weather forecast prior to commencing instream works and concrete pouring. It is noted that track levels for the entirety of the development are well above flood levels. • Works areas to be kept dry at all times through the use of bunds of non-erodible material adjacent to watercourses to avoid contaminated water entering the watercourse. • Settlement tanks, silt traps/bags and bunds will be used where required to remove silt from surface water runoff. Sizing of the tanks will be based on best available guidelines, CIRIA (2006). Any construction work within a 10m buffer zone must be provided with these measures to minimise sediment discharge to a watercourse; • Refuelling of all plant, machinery, and vehicles will be undertaken only in designated areas where leaks and spills are can be contained relatively easily. Spill kits will be made available on all temporary and permanent construction sites. Refuelling areas must be kept at least 50m away from any watercourse; • Construction materials to be managed in such a way as to effectively minimise the risk posed to the aquatic environment; • Construction Compounds and haul roads will avoid high flood risk zones as much as possible and maintain a minimum buffer of 50m from surface watercourses, and • Excavated material to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses. All of the above measures implemented on site will be monitored throughout the duration of construction/ to ensure that they are working effectively, to implement maintenance measures if required/applicable and to address any potential issues that may arise.
7.1.12.3	**Measures to Prevent introduction /spreading of non-native Invasive species during Construction** The appointed contractor will ensure that a confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and/or extent of all Third Schedule invasive species within the footprint of the Proposed Development. Where an infestation is confirmed / identified within the footprint of the Proposed Development, this will require the implementation of the measures detailed in the Non-Native Invasive Species Management Plan (See Appendix 1.5 of the NIS). ***Non-native Invasive Species Management Plan (ISMP)*** Where a pre-construction invasive species survey identifies newly established non-native invasive species within the footprint of the Proposed Development, the ISMP, as shown in Appendix 1.5, will be updated to provide a detailed description of the new infestations (e.g. approximate area of the respective colonies (m^2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated.

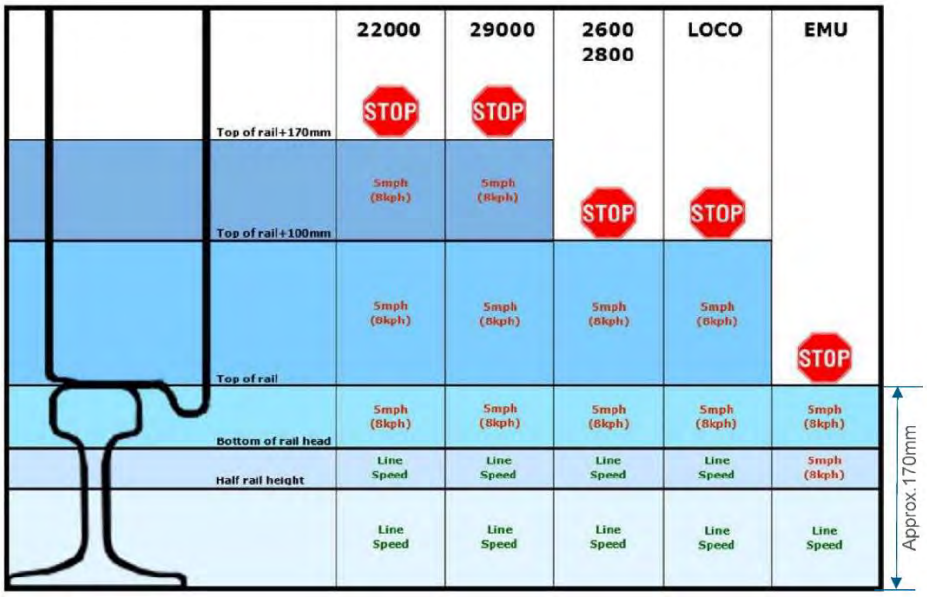
NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	The ISMP for the Proposed Development will be implemented, including confirmation following the preconstruction survey the appropriate treatment methodology including the detailed control measures contained within it, as advised by a suitably qualified specialist, in accordance with the Transport Infrastructure Ireland's (TII 2020) The Management of Invasive Alien Plant Species on National Roads - Technical Guidance) (2020a) and The Management of Invasive Alien Plant Species on National Roads – Standard (TII 2020b), and other species-specific guidance documents including those listed in the non-native ISMP, in so far as they can be applied to the Proposed Development, and as necessary. The appointed contractor will ensure that all control measures that may be specified in the non-native ISMP shall be implemented by a suitably qualified and licenced specialist prior to the construction of the Proposed Development to control the spread of newly established non-native invasive species within the footprint of the Proposed Development. Furthermore, the appointed contractor will adhere to control measures specified within the Non-Native ISMP throughout the construction phase of the Proposed Development. The site will be monitored by the appointed contractor in consultation with the suitably qualified and licensed specialist after the control measures have been implemented. Any re-growth will be subsequently treated as detailed in the Proposed Development ISMP.
7.1.12.5	**Measures to prevent habitat degradation as a result of air quality impacts** Before commencing relevant works, an air quality management plan shall be prepared by the contractor and submitted for approval to the relevant planning authorities. The plan must include all appropriate dust and emissions mitigation measures, applicable to the circumstances of the relevant site, based on the local authority requirements and industry best practices. Dublin City Council (DCC) guidance document titled *Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition* (DCC 2018) has been taken into consideration with respect to mitigation dust measures. The plan will be developed by the contractor and for each worksite shall include: • An inventory and timetable of activities which may give rise to emissions or dust; • Alert levels; • Alert system to be used (including notification process); • Details of control measures; and • Details of dust monitoring arrangements, including the location of sensitive receptors, monitoring locations, and monitoring equipment to be used. In summary, the measures which will be implemented shall include: • Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods; • Liaison with local authorities and community groups; • Hoarding will be provided around the Construction Compounds; and • It is anticipated that methods of collecting rainwater and recycling for general site use, will be adopted where practical. Strict dust prevention will always be in place, to minimise any potential emissions and these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations. ***Construction Phase Traffic Mitigation Measures*** The modelling of road traffic for impacts on human and ecological receptors has found no significant impacts that require mitigation measures with respect to the modelling of emissions (reference the assessment). However, some mitigation measures can be put in place to minimise fugitive emissions:

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	• Implement a policy which prevents idling of vehicles both on and off-site including HGV holding sites; • Construction Phase traffic should be monitored to ensure construction vehicles are using the designated haul routes; • The contractor must adhere to defined traffic routes as noted in the Construction Traffic Management Plan; • Efficient scheduling of deliveries to minimise number of truck movements; • Construction vehicles will conform to the current EU emissions standards and where reasonably practicable, their emissions should meet upcoming standards prior to the legal requirement date for the new standard. This will ensure emissions on haul routes are minimised. Mitigation measures are required for the control of dust with respect to HGV movements onsite with the site and deliveries to/from the site: o HGV traffic leaving site will pass through a wheel wash. o Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary. If public roads are deemed to require additional cleaning where possible a suction device for road cleaning will be utilised to access spaces around cars and other street furniture more effectively. o During movement of loose material both on and off-site, trucks will be stringently covered with tarpaulin. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
7.2	**River Boyne and River Blackwater SAC [001957]**
7.2.7	**Measures to Protect Surface Water Quality during Construction** The measures presented above in Section 7.1.12 will protect surface water quality during construction of the Proposed Development.
7.2.8	**Measures to Prevent introduction /spreading of non-native Invasive species during Construction** The measures presented above in Section 7.1.12 will prevent the spread of non-native invasive species to downstream European sites during construction of the Proposed Development.

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
7.2.9	**Measures to Protect Otter from Disturbance/Displacement impacts** **Pre-Construction Survey** • Prior to construction works commencing, the appointed contractor will engage the services of a suitably experienced ecologist to conduct a pre-construction otter survey of the Proposed Development. The survey will be undertaken within 10 months in advance of construction and supplemented by a further inspection of the Proposed Development immediately prior to site clearance to ensure that no new holts have been established in the intervening period. These surveys will be carried out in accordance with *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (TII, 2006). • Where any new active holts/couches are recorded within 150m of the Proposed Development the appointed ecologist will ensure that adequate mitigation is provided in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2006), and a derogation licence is sought from the NPWS where necessary. **Precautionary Mitigation measures for new active holts/couches recorded within 150m of the Proposed Development** Until such time as otters have been successfully evacuated from active holts, the following provisions will apply to all construction works: • No works will be undertaken within 150m of any holts at which breeding females or cubs are present. Until consultation with NPWS, works closer to such breeding holts may take place - provided appropriate mitigation measures detailed below are in place. • No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence. • The prohibited working area associated with otter holts will where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Fencing will be in accordance with Clause 303 of the TII's Specification for Roadworks (TII 2011). Appropriate awareness of the purpose of the enclosure will be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt. **Ecological Clerk of Works/Retained Ecologist** • Were a new holt to be encountered within 150 metres (up and downstream) of watercourse crossing, NPWS consultation will be sought, and the services of an Ecological Clerk of Works (EcOW) or retained Ecologist (both with experience with otter survey/mitigation) would be required. • The appointed contractor shall employ the services of an EcOW with experience in implementing otter mitigation, to oversee and advise works at watercourse crossings for the Proposed Development (they may also undertake the preconstruction survey). The EcOW will have the authority to: o Review method statements; o Oversee works; o Provide instruction to the appointed contractor(s); and, o Require the temporary cessation of works, where necessary. • The EcOW will deliver a toolbox talk on biodiversity including otter to the appointed contractor(s) working in the proximity of watercourses. This talk will include instructions on identifying otter and details on the protections afforded to otter under Irish and EU legislation. The EcOW will outline the actions which will be taken by the contractor(s) if otter are noted on or near the Proposed Development during construction works.

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	Measures to Prevent/Reduce Disturbance and Displacement of otters • Night working within/directly adjacent to watercourses where otter are known to commute will be avoided, where possible, and will only be permitted with the prior approval of the planning authority. • Where night-working adjacent to watercourses known to support otter, is required, the advice of a suitably qualified ecologist/ECoW must be sought and a derogation licence, if necessary, will be sought from NPWS permitting such works. **Measures to Reduce Lighting Impacts to Otter** Security lighting in active works areas in close proximity to watercourses with known otter activity will be designed in conjunction with a suitably qualified ecologist to minimise light spill. Similarly, where any new or amended lighting design is required at a watercourse crossing, it should be cognisant of downward light-spill onto watercourses. Measures to reduce light spill may include the following: • The use of sensor / timer triggered lighting; • LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability; • Column heights should be considered to minimise light spill; and, • Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed.
7.2.10	**Measures to prevent habitat degradation as a result of air quality impacts during construction** The measures presented above in Section 7.1.12 will prevent habitat degradation as a result of air quality impacts during construction of the Proposed Development.
7.3	**Boyne Coast and Estuary SAC [001957]**
7.3.6.1	**Measures to Protect Surface Water Quality during Construction** The mitigation measures presented above in Section 7.1.12. will protect surface water quality during construction of the Proposed Development.
7.3.6.2	**Measures to Prevent the Spread of Invasive Species during Construction** The mitigation measures presented above in section 7.1.12 will prevent the spread of invasive species to downstream European sites during the construction of the Proposed Development.
7.4	**Rockabill to Dalkey Island SAC [003000], Lambay Island SAC [000204] & Codling Fault Zone SAC [003015]**
7.4.7.1	**Measures to Protect Surface Water Quality during Construction** The measures presented above in Section 7.1.12 will protect surface water quality during construction of the Proposed Development.
7.5	**Rogerstown Estuary SPA [004015], Malahide Estuary SPA [004025], Lambay Island SPA [004069], Skerries Islands SPA [004122], Baldoyle Bay SPA [004016], North Bull Island SPA [004006], South Dublin and River Tolka Estuary SPA [004024], River Nanny Estuary and Shore SPA [004158], Boyne Estuary SPA [004080], River Boyne and River Blackwater SPA [004232], Howth Head Coast SPA [004113], Dalkey Island SPA [004172], Dundalk Bay SPA [004026], Ireland's Eye SPA [004117], Rockabill SPA [004014], The Murrough SPA [004186], and Stabannan-Braganstown SPA [004091], and the North-West Irish Sea SPA [004236]**
7.5.22.1	**Measures to Protect Surface Water Quality during Construction**

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	The measures presented above in Section 7.1.12 will protect surface water quality during construction of the Proposed Development.
7.5.22.2	**Measures to Prevent the Spread of Invasive Species during Construction** The mitigation measures presented above in section 7.1.12 will prevent the spread of invasive species to European sites during construction of the Proposed Development.
7.5.22.3	**Measures to prevent disturbance and displacement of SCI species** Where a site Construction Compound is required, its location relative to the Proposed Development is likely to be adjacent to the potential foraging areas. The appointed contractor will undertake the establishment of the following Construction Compounds outside of the wintering bird season (October to March): • CC-16100 Malahide (Caves Strand) • CC-15900W Malahide (Bissets Strand) • CC-52050, CC-51800, CC-51900 Drogheda Substation/Compounds • CC-44900 Laytown Construction Compound • CC-32200 Skerries Substation/Compound • CC 40200 Gormanston Construction Compound In addition, the Construction Compound in Malahide (CC-16100 Caves Strand), and the utilities compound in Laytown (CC- 44390E) will only be in use outside of the wintering bird season (October to March, inclusive) to ensure there are no disturbance related impacts to wintering birds foraging and roosting in the surrounding habitats. As a further precautionary measures, the design of the lighting will ensure that light-spill will not occur in the direction of any adjacent fields. Mitigation measures to reduce light spill will include the following: • The use of sensor/timer triggered lighting; • LED luminaires to be used where practicable; • Column heights to be considered to minimise light spill; and • Accessories such as baffles, hoods or louvres to be used to reduce light spill and direct it only where needed.
7.6	**Seas Off Wexford SPA [004237], Wicklow Head SPA [004127], and Saltee Islands SPA [004002]**
7.6.7.1	**Measures to Protect Surface Water Quality during Construction** The measures presented above in Section 7.1.12 will protect surface water quality during construction of the Proposed Development.
Operational Phase Mitigation	
7.1	**Malahide Estuary SAC [000205], Rogerstown Estuary SAC [000208], North Dublin Bay SAC [000206], South Dublin Bay SAC [000210] and Baldoyle Bay SAC [000199]**

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
7.1.12.2	**Measures to Protect Surface Water Quality during the Operational Phase** Maintenance of the railway and substations will be on-going to ensure the risks are minimised during the Operational Phase. Maintenance activities will be in accordance with Iarnród Éireann best practice procedures to ensure that no additional risks to waterbodies are encountered. Iarnród Éireann will also follow and implement its flood risk management operational procedures which assist in managing flood risk for rolling stock during inclement weather and flooding events, these include: • CCE-TMS-311 - Irish Rail Weather Management Procedures (2017); • CCE-TEB-2014-05 - Guidance On Alerts And Service Restrictions During Adverse Weather Events; and; • CME-TMS-001-008 - Operation Of IÉ RU Rolling Stock On Flooded Track (2016). These procedures specify how Iarnród Éireann: • Monitors and disseminates applicable weather warnings from Met Éireann; • Prepares and implements local weather management plans for predicted adverse weather events; • Sets out recommended flood level limits for their rolling stock passing over flooded tracks; and • Sets out actions to be undertaken by duty managers, drivers, signallers etc when high water alerts are issued. Operational limits have been specified for the different rolling stock (i.e., types of trains) within their fleet, as shown in Chapter 10 (Water) in Volume 2 of the EIAR and in **Figure 27-1** in the NIS. The limits have been set to avoid damage to critical onboard equipment and to mitigate against the risk of a train becoming disabled in a flooded area. The limits are also subject to change depending on the track and weather conditions. It is important to note that no trains may operate over flooded track until permitted to do so by Iarnród Éireann's Infrastructure Department. Electric Multiple Units (EMUs) are the type of rolling stock of primary concern for this study; however diesel units will continue to use the railway line. The maximum limit identified within the procedure for the EMU is the top of the railway track. A typical railway track is approximately 170mm deep from ground level.  **Figure 27-1 Iarnród Eireann RU Rolling Stock Operating Procedure on Flooded Track Condition**

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
7.1.12.4	**Measures to Prevent introduction /spreading of non-native Invasive species during Operation** Once the Proposed Development is in operation, and in the absence of any required management during the Construction Phase, which might extend into the Operational Phase depending on the method of eradication used, Iarnród Éireann will implement a maintenance and management regime subject to their current management procedures for trackway maintenance, where any introduction of non-native invasive plant species are managed, across their assets or the ongoing control and management of invasive species on their network. This includes the following documents, which can be found in Appendix 1.6: • Control and Management of Vegetation; • Identification and Control of Japanese Knotweed; and • Identification and Control of Giant Hogweed.
7.2	**River Boyne and River Blackwater SAC [001957]**
7.2.7	**Measures to Protect Surface Water Quality during Operation** The measures presented above in Section 7.1.12 will protect surface water quality during operation of the Proposed Development.
7.2.8	**Measures to Prevent introduction /spreading of non-native Invasive species during Operation** The measures presented above in Section 7.1.12 will prevent the spread of non-native invasive species to downstream European sites during operation of the Proposed Development.
7.3	**Boyne Coast and Estuary SAC [001957]**
7.3.6.1	**Measures to Protect Surface Water Quality during Operation** The mitigation measures presented above in Section 7.1.12 will protect surface water quality during operation of the Proposed Development.
7.3.6.2	**Measures to Prevent the Spread of Invasive Species during Operation** The mitigation measures presented above in section 7.1.12 will prevent the spread of invasive species to downstream European sites during the operation of the Proposed Development.
7.4	**Rockabill to Dalkey Island SAC [003000],Lambay Island SAC [000204] & Codling Fault Zone SAC [003015]**
7.4.7.1	**Measures to Protect Surface Water Quality during Operation** The measures presented above in Section 7.1.12 will protect surface water quality during operation of the Proposed Development.
7.5	**Rogerstown Estuary SPA [004015], Malahide Estuary SPA [004025], Lambay Island SPA [004069], Skerries Islands SPA [004122], Baldoyle Bay SPA [004016], North Bull Island SPA [004006], South Dublin and River Tolka Estuary SPA [004024], River Nanny Estuary and Shore SPA [004158], Boyne Estuary SPA [004080], River Boyne and River Blackwater SPA [004232], Howth Head Coast SPA [004113], Dalkey Island SPA [004172], Dundalk Bay SPA [004026], Ireland's Eye SPA [004117], Rockabill SPA [004014], The Murrough SPA [004186], and Stabannan-Braganstown SPA [004091], and the North-West Irish Sea cSPA [004236]**
7.5.22.1	**Measures to Protect Surface Water Quality during Operation** The measures presented above in Section 7.1.12 will protect surface water quality during operation of the Proposed Development.
7.5.22.2	**Measures to Prevent the Spread of Invasive Species during Operation**

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	The mitigation measures presented above in section 7.1.12 will prevent the spread of invasive species to European sites during operation of the Proposed Development.
7.5.22.4	**Measures to prevent direct injury/mortality of SCI bird species during Operation** The following mitigation shall be implemented for the protection of SCI species. The feeder wire along both sides of the new Single-Track Cantilever OHLE masts will be fitted with a device to make lines more visible to commuting, foraging and migrating SCI species. Although the information surrounding the efficacy of bird diverters with a species-specific focus is limited, a wide range of wire marking devices can been used, generally falling into three basic designs; aerial marker spheres, spirals, and suspended devices (swinging, flapping, and fixed) (APLIC, 2012). The hanging device is proposed here (**Figure 27-2**) as it is universal, cost-effective, allows easy installation, remains in position in severe weather conditions and fits a range of conductors/wires. Like other diverters (because there are few comparative studies), there is extensive field studies (Prinsen et al., 2011) showing that when installed properly they can significantly decrease bird strike. Hanging devices (e.g. Raptor Clamp Diverter, Fire Fly) are suspended from the wire with fixed or swinging plates or flappers and are designed to increase the visibility of overhead lines and reduce the incidence of bird collisions with overhead cables.  **Figure 27-2 Examples of hanging tabs (APLIC, 2012)** Specification requirements include (derived from SNH Guidance, 2016): • Devices should vary in colour (e.g. black and white), be as reflective as possible with glowing surfaces and be capable of a swinging or flapping motion making them more visible and effective (ESKOM Transmission, 2009) (see Figure 27-2). Devices shall not be restricted in their movement; • Devices should be placed 5m apart and staggered on parallel lines. Based on various studies as reported by APLIC (2012) in the United States, data recommends spacing between 4.6 m and 30 m. As this is largely dependent on the extent of the overhead lines which requires mitigation through diversion devices, 10m is considered appropriate for the Viaducts (i.e. Malahide, Rogerstown, Balbriggan), and at areas where there is no tree/building cover leaving the proposed OHLE exposed (i.e. Gormanston Station – Monsey Accommodation centre), along the Proposed Development, as advised in APLIC (2012) report for these types of bird diverter, however they will be spaced so that the devices will be no more than 5m apart on separate lines; • Devices should be as large as possible for maximum visibility (i.e. diameter of at least 20 cm and length of at least 10 to 20cm).

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	A study completed by Jenkins et al., (2010) concluded that by line marking with devices that increase visibility of the line, are likely to lower general collision rates of SCI bird species by 50% to 80%. Other studies have also shown a reduction of collision rates by 50% to 94% (Prinsen et al., 2011); • Line markers shall require annual maintenance and replacement, ensuring that markers remain in position and functional throughout the lifetime of the Proposed Development.
7.6	**Seas Off Wexford SPA [004237], Wicklow Head SPA [004127], and Saltee Islands SPA [004002]**
7.6.7.1	**Measures to Protect Surface Water Quality during Operation** The measures presented above in Section 7.1.12 will protect surface water quality during operation of the Proposed Development.

27.3 References

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Appendix B: Natura Impact Statement – Mitigation Measures

CONTENTS

1. APPENDIX B: NATURA IMPACT STATEMENT (NIS) – MITIGATION MEASURES

1.1 Introduction

In addition to the mitigation and monitoring measures included in the EIAR, specific mitigation is identified within the Natura Impact Statement (NIS) which accompanies the Railway Order application, in order to ensure that there are no significant effects on European sites[1] as a result of the Proposed Development.

1.2 Mitigation Measures

Table 1-1 presents the mitigation and monitoring measures included in the NIS for the Construction Phase of the Proposed Development. These mitigation measures will be complied with by the Contractor during the Construction Phase of the Proposed Development as far as reasonably practicable.

Table 1-1 Mitigation and Monitoring Measures from the Natura Impact Statement

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
Mitigation Measures	
Construction Phase Mitigation	
7.1	**Malahide Estuary SAC [000205], Rogerstown Estuary SAC [000208], North Dublin Bay SAC [000206], South Dublin Bay SAC [000210] and Baldoyle Bay SAC [000199]**
7.1.12	**Mitigation Measures**
7.1.12.1	**Measures to Protect Surface Water Quality during Construction** Surface water protections are included within the Construction Environmental Management Plan (CEMP) which outlines appropriate mitigation measures for the Construction Phase (See Appendix 1.7). This includes measures relating to: • A requirement for a Pollution Incident Response Plan; • Construction Compound management including the storage of any fuels and materials; • Control of Sediments; • Use of concrete; and • Management of vehicles and plant including refuelling and wheel wash facilities, etc. As well as these generic mitigation measures, other specific mitigation and/or monitoring measures may be required, which will include, but will not be limited to:

[1] The Natura 2000 network of sites are defined under the Habitats Directive (Article 3) as a European ecological network of special areas of conservation, composed of sites hosting the natural habitat types listed in Annex I and species listed in Annex II, and special protection areas classified pursuant to the Birds Directive (2009/147/EC). The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats. In Ireland, these sites are designed as *European sites* – as defined under the Planning and Development Acts and/or Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs).

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	• Works in Flood Zones A and B are avoided where possible. In these areas, the Contractor will be required to provide a method statement for the removal of materials and personnel to minimise sediment discharge into the river and risk to personnel during flood events; • Construction works in areas prone to flooding are to take place during dry seasons. The Contractor must follow the weather forecast prior to commencing instream works and concrete pouring. It is noted that track levels for the entirety of the development are well above flood levels. • Works areas to be kept dry at all times through the use of bunds of non-erodible material adjacent to watercourses to avoid contaminated water entering the watercourse. • Settlement tanks, silt traps/bags and bunds will be used where required to remove silt from surface water runoff. Sizing of the tanks will be based on best available guidelines, CIRIA (2006). Any construction work within a 10m buffer zone must be provided with these measures to minimise sediment discharge to a watercourse; • Refuelling of all plant, machinery, and vehicles will be undertaken only in designated areas where leaks and spills are can be contained relatively easily. Spill kits will be made available on all temporary and permanent construction sites. Refuelling areas must be kept at least 50m away from any watercourse; • Construction materials to be managed in such a way as to effectively minimise the risk posed to the aquatic environment; • Construction Compounds and haul roads will avoid high flood risk zones as much as possible and maintain a minimum buffer of 50m from surface watercourses, and • Excavated material to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses. All of the above measures implemented on site will be monitored throughout the duration of construction/ to ensure that they are working effectively, to implement maintenance measures if required/applicable and to address any potential issues that may arise.
7.1.12.3	**Measures to Prevent introduction /spreading of non-native Invasive species during Construction** The appointed contractor will ensure that a confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and/or extent of all Third Schedule invasive species within the footprint of the Proposed Development. Where an infestation is confirmed / identified within the footprint of the Proposed Development, this will require the implementation of the measures detailed in the Non-Native Invasive Species Management Plan (See Appendix 1.5 of this NIS. ***Non-native Invasive Species Management Plan (ISMP)*** Where a pre-construction invasive species survey identifies newly established non-native invasive species within the footprint of the Proposed Development, the ISMP, as shown in Appendix 1.5 of the NIS, will be updated to provide a detailed description of the new infestations (e.g. approximate area of the respective colonies (m^2), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated. The ISMP for the Proposed Development will be implemented, including confirmation following the preconstruction survey the appropriate treatment methodology including the detailed control measures contained within it, as advised by a suitably qualified specialist, in accordance with the Transport Infrastructure Ireland's (TII 2020) The Management of Invasive Alien Plant Species on National Roads - Technical Guidance) (2020a) and The Management of Invasive Alien Plant Species on National Roads – Standard (TII 2020b), and other species-specific guidance documents including those listed in the non-native ISMP, in so far as they can be applied to the Proposed Development, and as necessary.

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	The appointed contractor will ensure that all control measures that may be specified in the non-native ISMP shall be implemented by a suitably qualified and licenced specialist prior to the construction of the Proposed Development to control the spread of newly established non-native invasive species within the footprint of the Proposed Development. Furthermore, the appointed contractor will adhere to control measures specified within the Non-Native ISMP throughout the construction phase of the Proposed Development. The site will be monitored by the appointed contractor in consultation with the suitably qualified and licensed specialist after the control measures have been implemented. Any re-growth will be subsequently treated as detailed in the Proposed Development ISMP. The ISMP is contained within Appendix 1.5 of the NIS.
7.1.12.5	**Measures to prevent habitat degradation as a result of air quality impacts** Before commencing relevant works, an air quality management plan shall be prepared by the contractor and submitted for approval to the relevant planning authorities. The plan will be developed by the contractor and for each worksite shall include: • An inventory and timetable of activities which may give rise to emissions or dust; • Alert levels; • Alert system to be used (including notification process); • Details of control measures; and • Details of dust monitoring arrangements, including the location of sensitive receptors, monitoring locations, and monitoring equipment to be used. In summary, the measures which will be implemented shall include: • Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods; • Liaison with local authorities and community groups; • Hoarding will be provided around the Construction Compounds; and • It is anticipated that methods of collecting rainwater and recycling for general site use, will be adopted where practical. Strict dust prevention will always be in place, to minimise any potential emissions and these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations. ***Construction Phase Traffic Mitigation Measures*** The modelling of road traffic for impacts on human and ecological receptors has found no significant impacts that require mitigation measures with respect to the modelling of emissions (reference the assessment). However, some mitigation measures can be put in place to minimise fugitive emissions: • Implement a policy which prevents idling of vehicles both on and off-site including HGV holding sites; • Construction Phase traffic should be monitored to ensure construction vehicles are using the designated haul routes; • The contractor must adhere to defined traffic routes as noted in the Construction Traffic Management Plan; • Efficient scheduling of deliveries to minimise number of truck movements; • Construction vehicles will conform to the current EU emissions standards and where reasonably practicable, their emissions should meet upcoming standards prior to the legal requirement date for the new standard. This will ensure emissions on haul routes are minimised. Mitigation

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	measures are required for the control of dust with respect to HGV movements onsite with the site and deliveries to/from the site: o HGV traffic leaving site will pass through a wheel wash. o Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary. If public roads are deemed to require additional cleaning where possible a suction device for road cleaning will be utilised to access spaces around cars and other street furniture more effectively. o During movement of loose material both on and off-site, trucks will be stringently covered with tarpaulin. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
7.2	**River Boyne and River Blackwater SAC [001957]**
7.2.7	**Measures to Protect Surface Water Quality during Construction** The measures presented above in Section **Error! Reference source not found.** will protect surface water quality during construction of the Proposed Development.
7.2.8	**Measures to Prevent introduction /spreading of non-native Invasive species during Construction** The measures presented above in Section **Error! Reference source not found.** will prevent the spread of non-native invasive species to downstream European sites during construction of the Proposed Development.
7.2.9	**Measures to Protect Otter from Disturbance/Displacement impacts** **Pre-Construction Survey** • Prior to construction works commencing, the appointed contractor will engage the services of a suitably experienced ecologist to conduct a pre-construction otter survey of the Proposed Development. The survey will be undertaken within 10 months in advance of construction and supplemented by a further inspection of the Proposed Development immediately prior to site clearance to ensure that no new holts have been established in the intervening period. These surveys will be carried out in accordance with *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (TII, 2006). • Where any new active holts/couches are recorded within 150m of the Proposed Development the appointed ecologist will ensure that adequate mitigation is provided in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2006), and a derogation licence is sought from the NPWS where necessary. **Precautionary Mitigation measures for new active holts/couches recorded within 150m of the Proposed Development** Until such time as otters have been successfully evacuated from active holts, the following provisions will apply to all construction works: • No works will be undertaken within 150m of any holts at which breeding females or cubs are present. Until consultation with NPWS, works closer to such breeding holts may take place - provided appropriate mitigation measures detailed below are in place. • No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence. • The prohibited working area associated with otter holts will where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Fencing will be in accordance with Clause

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
	303 of the TII's Specification for Roadworks (TII 2011). Appropriate awareness of the purpose of the enclosure will be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt. **Ecological Clerk of Works/Retained Ecologist** • Were a new holt to be encountered within 150 metres (up and downstream) of watercourse crossing, NPWS consultation will be sought, and the services of an Ecological Clerk of Works (EcOW) or retained Ecologist (both with experience with otter survey/mitigation) would be required. • The appointed contractor shall employ the services of an EcOW with experience in implementing otter mitigation, to oversee and advise works at watercourse crossings for the Proposed Development (they may also undertake the preconstruction survey). The EcOW will have the authority to: o Review method statements; o Oversee works; o Provide instruction to the appointed contractor(s); and, o Require the temporary cessation of works, where necessary. • The EcOW will deliver a toolbox talk on biodiversity including otter to the appointed contractor(s) working in the proximity of watercourses. This talk will include instructions on identifying otter and details on the protections afforded to otter under Irish and EU legislation. The EcOW will outline the actions which will be taken by the contractor(s) if otter are noted on or near the Proposed Development during construction works. **Measures to Prevent/Reduce Disturbance and Displacement of otters** • Night working within/directly adjacent to watercourses where otter are known to commute will be avoided, where possible, and will only be permitted with the prior approval of the planning authority. • Where night-working adjacent to watercourses known to support otter, is required, the advice of a suitably qualified ecologist/ECoW must be sought and a derogation licence, if necessary, will be sought from NPWS permitting such works. **Measures to Reduce Lighting Impacts to Otter** Security lighting in active works areas in close proximity to watercourses with known otter activity will be designed in conjunction with a suitably qualified ecologist to minimise light spill. Similarly, where any new or amended lighting design is required at a watercourse crossing, it should be cognisant of downward light-spill onto watercourses. Measures to reduce light spill may include the following: • The use of sensor / timer triggered lighting; • LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability; • Column heights should be considered to minimise light spill; and, • Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed.
7.2.10	**Measures to prevent habitat degradation as a result of air quality impacts during construction** The measures presented above in Section **Error! Reference source not found.** will prevent habitat degradation as a result of air quality impacts during construction of the Proposed Development.
7.3	**Boyne Coast and Estuary SAC [001957]**

NIS Section Reference	Description of Mitigation and Monitoring Measures from the NIS
7.3.6.1	**Measures to Protect Surface Water Quality during Construction** The mitigation measures presented above in Section **Error! Reference source not found.** will protect surface water quality during construction of the Proposed Development.
7.3.6.2	**Measures to Prevent the Spread of Invasive Species during Construction** The mitigation measures presented above in section 7.1.12.3 will prevent the spread of invasive species to downstream European sites during the construction of the Proposed Development.
7.4	**Rockabill to Dalkey Island SAC [003000] & Lambay Island SAC [000204]**
7.4.7.1	**Measures to Protect Surface Water Quality during Construction** The measures presented above in Section **Error! Reference source not found.** will protect surface water quality during construction of the Proposed Development.
7.5	**Rogerstown Estuary SPA [004015], Malahide Estuary SPA [004025], Lambay Island SPA [004069], Skerries Islands SPA [004122], Baldoyle Bay SPA [004016], North Bull Island SPA [004006], South Dublin and River Tolka Estuary SPA [004024], River Nanny Estuary and Shore SPA [004158], Boyne Estuary SPA [004080], River Boyne and River Blackwater SPA [004232], Howth Head Coast SPA [004113], Dalkey Island SPA [004172], Dundalk Bay SPA [004026], Ireland's Eye SPA [004117], Rockabill SPA [004014], The Murrough SPA [004186], and Stabannan-Braganstown SPA [004091], and the North-West Irish Sea cSPA [004236]**
7.5.22.1	**Measures to Protect Surface Water Quality during Construction** The measures presented above in Section **Error! Reference source not found.** will protect surface water quality during construction of the Proposed Development.
7.5.22.2	**Measures to Prevent the Spread of Invasive Species during Construction** The mitigation measures presented above in section 7.1.12.3 will prevent the spread of invasive species to European sites during construction of the Proposed Development.
7.5.22.3	**Measures to prevent disturbance and displacement of SCI species** • The appointed contractor will undertake the establishment of the construction compound outside of the wintering bird season (October to March). As a further precautionary measure, the design of the lighting will ensure that light-spill will not occur in the direction of any adjacent fields. Mitigation measures to reduce light spill will include the following: • The use of sensor/timer triggered lighting; • LED luminaires to be used where practicable; • Column heights to be considered to minimise light spill; and • Accessories such as baffles, hoods or louvres to be used to reduce light spill and direct it only where needed.

Appendix C: Statutory Planning Consent including any additional Environmental commitments

Appendix D: Environmental Operating Plan

CONTENTS

1. APPENDIX A5.1 – APPENDIX D: ENVIRONMENTAL OPERATING PLAN

1.1 Introduction

This document is the project-specific Environmental Operating Plan ("EOP") for the DART+ Coastal North project. It is prepared to inform and provide a template for the successful contractor to develop and maintain an EOP for the construction of the DART+ Coastal North ("the Proposed Development").

1.1.1 Purpose and Scope

The EOP is designed to assist the main contractor in preventing, managing and/or minimising significant environmental impacts during the construction phase. The EOP sets out the mechanism by which environmental protection is to be achieved on the DART+ Coastal North. The EOP describes the Environmental Management System (EMS) of the Proposed Development, which will be devised according to the criteria of ISO 14001:2015 – Environmental Management Systems and developed having regard to Iarnród Éireann's Environmental Management Policy and the National Road Authority (now known for operating purposes as Transport Infrastructure Ireland (TII)) "*Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*". This EOP will be complemented by General Procedures, Work Procedures and Operations Instructions of the contractor. These documents will be in place within the site administration offices and appropriate site locations during the works.

This EOP covers the activities of the successful contractor and that of its sub-contractors. It outlines the environmental commitments in relation to the construction works and how these commitments are to be managed, including details of the monitoring systems and mitigation measures to be employed by the successful contractor. It also assigns responsibilities for ensuring the effective implementation of the EOP.

To achieve this objective, the finalised EOP should contain all Environmental Commitments and Requirements set out in:

- the Contract documents (in particular, the Works Requirements (WR));
- the Environmental Impact Assessment Report (EIAR);
- the Natura Impact Statement (NIS) and any appendices;
- The Railway Order including any conditions and/or modifications imposed by An Bord Pleanála (ABP);
- the Schedule of Commitments, and provide a method of documenting compliance with these Environmental Commitments and conditions/modifications; (refer to the CEMP);
- List all relevant environmental legislative requirements and provide a method of documenting compliance with these requirements; and
- Outline methods by which construction work will be managed to prevent, reduce or compensate for potential adverse impacts on the environment. (refer to the CEMP – Schedule of Environmental Commitments).

The EOP of the contractor should address the following key requirements:

- Clearly identify the roles and responsibilities of the main contractor's staff having regard to the main contractor's organisational structure;
- Incorporate procedures for communicating with the public;
- Incorporate procedures for communicating with relevant site-personnel;
- Incorporate procedures for Environmental Awareness Training for the main contractor's staff;
- Incorporate monitoring procedures and responses to monitoring results, where contractually required; and
- Provide for a system of audit with regard to the effectiveness of the EOP during the construction life cycle of the project.

This EOP should be read in conjunction with the Construction Environmental Management Plan (CEMP) and serves as an indicative template for the main contractor to ensure that they are fully aware and plan for all Environmental Commitments and Requirements relevant to the Proposed Development.

1.1.2 EOP Structure

The contents of this EOP are presented as follows:

- Section 1.2 General Project Details;
- Section 1.3 Contract Sheets;
- Section 1.4 Reference Documents;
- Section 1.5 Organisational Structure / Duties and Responsibilities;
- Section 1.6 Environmental Commitments;
- Section 1.7 Environmental Control Measures;
- Section 1.8 Site-Specific Method Statements;
- Section 1.9 Environmental Awareness Training;
- Section 1.10 Communication;
- Section 1.11 Inspections, Auditing and Monitoring Compliance; and
- Section 1.12 Handover of the Final EOP.

1.1.3 Contractor's Environmental Policy Statement

Environmental management is fundamental to the successful operation of construction activities. Therefore, the Environmental Policy must, as a priority, be understood by all parties involved in the contract and adhered to throughout the course of the works to allow for legal compliance and environmental management.

The EOP shall be prepared having regard to IÉ Environmental Management Policy (EMP).

[*Successful Contractor Name*] Environmental Policy Statement is detailed below.

[*Insert policy statement*]

1.2 General Project Details

1.2.1 Project Description

This section will be completed by the successful contractor once appointed:

- Brief overview;
- Location of the project;
- Location of compounds;
- Contact Sheets for site, employer and third-party contacts;
- Register of all applicable legislation, including relevant standards, Codes of Practice and Guidelines;
- Organisational chart; and
- Duties and responsibilities.

1.2.2 Project Overview and Location

1.2.2.1 Project Location

The Proposed Development, will modify the current rail network between Dublin City Centre (north of Connolly Station) and Drogheda MacBride Station. The Proposed Development extends across four local authority areas, including Louth, Meath and Fingal County Council as well as Dublin City Council. The total length of the Proposed Development is approximately 50 kilometres.

1.2.2.2 Project Description

The Proposed Development is described in detail in Chapter 4 (Description of the Proposed Development) in Volume 2 of this EIAR.

The key infrastructural components of the DART+ Coastal North project include:

- Extension of existing 1500V DC electrification, which currently terminates at Malahide, as far as Drogheda MacBride Station (approximately 37km); this includes:
    - The installation of foundations, masts, and overhead wires to supply power to the railway;
    - Undertaking upgrades to existing signalling, telecoms, and power supplies to support the planned increase in train services, including the introduction of new electrical substations at key locations alongside the railway line:
        - Drogheda;
        - Bettystown;
        - Gormanston;
        - Balbriggan;
        - Skerries North;
        - Skerries South;
        - Rush & Lusk (this location also incorporates an overhead line equipment (OHLE) maintenance compound);
        - Donabate.
    - Undertaking improvements / modifications to bridges spanning the railway arising from track reconfigurations and / or meeting required electrical clearances;

  - Undertaking localised bridge modifications to enable OHLE to be fixed to bridges carrying the railway;
  - Canopy modifications at Drogheda MacBride Station to accommodate OHLE clearances; and
  - Modified railway boundary fences to protect the public from contacting the overhead line.
- Infrastructure works to facilitate the increase in service frequency and capacity, in specific areas of intervention as outlined below:
  - works around Howth Junction & Donaghmede Station;
  - works around Clongriffin Station;
  - works around Malahide Station & Viaduct;
  - works to the existing user worked level crossing (XB001) south of Donabate; and
  - works around Drogheda MacBride Station.
- Modifications to existing depots at Drogheda and Fairview to support the new train fleet, including the provision of additional train stabling at Drogheda;
- Ancillary civils, utility diversions, drainage, and power work to cater for the changes.

The key interventions in each zone are presented in Table 1-1.

Table 1-1 Key Infrastructural Elements in each Geographic Zone

Zone	Activity
Zone A	This zone from north of Connolly Station to south of Howth Junction & Donaghmede Station includes the following works: • Minor upgrades to Fairview Depot and sidings. • New drainage connection to combined sewer on Alfie Byrne Road.
Zone B	This zone from south of Howth Junction & Donaghmede Station to Malahide Viaduct (including Howth Branch) includes the following works: • Modification of Howth Junction & Donaghmede Station Accesses and Footbridge (OBB17A); • Construction of the Howth Junction & Donaghmede Station Platform 2 Extension; • Construction of a new crossover on the Howth Branch Line at Howth Junction & Donaghmede Station (Howth Junction Turnback); • Construction of two new turnouts on the Up Dublin Line, and a new Loop Line to the east of Clongriffin Station. (Clongriffin Turnback); • Construction of a new retaining wall at Clongriffin Station, utility diversions and associated earthworks; • Construction of new Underbridge UBB19A (Mayne River), UBB18D culvert extension and embankment north of Clongriffin Station; • Construction of a new central turnback line north of Malahide Station, new crossover on the Up Dublin Line and new turnout on the Down Belfast Line. (Malahide Turnback); • Construction of new reinforced earth wall alongside the proposed Broadmeadow Way greenway and embankment widening, north of Malahide Station; • Modification of Underbridge UBB30 (Malahide Viaduct) to support OHLE; • Closure of (user worked) level crossing (XB001); • Construction of a new Otter Crossing, adjacent to the Underbridge UBB31 (River Pill); • OHLE and Signalling, Electrification and Telecoms (SET) modifications at Malahide, Howth and Clongriffin; and • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works north of Malahide Turnback.

Zone	Activity
Zone C	The zone from the north of Malahide viaduct (south of Donabate Station) to south of Gormanston Station (Fingal boundary) includes the following works: • Construction of Donabate Substation compound; • Modification of Underbridge UBB36 (Rogerstown Viaduct / Estuary) to support OHLE; • Construction of Rush and Lusk Substation and OHLE maintenance compound; • Upgrade of existing station access road junction at Rush and Lusk Station; • Track lowering at Overbridge OBB39 (carrying Station Road / R128); • Track lowering at Overbridge OBB44 (carrying local road in Tyrrelstown Big); • Construction of Skerries South Substation compound; • Construction of Skerries North Substation compound; • Track lowering at Overbridge OBB55 (carrying Lawless Terrace / R127); • Modification of Underbridge UBB56 (Balbriggan Viaduct) to support OHLE; • Construction of Balbriggan Substation compound; • Road overbridge parapet modifications for compliant safety standards to: o OBB32A (carrying the Donabate Distributor Road), o OBB35 (access to Beaverstown Golf Club), o OBB38 (carrying Rogerstown Lane), o OBB41 (carrying local road in Rathartan), o OBB46 (carrying the L1285 / Baldongan Close), o OBB47 (historic access to Skerries Golf Club), o OBB49 (carrying Golf Links Road), o OBB55 (carrying Lawless Terrace / R127) and o OBB68 (local access adjacent Gormanston Camp). • Pedestrian footbridge parapet modifications for compliant safety standards to: o OBB33A (Donabate Station footbridge), o OBB38A (Rush & Lusk Station footbridge), o OBB51A (Skerries Station footbridge), o OBB54 (The Ladies Stairs) and o OBB57A (Balbriggan Station footbridge). • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Rush & Lusk, Tyrrelstown, Golf Links Road, Baldongan, and Balbriggan; and o Utility diversions.
Zone D	The zone south of Gormanston Station (Fingal border) to Louth/Meath border includes the following works: • Construction of Gormanston Substation compound; • Modification of Underbridge UBB72 (Laytown Viaduct) to support OHLE; • Construction of Bettystown Substation compound; • Track lowering at Overbridge OBB78 (carrying Colpe Road); • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Gormanston, Laytown, and Drogheda; • Road overbridge parapet modifications for compliant safety standards to: o OBB68 (Irishtown), o OBB77 (Colpe East), and o OBB78 (carrying Colpe Road). • Pedestrian footbridge parapet modifications for compliant safety standards to: o OBB74A (Laytown Station footbridge); and • Utility diversions.
Zone E	Drogheda MacBride Station and surrounds includes the following works: • Demolition and replacement of triple span Overbridge OBB80/80A/80B (Railway Terrace); • Realignment of Railway Terrace and McGrath's Lane;

Zone	Activity
	• Reconstruction of Underbridge UBK01 (R132/Dublin Road Bridge); • Reconstruction of Overbridge OBB81 (Drogheda Station Footbridge); • Modification to existing Platform 1 Station Canopy; • Construction of new Platform 4 (on the Drogheda Freight Sidings) and associated modifications to station car park and connectivity to Drogheda MacBride Station; • Track works on Drogheda Freight Sidings at Drogheda (Drogheda Turnback); • Construction of Drogheda Substation compound; • Civil Works on Light Maintenance Roads, Under Frame Cleaning (UFC) facility and Northern Headshunt; • Reprofiling existing earthwork bund at Drogheda Depot; • Track works on Stabling Roads 7a, 7b; • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Drogheda; and • Utility diversions.

1.2.2.3 Duration of Project

Detailed description of the proposed DART+ Coastal North project is provided in Chapter 4 (Description of the Proposed Development) and in Chapter 5 (Construction Strategy) in Volume 2 of this EIAR. Extents of the Proposed Development including construction sites, compounds etc., are shown in development drawings in Volume 3A of the EIAR.

It is anticipated that the Construction Phase of the Proposed Development will be phased and will last approximately 36 months. The approximate duration of the main activities are illustrated in Image 1-1.

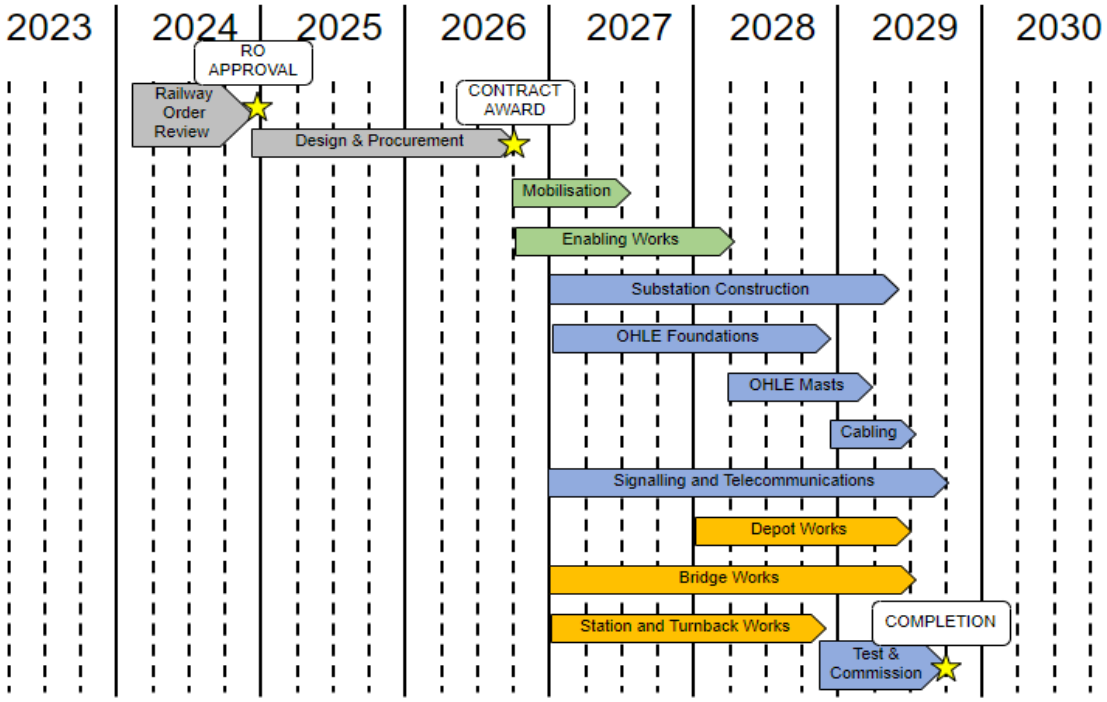

Image 1-1 High Level Construction Programme

A detailed construction programme is provided in Chapter 5 (Construction Strategy) in Volume 2 of the EIAR.

1.3 Contact Sheets

Contact details of relevant personnel employed during the construction phase of the Proposed Development are required to ensure that environmental incidents are competently reported. The contact details should be frequently reviewed to ensure that they are up to date.

Table 1-2, Table 1-3 and Table 1-4 provide examples of how to document the contact details of all relevant main contractor, employer and third-party consultation personnel respectively.

Table 1-2 Main Contractor Contacts (Example)

Position Title	Name	Phone number	Email Address
Project Manager			
Site Manager*			
Environmental Manager*			
Site Agents			
Forepersons			
Safety Officers*			
Site Emergency Number*			
Other, as appropriate			

* 24hr contact details are required for persons with this position.

Table 1-3 Employer Contacts (Example)

Organisation	Position Title	Name	Phone Number	Email Address
Project Resident Engineer's Office	Project Resident Engineer			
Córas Iompair Éireann	Design Office Project Manager			
Córas Iompair Éireann	Liaison Officer			
ARUP	Project Designer			
Córas Iompair Éireann	Project Supervisor Design Process (PSDP)			
Córas Iompair Éireann	Project Supervisor Construction Stage (PSCS)			
Other, as appropriate				

Table 1-4 Third-Party Contacts (Example)

Organisation	Position Title	Name	Phone Number	Email Address
Dublin City Council				
Fingal County Council				
Meath County Council				
Louth County Council				
National Parks and Wildlife Service				
Office of Public Works				
Environmental Protection Agency				
Local Authority				
Health and Safety Authority				
Emergency Services				
Other, as appropriate				

1.4 Reference Documents

1.4.1 Scheme Specific Documentation

Scheme specific documentation to be referred to when determining the Environmental Commitments and Requirements for the Proposed Development include:

- The Contract Documents;
- The Environmental Impact Assessment Report (EIAR);
- The Natura Impact Statement (NIS) and any appendices;
- The Railway Order including any conditions and/or modifications imposed by An Bord Pleanála (ABP);
- Schedule of Commitments (Refer to Appendix A5.1 (CEMP)); and
- Contractor's Construction Phase Safety and Health Plan.

1.4.2 General Reference and Guidance Documentation

The contractor should have regard to Iarnród Éireann's Environmental Management Policy ISO 14001:2015 – Environmental Management Systems and relevant TII/NRA guidelines and standards.

TII's "*Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*" should be referred to when developing the contractors EOP.

The contractor will also have regard to the relevant Iarnród Éireann standards and guidance documents such as:

- CCE-TMS-381 Control and Management of Vegetation;
- CCE-TEB-2013-3 Guidance on the Identification and Control of Japanese Knotweed;
- CCE-TMS-383 Control, Management and Application of Pesticides & Herbicides;

- CCE-TMS-310 Guidance on Third Party Contracts;
- CCE-IMS-008-005 Preparation of Environmental Aspects Register;
- CCE-IMS-008-010 Management of Spent Ballast;
- CCE-IMS-008-001 Ecological Assessment: Railway Maintenance and Building Maintenance Activities; and
- CCE-IMS-008-002 Noise Management –CCE Work Activities.

This is a non-exhaustive list and relevant standards or procedures at the time of construction will be required to be adhered to.

1.5 Organisational Structure/Duties and Responsibilities

1.5.1 Organisational Structure

The successful contractor will provide an organogram in the EOP to assign the duties and responsibilities of their personnel under the EOP.

1.5.2 Duties and Responsibilities

The below list of personnel may be required depending on the phase and type of works being undertaken.

1.5.2.1 Project Manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Project Manager's main duties and responsibilities in relation to the EOP include liaising with the Project Team in assigning duties and responsibilities in relation to the EOP to individual members of the main contractor's project staff.

It is the responsibility of the Project Manager to approve key personnel required for employment on the project. The Project Manager will liaise with the Site Environmental Manager.

The Project Manager will lead the works on site. The Project Manager will be responsible for the management and control of the activities and will have overall responsibility for the implementation of the EOP. The Project Manager will be assisted by the Site Environmental Manager who will act as their deputy.

1.5.2.2 Site Manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Site Manager's environmental management responsibilities include, but are not limited to:

- Liaise with the Site Environmental Manager and the Project Team in assigning duties and responsibilities in relation to the EOP, to individual members of the main contractor's project staff;
- Liaising with Site Manager in preparing, reviewing and updating all site-specific method statements for activities where there is a risk of pollution or adverse effects on the environment;
- Liaising with the Site Environmental Manager in agreeing site specific Method Statements with Third Parties;
- Ensuring that all relevant information on project programming, timing, construction methodology, etc., is communicated from the contractor's Project Team, including the Project Manager, to the Site Environmental Manager in a timely and efficient manner in order to allow pre-emptive actions relating to the environment to be taken where required;
- Ensuring that the risk assessments for control of noise and environmental risk are prepared and effectively monitored, reviewed and communicated on site;
- Close liaison with the Site Environmental Manager to ensure adequate resources are made available for implementation of the EOP; and
- Ensuring that the Site Environmental Manager reviews all method statements, performs regular and frequent environmental site inspections and that relevant environmental protocols are incorporated and appended.

1.5.2.3 Environmental Manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

In order to ensure the successful development, implementation, and maintenance of the EOP, the contractor will be required to appoint an independent Site Environmental Manager to provide independently verifiable audit reports.

The Site Environmental Manager must possess sufficient training, experience, and knowledge appropriate to the nature of the task to be undertaken, a Level Eight qualification recognised by the Higher Education and Training Awards Council (HETAC), or a university equivalent, or other qualification acceptable to the Employer, in Environmental Science or Environmental Management, Environmental Hydrology, Engineering or other relevant qualification acceptable to the Employer.

Separate from the ongoing and detailed monitoring carried out by the contractor as part of the EOP, the EM shall carry out the inspection/monitoring regime described below, and report to the contractor. The results will be stored in the Site Environmental Manager's monitoring file and will be available for inspection/audit by the Client, National Parks and Wildlife Service (NPWS) or Inland Fisheries Ireland (IFI) staff. All inspections/monitoring/results will be recorded on standard forms.

The responsibilities of the Site Environmental Manager include:

Site-Specific Method Statements

- Liaising with the Construction Manager in preparing site-specific Method Statements for all Works activities where there is a risk of environmental damage. These site-specific Method Statements should incorporate relevant Environmental Control Measures and take account of relevant Environmental Control Measure Sheets;
- Liaising with the Construction Manager in reviewing and updating site-specific Method Statements for all Works activities where Environmental Control Measures and Environmental Control Measure Sheets have been altered; and
- Liaising with the Construction Manager where third party agreement is required in relation to site specific Method Statements, Environmental Control Measures and/or Environmental Control Measure Sheets.

General

- Being familiar with the contents, environmental commitments and requirements contained within the Reference Documents;
- Being familiar with baseline data gathered during Environmental Impact Assessment and NIS and during pre-construction surveys;
- Listing all Environmental Commitments and Requirements in an Environmental Commitments Summary Table;
- Assisting the Construction Manager in liaising with the PSDP/Engineer and the provision of information on environmental management to the Engineer during the course of the construction phase; and
- Liaising with the Project Team in assigning duties and responsibilities in relation to the EOP to individual members of the main contractor's project staff.

Third Party Consultations

- Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil best practice requirements;
- Ensuring that the minutes of meetings, action lists, formal communications, etc. are well documented and that consultation certificates are issued to the engineer as required;
- Liaising with all prescribed bodies during site visits, inspections and consultations;
- Where new Environmental Control Measures are agreed as a result of third-party consultation, ensuring that the EOP is amended accordingly;
- Where new Environmental Control Measures are agreed as a result of third-party consultation, the Environmental Manager should liaise with the Construction Manager in updating relevant site-specific Method Statements; and
- Where required, liaising with the Construction Manager in agreeing site-specific Method Statements with third parties.

Licensing

- Ensuring that all relevant works have (and are being carried out in accordance with) the required permits, licences, certificates, planning permissions, etc;
- Liaising with the designated licence holders with respect to licences granted pursuant to the Wildlife Act, 1976, as amended;
- Liaising with the designated licence holders and "scientific agent" (generally defined in the licence as "the contractor engaged to carry out the scientific direction and monitoring of mitigation measures") with respect to licences granted pursuant to the European Communities (Birds and Natural Habitats) Regulations 2011, (S.I. No. 477 of 2011) as amended; and
- Bringing to the attention of the Project, Design and Construction Team any timing and legal constraints that may be imposed on the carrying out of certain tasks.

Waste Management Documentation

- Holding copies of all permits and licences provided by waste contractors;
- Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc., have appropriate authorisation; and
- Gathering and holding documentation with respect to waste disposal.

Legislation

- Keeping up to date with changes in environmental legislation that may affect environmental management during the construction phase;
- Advising the Construction Manager of these changes; and
- Reviewing and amending the EOP in light of these changes and bringing the changes to the attention of the main contractor's senior management and sub-contractors.

Site Environmental Inspections

- Carrying out regular documented inspections of the site to ensure that work is being carried out in accordance with the Environmental Control Measures and relevant site-specific Method Statements, etc;
- Appending copies of the inspection reports to the EOP.

Specialist Environmental Contractors

- Identifying requirements for specialist environmental contractors (including ecologists, waste contractors and spill clean-up specialists) before commencement of the project;
- Procuring the services of specialist environmental contractors and liaising with them with respect to site access and report production;
- Ensuring that specialist environmental contractors are competent and have sufficient expertise to coordinate and manage environmental issues; and
- Co-ordinating the activities of all specialist environmental contractors on environmental matters arising out of the contract.

Environmental Induction Training and Environmental Tool Box Talks

- Ensuring that Environmental Induction Training is carried out for all the main contractor's site personnel. The induction training may be carried out in conjunction with Safety Induction Training; and
- Providing toolbox talks on Environmental Control Measures associated with site specific Method Statements to those who will undertake the work.

Environmental Incidents/Spillages

- The Environmental Manager should be notified of all incidents where there has been a breach of agreed environmental management procedures: where there has been a spillage of a potentially environmentally harmful substance; where there has been an unauthorised discharge to ground, water or air; where there has been damage to a protected habitat, etc;
- The Environmental Manager should prepare and be in readiness to implement at all times an Emergency Response Plan;
- The Environmental Manager is responsible for notifying the relevant statutory authority of environmental incidents; and
- Carrying out an investigation and producing a report regarding environmental incidents. The report of the incident and details of remedial actions taken should be made available to the relevant authority, the Engineer, and the Construction Manager.

1.5.2.4 Design Manager

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The main duties and responsibilities of the Design Manager include:

- Be familiar with the EOP and relevant documentation referred to within;
- Be familiar with the contents, commitments and requirements contained within the reference documents; and
- Participate in Third Party Consultations and liaising with third Parties through the site Environmental Manager.

1.5.2.5 Site Agents

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Site Agents are responsible for the following:

- Ensuring Forepersons under their control adhere to the relevant Environmental Control measures and relevant site-specific Method Statements, etc;
- Ensuring that the procedures agreed during third party consultations are followed;

- Reporting immediately to the Site Environmental Manager any incidents where there has been a breach of agreed environmental management procedures, where there has been a spillage of a potentially environmentally harmful substance, where there has been an unauthorized discharge to ground, water or air, damage to habitat, etc; and
- Attending environmental review meeting and preparing any relevant documentation as required by Management.

1.5.2.6 Forepersons

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The forepersons on site are responsible for the following:

- Ensuring personnel under their control adhere to the relevant environmental control measures and relevant site-specific Method Statement; and
- Reporting immediately to the site agents and Site Environmental Manager any incidents where there has been a breach of agreed procedures e.g., spillages and discharges.

1.5.2.7 Employer's Representative

Name: [To be inserted by successful contractor]

Duties and Responsibilities

The Employer's Representative (ER) acts on behalf of the Employer in the course of a construction project. The EOP will be audited by the Employer's Representative to ensure that the Contractor is compliant with the environmental provisions of the Contract Documents.

1.5.2.8 Project Supervisor Construction Stage

The role of the Project Supervisor Construction Stage (PSCS) is to manage and co-ordinate health and safety matters during the construction stage. The PSCS will be appointed before the construction work begins and will remain in that position until all construction work on the project is completed.

It is the responsibility of the PSCS to ensure that the project:

- Is designed and is capable of being constructed to be safe and without risk to health;
- Is constructed to be safe and without risk to health;
- Can be maintained safely and without risk to health during subsequent use; and
- Complies in all respects, as appropriate, with the relevant statutory provisions.

The PSCS will prepare the Construction Phase Safety and Health Plan in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) (as amended) prior to the commencement of construction work for the project. The Plan should provide the blueprint for managing and coordinating safety and health during construction and should explain how the key safety and health issues will be managed.

The PSCS will maintain contact with the Project Supervisor Design Process (PSDP) throughout the construction phase to communicate any health and safety related issues. The PSDP will prepare written safety file appropriate to the characteristics of the project, containing relevant health and safety information, to be considered during any subsequent construction work following completion of the project.

1.5.2.9 All Project Personnel

Name: [To be inserted by successful contractor]

Duties and Responsibilities

All project personnel have the following responsibilities:

- Reporting any operations and conditions that deviate from the EOP to the Site Agent and Site Environmental Manager. Depending on circumstances it may be appropriate for general operatives and machinery operators to report directly to their Foreperson who will then report to the Site Environmental Manager and Site Agent;
- Taking an active part in site safety and environmental meetings;
- Ensuring awareness of the contents of method statements, plans, supervisors' meetings or any other meetings that concern the environmental management of the site; and
- Attend environmental training as required.

1.5.2.10 Ecological Clerk of Works (ECoW)

Name: [To be inserted by successful contractor]

Duties and Responsibilities

In order to ensure the successful development and implementation of the EOP, the Contractor will appoint an independent Ecological Clerk of Works (ECoW). The ECoW must possess training, experience, and knowledge appropriate to the role, including:

- An NFQ Level 8 qualification or equivalent or other acceptable qualification in ecology or environmental biology; and
- Demonstrable experience in the protection of European sites.

The principal functions of the ECoW are:

- To provide ecological supervision of the construction of the Proposed Development and thereby ensure the full and proper implementation of all the mitigation measures relating to biodiversity prescribed in the EIAR and NIS;
- To regularly review the outcome of the specialist hydroacoustic monitoring if being undertaken and, on that basis, make any necessary adjustments to the mitigation; and
- To carry out weekly inspections and reporting on the implementation of the Contractor's Biosecurity Protocol.

During the preparation of the Contractor's EOP, the Site Environmental Manager may, as appropriate, assign other duties and responsibilities to the ECoW.

In exercising his/her functions, the ECoW will be required to keep a monitoring file, and this will be made available for inspection or audit by Irish Rail, the National Parks and Wildlife Service (NPWS) or Inland Fisheries Ireland (IFI) at any time.

1.5.2.11 Project Archaeologist

Name: [To be inserted by successful contractor]

Duties and Responsibilities

A suitably qualitied Project Archaeologist on site is responsible for the following:

- Relevant licenses required for the project in advance of any construction work taking place and throughout the project as required;
- To supervise works in vicinity of known archaeological sites; and
- To supervise any pre-construction archaeological survey works.

Section 26 of the National Monuments Act 1930 (as amended) requires that excavations for archaeological purposes must be carried out by suitably qualified and experienced archaeologists acting under an excavation licence. Inappropriate excavation of a heritage site could result in damage to, or destruction of, the integrity, setting or historical context of the site, contrary to the public interest.

1.5.2.12 Other

Subject to the environmental commitments/requirements, other environmental specialists will be employed as required during the construction works.

1.6 Environmental Commitments

The CEMP contains the following supporting environmental documents:

- Appendix A: Environmental Impact Assessment Report Chapter 27 (Summary of Mitigation and Monitoring Measures);
- Appendix B: Natura Impact Statement – Mitigation Measures;
- Appendix C: The Railway Order including any conditions and/or modifications imposed by An Bord Pleanála (ABP);
- Appendix D: Environmental Operating Plan;
- Appendix E: Construction and Demolition Waste Management Plan;
- Appendix F: Incident Response Plan;
- Appendix G: Construction Traffic Management Plan (CTMP); and
- Appendix H: Surface Water Management Plan (SWMP).

The Schedule of Environmental Commitments comprises the mitigation measures as outlined in 'Chapter 27 Summary of Mitigation and Monitoring Measures' of the Environmental Impact Assessment Report. Any additional commitments arising up to and including the Oral Hearing should be included in the updated CEMP in Appendix C of the CEMP.

- Relevant environmental legislation prescribes environmental performance criteria. Therefore, in addition to: the Contract documents, the conditions and/or modifications imposed by An Bord Pleanála, the Schedule of Commitments, and relevant environmental legislation all prescribe environmental performance criteria.

The following table lists the complete suite of Environmental Commitments together with the relative specification and evidence of how each commitment will be met. An example of the layout of this table and potential entries is given below.

Table 1-5 Environmental Commitments (Example)

Environmental Commitment	Legislation / Specific Ref.	Action Owner	Evidence	Target Date	Close Date
Biodiversity (Flora and Fauna)	EIAR Volume 2: Chapter 8 Biodiversity/ Chapter 27 Summary of Mitigation and Monitoring Measures	Env. Manager/ Specialist Ecologist/ Env. Designer/ Site Agent/ Foreman	Method Statement/ Ecological Walkover/ Pre-surveys/ Agreement from IFI & NPWS/ Site Inspections	Ongoing	End of Contract
Hydrology and Hydrogeology	EIAR Volume 2: Chapter 8 Biodiversity Chapter 10 Water (including Hydrology and Flood Risk) Chapter 11 Hydrogeology Chapter 27 Summary of Mitigation and Monitoring Measures	Env. Manager/ Specialist Ecologist/ Env. Designer/ Site Agent/ Foreman	Method Statement/ Site Inspections/ Monitoring Data	Ongoing	End of Contract
Air Quality	EIAR Volume 2: Chapter 12 Air Quality Chapter 27 Summary of Mitigation and Monitoring Measures	Env. Manager/ Site Agent/ Foreman	Method Statement/ Site Inspections/ Monitoring Data	Ongoing	End of Contract
Noise and Vibration	EIAR Volume 2: Chapter 14 Noise and Vibration Chapter 27 Summary of Mitigation and Monitoring Measures	Env. Manager/ Noise Specialist/ Env. Designer/ Site Agent/ Foreman	Method Statement/ Site Inspections/ Monitoring Data/ Environmental Control Measure Sheet	Ongoing	End of Contract

Environmental Commitment	Legislation / Specific Ref.	Action Owner	Evidence	Target Date	Close Date
Landscape and Visual Amenity	EIAR Volume 2: Chapter 8 Biodiversity Chapter 15 Landscape and Visual Amenity Chapter 27 Summary of Mitigation and Monitoring Measures	Env. Manager/Specialist Ecologist/ Env. Designer/ Site Agent/Foreman	Method Statement/ Site Inspections/	Ongoing	End of Contract

1.7 Environmental Control Measures

Environmental Control Measures to meet the Environmental Commitments/Requirements will be identified and implemented by the Contractor, refer to Appendix A5.1 (CEMP) for the list of Environmental Commitments/Requirements.

The Contractor will follow the procedure outlined in Figure 1-1 to identify the environmental control measures.

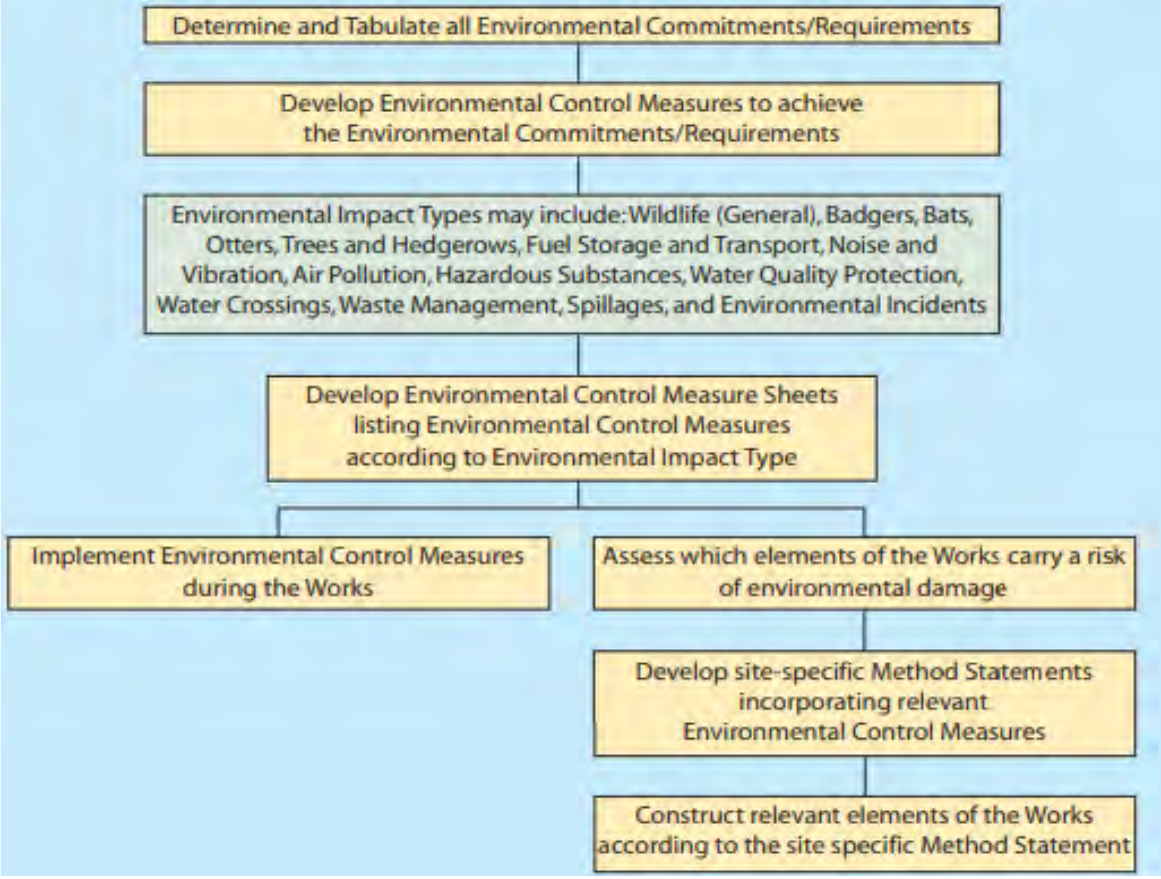

Figure 1-1 Example of Main Steps in Developing and Implementing Environmental Control Measures. Source: TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan

As outlined in Figure 1-1 above, some environmental control measures are generally implemented across all works. However, some construction works may present a risk of environmental damage for which, relevant environmental control measures are required to be incorporated into site-specific method statements.

Environmental Control Sheets will be prepared by the Contractor which will contain the prescribed environmental control measures according to the environmental impact (e.g. impacts on watercourses, bats, badger etc.). It will be the responsibility of the Site Environmental Manager to ensure that the identified environmental control measures are sufficient to meet the environmental commitments and that they are brought to the attention of the relevant key personnel.

An example of an Environmental Control Sheet is shown in Figure 1-2 and Figure 1-3 below. For more examples, see Section 7.3 of the TII's "Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan"1.

[1] https://www.tii.ie/tii-library/environment/planning-guidelines/Guidelines-for-the-Creation-and-Maintenance-of-an-Environmental-Operating-Plan.pdf

Example Environmental Control Measure Sheet – Noise and Vibration (contd.)

Environmental Control Measures – Communication with the Public

- A Public Communications Strategy should be established to promote awareness of measures being taken to restrict noise and vibration to acceptable levels. See Chapter 10.

Environmental Control Measures – Piling and Blasting

- A publicity campaign should be undertaken prior to the commencement of piling and blasting, explaining the work being carried out and the reasons for the work.
- An on-site documented complaints procedure should be implemented.
- Blasting should be carried out at similar times each day to reduce the 'startle' effect.
- Trial blasts should be carried out in less sensitive areas to assist in blast designs and identify potential zones of influence.

Environmental Control Measures – Control of Noise and Vibration (General)

Environmental Control Measures in relation to Noise and Vibration may be split into two categories:

- Control of noise and vibration at source, and
- Controlling the spread of noise and vibration.

Environmental Control Measures – Control of Noise and Vibration at Source

- Where reasonably practicable, noisy plant or processes should be replaced by less noisy alternatives.
- Plant should be properly and regularly maintained.
- Compressors should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever machines are in use and all ancillary pneumatic tools should be fitted with suitable silencers.
- Machinery, which is used intermittently, should be shut down or throttled back to a minimum during those periods when not in use.
- All vehicles and mechanical plant should be fitted with effective exhaust silencers.
- Noise from existing plant and equipment can be reduced by modification or by the application of improved sound reduction methods, but this should only be carried out after consultation with the manufacturer.
- Depending on the nature of the machine and on their ventilation requirements the use of enclosures and acoustic sheds should be considered where their use is reasonably practicable.
- Where deemed reasonably practicable, plant and site equipment should be located away from noise sensitive receptors.
- Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise sensitive receptors.

Environmental Control Measures – Controlling the Spread of Noise and Vibration

At certain times during construction and at particular locations the use of temporary noise attenuating devices should be considered:

- The erection of temporary noise attenuating screens may be required in order to reduce noise levels below the maximum permissible noise levels. Noise-attenuating screens can be made up of formwork panels or constructed from at least 12 mm thick plywood and battens. Plywood may need to be stiffened with additional battens to prevent drumming. The lower edge of the panels should rest on the ground with any gap plugged by spoil, sandbags, etc.
- The use of temporary or the advance construction of permanent berms may be appropriate.
- Site buildings or material stockpiles may be located so as to shield sensitive receptors.

Environmental Control Measures – Construction of Permanent Noise Reducing Measures

Permanent noise mitigating measures installed on national road schemes should achieve the noise design commitments specified in the Contract documents, the EIS, any conditions and/or modifications imposed by ABP and the Schedule of Commitments. It will generally be required that such noise mitigation measures achieve the noise design goal '*performance standard*' of 60 L_{den} as specified in the *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (Revision 1, National Roads Authority, October 2004). In order to demonstrate that these noise design commitments are being achieved, the following Environmental Control Measures should be implemented:

- Documented evidence demonstrating that all noise mitigation measures will achieve the noise design commitments should be attached to the EOP. The Contractor's Designer, as advised by an acoustic specialist, should produce this report. This Environmental Control Measure should be in addition to any contractual requirements for the provision of documented evidence demonstrating that all noise mitigation measures meet the noise design commitments.
- Documented evidence demonstrating that all noise barriers have achieved the performance specified in the Contract in accordance with I.S. EN 1793 – 1:1998, I.S. EN 1793 – 2:1998, I.S. EN 1793 – 3:1998, I.S. EN 1794 – 1:2003 and I.S. EN 1794 – 2:2003 following the specifications outlined in I.S. EN 14388:2005 should be attached to the EOP. This documented evidence should demonstrate how the barriers meet the specified standards and should clearly indicate the absorptive performance (where such barrier is used) and airborne sound insulation categories of the constructed barriers as outlined in I.S. EN 1793 – 1:1998 and I.S. EN 1793 – 2:1998. This Environmental Control Measure should be in addition to any contractual requirements for the provision of such documented evidence.

Responsibility

- The Site Agent should be familiar with the noise sensitive receptors and alert the Environmental Manager in good time prior to work commencing in these areas.
- The Environmental Manager should develop site-specific Method Statements in conjunction with the Construction Manager.

References

Guidelines for the Treatment of Noise and Vibration in National Road Schemes (Revision 1, National Roads Authority, October 2004).

BS 5228: *Noise and vibration control on construction and open sites.*

ISO1996-1 1982 *Acoustics – Description and measurement of environmental noise – Part 1: Basic quantities and procedures.*

Figure 1-2 Example of an Environmental Control Sheet for Noise and Vibration. Source Box 19 *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

Example Environmental Control Measure Sheet – Otters

Environmental Control Measures – Pre-Construction Ecological Walkover

- The Environmental Manager should ensure that signs of otter activity are assessed during the Pre-Construction Ecological Walkover.

Environmental Control Measures – Consultation

Prior to their commencement, all works impacting on otters and their breeding or resting places should be agreed and documented in consultation with the relevant statutory authority:

- National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government.

Such consultation should take place at the earliest opportunity in order to avoid any delay in obtaining licences or disruption to the works programme.

Environmental Control Measures – Compliance with relevant Licences, Approvals and Legislation

All works impacting on otters and their breeding or resting places should be carried out in accordance with relevant licences, approvals and legislation.

- Otters, along with their breeding and resting places, are protected under the provisions of the Wildlife Act, 1976, as amended by the Wildlife (Amendment) Act, 2000. Otters have additional protection because of their inclusion in Annex II and Annex IV of the Habitats Directive, which is transposed into Irish law in the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997), as amended.

- The removal of otters from affected holts, and the subsequent destruction of these holts, must be conducted under a Regulation 25 derogation under the 1997 Habitats Regulations. The National Parks and Wildlife Service (NPWS), of the Department of the Environment, Heritage and Local Government, is responsible for processing these licences. An application for a Regulation 25 derogation should be submitted to the NPWS along with the relevant ecological information from otter surveys. At least three weeks is normally required to process a derogation application. Conditions will usually be attached to each derogation granted in respect of otters and operations at holts or in their vicinity. Closure of holts requires a monitoring period to ensure that there is no current otter activity at the holt. Derogations may not be provided by the NPWS for the closure of holts containing a breeding female or young otters. Derogations may also be required for any works likely to cause disturbance (e.g. piling and blasting) to active breeding holts (when present within c.150m of a scheme).

Environmental Control Measures – Otter Holt Protection

- A map (at an appropriate scale) should be attached to the Environmental Operation Plan showing the general locations of otter holts and otter crossing-points, where applicable. The map should be available to Site Agents, Forepersons and Monitoring Staff.

Site-specific Method Statements – Otters

Site-specific Method Statements should be drawn up for the following Works:

- The exclusion of otters from holts;
- The destruction of holts;
- The construction of otter ledges on culverts and bridges;
- The construction of otter underpasses;
- The construction of mammal resistant fencing;
- The construction of culverts and bridges known to contain otters, and
- Site works in the vicinity of otter holts.

Environmental Control Measures – Post-Construction Monitoring and Mitigation

- Quarterly monitoring of mitigation measures should take place after completion of construction. Monitoring should be continued for at least one year after construction work ceases.

Responsibility

The Environmental Manager is responsible for ensuring:

- That third party consultations take place;
- Liaison with the Designated Licence Holders and ensuring that the removal of otters from affected holts and subsequent destruction of these holts is conducted under licence;
- That a pre-construction survey is carried out;
- Environmental Control Measures are drawn up;
- Site Agents and Forepersons are made aware of requirements, and
- Post-mitigation monitoring takes place.

References

Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (National Roads Authority, 2006).

Figure 1-3 Example of an Environmental Control Sheet for Otters. Source Box 19 *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

1.8 Site Specific Method Statements

A Method Statement may be defined as a statement of the construction methods and resources to be employed in executing construction work. Method Statements can cover numerous works activities, however where there is a risk of environmental damage, site- specific method statements must be prepared for the construction works. The Method Statement should be prepared by the Contractor with assistance from the Site Environmental Manager who will identify which elements of the works have the potential to significantly impact the environment.

The Method Statement should refer to relevant Environmental Control Measure Sheets and incorporate relevant Environmental Control Measures. The Method Statement should include:

- The proposed method of construction and how impacts shall be mitigated;
- Contingency plans and emergency plans to limit damage caused by accidents, spills, or other unforeseen events; and
- Notification procedures to the relevant Authorities, Utilities and Service Providers.

There may be a requirement for method statements to be reviewed and/or approved by third party consultees (where applicable) prior to their finalisation.

A template of the site-specific method statements is provided in Figure 1-4 below.

Site-Specific Method Statement: Demolition of the Building at Chainage 13+00 LHS	
A. Resource Required	
Labour	
1	Site Agent
2	Forepersons
3	Machine Operators (as necessary)
4	General Operatives
5	Safety Officer
6	Environmental Manager
Plant & Equipment	
1	Teleporter with cradle.
2	20/30 tonne excavators.
3	Dumptruck (as necessary).
B. Material & Supplies	
Not Applicable.	

C. Staff Responsibilities	
Position Title	Responsibility
Environmental Manager	
Site Agent	
Foreperson	
Safety Officer	Ensure compliance with the Health and Safety Plan.
D. Environmental Control Measure Sheets	
Environmental Control Measure Sheet – Wildlife (General)	
Environmental Control Measure Sheet – Bats	
Environmental Control Measure Sheet – Trees and Hedgerows	
E. Health and Safety Risk Assessment	
F. Method	

	Operation	Person Responsible	Signature	Date	Comment
1.	Obtain copy of Licence issued by NPWS.	Environmental Manager	Environmental Manager	01/06/06	Copy of licence received from the Engineer. See attached licence.
2.	Main contractor's Engineer to survey and inspect the building to ensure that no hazardous materials are present and that all services are disconnected.	Site Engineer	Site Engineer	01/06/06	No hazardous materials were present. All services have been disconnected. See survey report attached.
3.	Ensure that Scientific Agent (listed in the Licence) examines building prior to demolition.	Environmental Manager	Environmental Manager	02/06/06	Building contained roosting bats as indicated in the EIS. Bats are inaccessible and the exclusion procedure must be followed. Scientific Agent
4.	Install one-way valves over suitable access points as per the advice of the Scientific Agent.	Environmental Manager	Environmental Manager	02/06/06	One-way valves installed in accordance with best practice. Scientific Agent
5.	Allow a sufficient period for bats to be excluded from the building as per the advice of the Scientific Agent.	Environmental Manager	Environmental Manager	06/06/06	Four day exclusion period required in accordance with best practice. Scientific Agent

Figure 1-4 Example of a Site-Specific Method Statement for Demolition Works. Source: TII's *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

1.9 Environmental Awareness Training

1.9.1 EOP, EIAR, NIS and Contractual Requirement Briefing

The Site Environmental Manager will brief the Contractor's senior personnel, namely the Project Manager, Site Manager, Design Engineers, Site Agents, PSCS and any other key personnel on the EOP and the Environmental Commitments/Requirements that must be met during the Construction Phase.

1.9.2 Site Induction

All employees and sub-contractors involved on site will be given a comprehensive induction prior to commencement of the works. The environmental training and awareness procedure will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

This environmental training can be run concurrently with safety awareness training.

Training will include:

- Overview of the Environmental Policy and Construction Environmental Management Plan, goals and objectives;
- Awareness in relation to risk, consequence, and methods of avoiding environmental risks as identified within the Register of Aspects and with the planning conditions;
- Awareness of roles and individual environmental responsibilities and environmental constrains to specific jobs;
- Location of and sensitivity of Special Area of Conservations, Special Protection Areas, protected monuments, structures etc; and
- Location of habitats and species to be protected during construction, how activities may affect them and methods necessary to avoid impacts.

A record will be kept of a signed register on the project files of all attendees of the environmental induction.

Toolbox talks based on specific activities being carried out will be given to personnel by the nominated project representative. These will be based on specific activities being carried out and will include environmental issues particular to the project, including the impact on bird populations and water quality namely:

- Oil/Diesel spill prevention and safe refuelling practice;
- Storage of materials including oil/diesels and cement;
- Emergency response processes used to deal with spills;
- Minimising disturbance to wildlife;
- Emergency response to include water pollution hotline to the EPA/Irish Rail for regulator response;
- Identification of registered/accredited spill cleanup company for oil etc; and

- Consideration of importance of containment of vehicle washing, containments of concrete /cement/grout washout etc, bank protection using hessian to prevent excessive scour and mobilisation of suspended solids, maintenance of vegetation corridors etc.

1.9.3 Specific Training and Awareness

A project specific training plan that identifies the competency requirements for all personnel allocated with environmental responsibilities will be produced by the Contractor. Training will be provided by the Contractor to ensure that all persons working on site have a practical understanding of environmental issues and management requirements prior to commencing activities. A register of completed training is to be kept by the site Environmental Manager. The Site Manager will ensure that environmental emergency plans are drawn up and the Site Environmental Manager will conduct the necessary training/inductions.

1.10 Communication

1.10.1 External Communication

A Stakeholder Management and Communication Plan (SMCP) will be prepared by the contractor. The Employer will appoint a Public Liaison Officer, or equivalent, who will be consulted in the preparation of the Plan as well as its maintenance and implementation. The SMCP will provide the means of the stakeholder and members of the public to communicate with the project team, and for the project team to communicate relevant information of the scheme.

The principal component of a Stakeholder Management and Communication Plan will include:

- Details of general construction process / phasing will be communicated to the relevant stakeholders and members of the public prior to implementation to ensure local residents and businesses are fully informed of the nature and duration of construction works: and
- Details of a contact name and number for any complaints that may arise during such works.

A complaints register will be developed as part of the Plan to efficiently record any complaints made. Environmental related complaints will be initially directed to the Site Environmental Manager. A template for an environmental complaints register is provided in Figure 1-5 below as an example.

Environmental Complaints Register

Form 4

Title:	Environmental Complaints Register				
Page:	Page 1 of 1	Ref. No.:		Issue No.:	
Issued by:		Approved by:		Date:	

Date	__/__/__
Complaint received by:	
Complaint recorded by:	
Complaint made by:	
Name:	
Address:	
Telephone:	
Email Address:	
Nature of the complaint:	
Weather conditions at time of complaint:	
Complaint reported to:	
Action taken:	
Was there a follow up call to complainant?	YES/NO
Use additional sheets if required	

Figure 1-5 Template of an Environmental Complaints Register. Source: Form 4 in *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

1.10.2 Internal Communication

Environmental issues and performance aspects will be communicated to the workforce on a regular basis. Weekly project meetings, which follow a set agenda incorporating Environment, will be held alongside overall management meetings.

All staff and sub-contractors involved in all phases of the project will be encouraged to report environmental issues.

The PSCS will maintain contact with the PSDP throughout the works to communicate any health and safety related issues. The PSDP will prepare a written safety file appropriate to the characteristics of the project, containing relevant health and safety information, to be taken into account during any subsequent construction work following completion of the project.

1.11 Inspections, Auditing and Monitoring Compliance

1.11.1 Inspections

The appointed Site Environmental Manager will carry out environmental inspections at appropriate intervals. The Site Environmental Manager will be accompanied by a qualified and accredited environmental specialist (ecologists, landscape architects and noise specialists etc.) when appropriate and where required during inspections.

The Site Environmental Manager will append the reports from environmental inspections to this EOP.

1.11.2 Monitoring

The Railway Order Consent may require the execution of certain types of monitoring e.g. related to noise, vibration, water quality air quality, etc.

The appointed Site Environmental Manager will prepare a schedule of monitoring required, detailing the type of report to be prepared and to whom it should be send to. All the monitoring is to be carried out by competent experts. A template of a monitoring schedule is provided in Figure 1-6 below as an example.

Monitoring Schedule

Form 5

Title:	Monitoring Schedule				
Page:	Page 1 of 1	Ref. No.:		Issue No.:	
Issued by:		Approved by:		Date:	

Location	Parameters	Frequency	By whom	Report type	Distribution to

Figure 1-6 Template of Monitoring Schedule. Source: Form 5 in *TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*

1.11.3 Audits

1.11.3.1 Audit by the Environmental Manager

The EOP will be audited by the Site Environmental Manager in conjunction with the Site Manager annually or as agreed at the start of the contract to ensure that the appointed Contractor is in compliance with all environmental commitments/requirements. Should there be a need to revise the EOP, the Site Environmental Manager will make all the necessary changes to the EOP and inform the key personnel of such changes. The EOP should only be revised by the Site Environmental Manager and approved by the Site Manager.

A template containing an auditing format is provided in Figure 1-7 below as an example.

Audit Format

Form 6

Title:	Audit Format				
Page:	Page 1 of 1	Ref. No.:		Issue No.:	
Issued by:		Approved:		Date:	

No.	Query	Outcome	Action required	Date for completion
1	Has the EOP been created, maintained and implemented?			
2	Has the EOP being submitted to the Engineer at appropriate intervals?			
3	Has an Environmental Manager, having sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken, been appointed by the main contractor?			
4	Have General Project Details been included within the EOP?			
5	Have Contact Details of relevant persons and bodies been incorporated and updated within the EOP?			
6	Has an up-to-date and appropriate Reference Document Section been included within the EOP?			
7	Has the main contractor's organisational structure been illustrated within the EOP?			
8	Have duties and responsibilities been satisfactorily assigned under the EOP?			
9	Have all the Environmental Commitments and Requirements been identified and documented?			
10	Have all Environmental Control Measures necessary to comply with the Environmental Commitments and Requirements been developed and documented?			
11	Have all site-specific Method Statements been developed for Works activity where a risk of environmental damage is present?			
12	Has Environmental Awareness Training been adequately carried out? Are records of training available and attached to the EOP?			
13	Is the complaints register being filled in?			
14	Do minutes of meetings show environmental issues on the agenda?			
15	Has the Environmental Manager carried out regular environmental inspections? Have the reports of the inspections been appended to the EOP?			
16	Has an appropriate schedule of monitoring been drawn up? Where monitoring falls outside of the range contractually required, has the Environmental Manager initiated and reported on corrective action?			
17	Have the Environmental Manager and Construction Manager audited the EOP on an annual basis?			

Figure 1-7 Template of an Audit Format. Source: Form 6 in TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan

1.11.3.2 Audit by the Employer's Representative

The EOP will be audited by the Employer's Representative to ensure that the Contractor is compliant with the environmental provisions of the Contract Documents.

1.12 Handover of the Final EOP

Two copies of the final and complete EOP should be supplied to the Employer's Representative/ PSDP immediately following the end of the defect's notification period.

Appendix E: Construction and Demolition Waste Management Plan

CONTENTS

1. APPENDIX A5.1 – APPENDIX E: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN (CDWMP)

1.1 Introduction

The Construction and Demolition Waste Management Plan (CDWMP) ensures that the management of any wastes arising on-site during the construction and demolition phases of the DART+ Coastal North Project ("the Proposed Development") complies with the provisions laid out in the Waste Management Act, 1996, as amended. The CDWMP will also ensure that optimum levels of reduction, re-use and recycling are achieved.

The CDWMP will be further developed and implemented by the Contractor accordingly, and will align with the relevant guidance documents together with local and national policies as listed in Appendix A19.1 of the Environmental Impact Assessment Report (EIAR).

The CDWMP will include, as a minimum, the following:

- Details of waste storage (i.e., skips, bins, containers) to be provided for different waste types and collection times;
- Details of where and how materials shall be disposed of (i.e., landfills or other appropriately licensed waste management facilities);
- Details of storage areas for waste materials and containers; and
- Details of how unsuitable excess materials will be disposed of, where necessary.

Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects were published by the Environmental Protection Agency (EPA) in 2021 (EPA, 2021) and supersede the guidelines published by the Government in 2006.

The replacement guidelines reflect current waste legislation and policy including 'A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025' (DECC, 2020). Since the publication of the 2006 guidelines, waste management legislation and policy have evolved towards prioritising waste prevention and life-cycle thinking through an increased emphasis on waste prevention and the promotion of core circular design and construction principles in line with the EU Circular Economy Action Plan under the EU Green Deal.

The guidelines address the best practice approach for the following phases of a project:

- Prior to Construction – including the stages of design, planning and procurement in advance of works on site; and
- During Construction – relating to the effective management of resources and wastes during construction or demolition operations.

The principal objective of sustainable resource and waste management is to use material resources more efficiently, to re-use, recycle and recover material and to reduce the amount of waste requiring final disposal. The value of products, material and resources should be maintained in the economy for as long as possible such that the generation of waste is minimised.

To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy (refer to Image 1-1).

The Department of Environment, Climate and Communication's (DECC) A Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020 – 2025 (DECC, 2020) notes that:

> *"In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value."*

The EU Circular Economy Action Plan (European Commission (EC), 2020) notes that:

> *"the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade."*

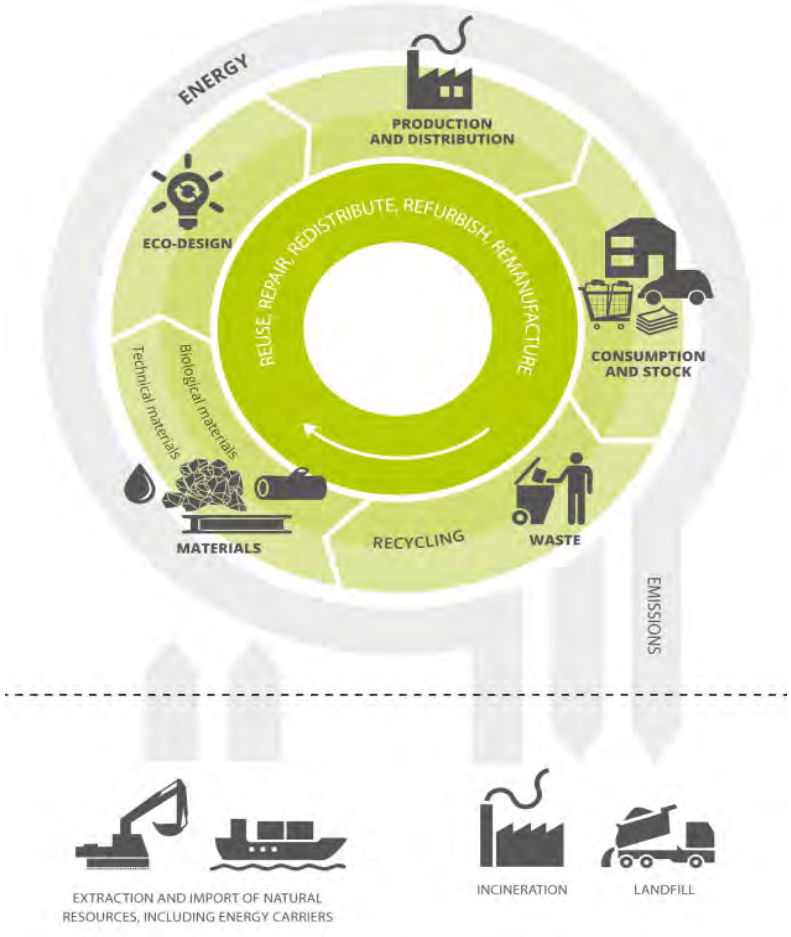

Image 1-1 A simplified model of the circular economy for materials and energy (European Environment Agency, 2016)

1.2 Waste Management Strategy

Where residual waste generation is unavoidable, it will be dealt with in a way that follows the waste hierarchy (as illustrated in Image 1-2) and set out in Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives on waste as amended by Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 ("the Waste Framework Directive").

The European Commission has adopted "A new Circular Economy Action Plan For a cleaner and more competitive Europe" (EC, 2020) - one of the main blocks of the European Green Deal, Europe's new agenda for sustainable growth. The Circular Economy Action Plan identifies construction as a key area where there are opportunities for resource efficiency and circularity.

The Irish Waste Action Plan for a Circular Economy (DECC, 2020) outlines the commitment in the Programme for Government to implement a new National Waste Action Plan providing new waste policy and giving direction to waste planning and management in Ireland. The Plan includes the target of preparing for reuse, recycling, and other material recovery (including beneficial backfilling operations using waste as a substitute) of 70% by weight of Construction and Demolition non-hazardous waste (excluding natural soils & stone).

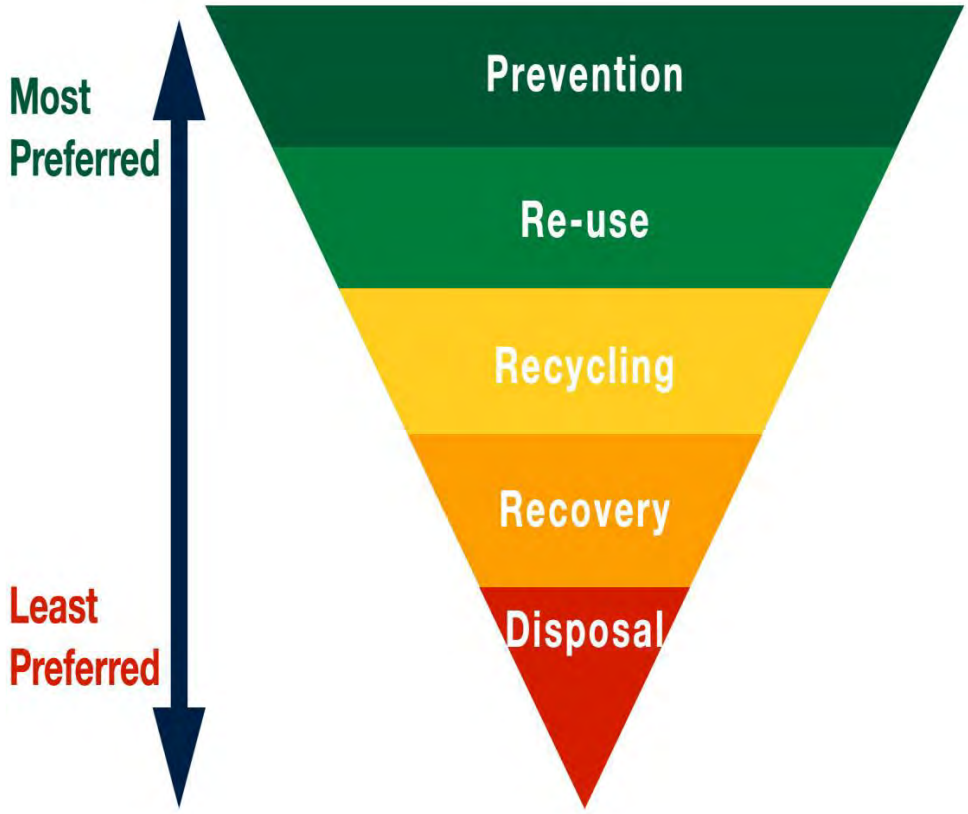

Image 1-2 Waste hierarchy

The Department of Environment, Climate and Communications published the 'Whole-of-Government Circular Economy Strategy 2022-2023' (DECC, 2021) in December 2021. The Strategy aims to support and implement measures that significantly reduce Ireland's circularity gap, so that Ireland's rate is above the EU average by 2030.

In July 2022, the Circular Economy and Miscellaneous Provisions Act 2022 was signed into law (Government of Ireland, 2022). This Act aims to place the Strategy, and the commitment to a circular economy, on a clear statutory footing. It underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act is a key step in the successful transition of Ireland's economy to a circular economy and is evidence of Government's commitment to the achievement of that goal.

The Contractor shall develop and implement a plan to facilitate reuse and recycling and to divert waste from landfill. The content and headings used shall comply with the EPA Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects (EPA, 2021).

Following appointment, the Contractor will be responsible for detailing and maintaining this CDWMP for implementation and updating it as appropriate.

1.2.1 Material Management

The Contractor shall implement the following measures to prevent waste, facilitate recycling and minimise waste disposal during the Construction Phase:

- Where waste generation cannot be avoided, waste disposal will be minimised;
- Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Development;
- Possibilities for reuse of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use;
- Where non-hazardous excavation material cannot be reused within the Proposed Development works, material will be sent for recycling or recovery;
- Excavations of made ground will be monitored by an appropriately qualified person to ensure that any hotspots of possible contamination are properly identified, with the contaminated material segregated and disposed of appropriately;
- Any identified contaminated material will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross contaminate clean soils elsewhere throughout the site;
- The potential risk to site users and member of the public from contaminated dust during the Construction Phase will be managed using standard health and safety measures as outlined in '*Asbestos-containing Materials (ACMs) in Workplaces: Practical Guidelines on ACM Management and Abatement*' (HSA, 2013). This document states that "removal of asbestos from contaminated soil will require a specialist asbestos Contractor for any friable asbestos to be removed" and "*a risk assessment by an independent competent person should determine the most appropriate control measures and remediation strategies*" (HSA, 2013);

- The site will be maintained to prevent litter and regular litter picking will take place throughout the site;
- 'Just-in-time' delivery will be used to minimise material wastage;
- Paints, sealants and hazardous chemicals will be stored in secure, bunded locations;
- All staff on-site will be trained on how to minimise waste (i.e., training, induction, inspections and meetings);
- Materials on-site will be correctly and securely stored;
- Where possible, metal, timber, glass, and other recyclable material will be segregated and removed off site to a permitted / licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation;
- On-site office and food waste arising will be source separated at least into dry mixed recyclables, biodegradable and residual wastes;
- Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate;
- Segregated skips will be used within a designated waste segregation area to be located in the on-site Construction Compound (particularly for hazardous, gypsum, metal, timber, inert waste and general waste);
- The appointed Contractor will record the quantity in tonnes and types of waste and materials leaving the site during the Construction Phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered, which is recycled and which is disposed of;
- Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility;
- The appointed Contractor will ensure that any off site interim storage facilities for excavation material have the appropriate Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence in place;
- Where Regulation 27 notifications are required in relation to the Proposed Development, the appointed Contractor will complete and submit these Regulation 27 notifications to the EPA for by-product reuse; and
- The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence).

1.2.2 Waste Auditing

The appointed Resource Manager (RM – refer to Section 1.7) will arrange for audits (including pre-demolition audits) to be completed on the Proposed Development prior to any construction works commencing and during the construction works. Audits will be of all existing structures and hard surfaces within the Proposed Development site which will be impacted by the works. The audits will identify and quantify the key materials associated with the Proposed Development, outline potential reuse and recycling applications for these materials, identify reuse, recycling and landfill diversion targets for these materials and identify potential local recovery and recycling facilities to which these materials may be delivered.

The Contractor will record the quantity, in tonnes, and types of waste and materials leaving the development site during site clearance, demolition, excavation, and construction of the Proposed Development. Quantities will be regularly reviewed and compared with targets set during initial audits (including the pre-demolition audit).

The name, address and authorisation details of all facilities and locations to which waste and materials from the Proposed Development are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility and the date of the waste movement. Records will show material which is recovered and disposed of.

1.3 Waste and Recycling Targets and Opportunities

The Contractor's CDWMP, waste handling and proposed construction methods shall aim to achieve the following targets:

- The Contractor shall be responsible for sourcing materials for the construction of the Proposed Development. These materials must comply with specific quality requirements;
- The Contractor will endeavour to procure the highest recycled steel content that is available for the particular usage subject to engineering constraints;
- All aggregates shall be secondary aggregates with virgin aggregates employed only where secondary aggregates do not satisfy structural requirements and/or are unavailable;
- Local suppliers and re-use of materials shall be supported by the Contractor to minimise the environmental impact, cost of transport and to support the local economy in line with the proximity principle;
- Where possible, materials will be re-used/recycled to reduce the procurement of new materials. In accordance with the IÉ Sustainability Strategy 2021-2030, at least 25% of raw material purchases will come from recycled sources; and
- The above actions and others within the IÉ Sustainability Strategy will be implemented as part of the Proposed Development.

The Contractor will seek opportunities, wherever possible, to reduce the amount of waste generated on site and maximise the potential for recycling materials in accordance with the waste hierarchy through the following:

- Storing materials in designated areas and separate from wastes to minimise damage;
- Returning packaging to the producer where possible;
- Segregating construction and demolition wastes into reusable, recyclable and non-recyclable materials;
- Reusing and recycling materials on site during construction;
- Recycling other recyclable materials through appropriately permitted/licensed Contractors and facilities; and
- Disposing of non-recyclable wastes to licensed landfills.

1.4 Waste Disposal Licensing

1.4.1 Licensing Requirements

Waste from construction will be delivered to authorised waste facilities in accordance with the Waste Management Act, 1996, as amended.

The following authorisations are applicable:

- Certificates of Registration (CoR) from the Local Authority (issued to private sector);
- Certificates of Registration (CoR) from the EPA (issued to Local Authority);
- Waste Facility Permit (WFP) from the Local Authority; and
- Waste or Industrial Emissions Licence from the EPA.

A list of currently authorised (CoR or WFP) waste sites in each Local Authority is available on the following website: http://facilityregister.nwcpo.ie/.

Lists of sites currently licensed by the EPA (Industrial Emissions or Waste Licence) are available on the following websites:

- https://epawebapp.epa.ie/terminalfour/waste/index.jsp (for Waste Licensed sites);
- https://epawebapp.epa.ie/terminalfour/ippc/index.jsp (for Industrial Emission Licensed waste facilities).

An up-to-date list of all waste facilities to which waste from the site will be delivered will be maintained on site and updated by the Contractor. Copies of valid facility Certificates of Registration, Waste Facility Permits and Waste Licences will be held on site by the Contractor.

1.4.2 Exclusion from Legislation

The European Union (Waste Directive) Regulations 2011 (SI. 126 of 2011) (Regulation 4) substitutes new Sections 3 and 4 into the Waste Management Act 1996 (as amended) ("the 1996 Act") and Section 3(1)I of the 1996 Act now provides that the 1996 Act shall not apply to:

> *"uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which is was excavated."*

1.4.2.1 Regulation 27

Surplus excavation material may be declared a by-product under (under Regulation 27 of the EC Waste Directive Regulations, 2011-2020) for reuse in one or more known construction projects.

By-product notifications to the EPA provide an opportunity for reuse of surplus clean soil and stone material arising from construction activity. This can apply to locations other than authorised recovery facilities e.g., quarries operating under planning permission, parks or other developments requiring earthworks and importation of clean soil and stone. This option can bring significant economic benefits while facilitating beneficial re-use of by-products. This plays a role in Ireland's implementation of Circular Economy principles.

A Regulation 27 notification to the EPA under Regulation 27 of the EC Waste Directive Regulations, 2011-2020 is required to achieve by-product status for soil and stones. It is noted that the use of Regulation 27 is limited to clean soil and stone, and it must be demonstrated to the EPA that the following four conditions are met:

- Further use of the soil and stone is certain;

- The soil and stone can be used directly without any further processing other than normal industrial practice;
- The soil and stone are produced as an integral part of a production process; and
- Further use is lawful in that the soil and stone fulfil all relevant requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Where it is proposed to use a Regulation 27 EPA notification in relation to excavation material from the Proposed Development, the Contractor is responsible for submission of the Regulation 27 notification to the EPA. Where it is proposed to use soil from off-site with a Regulation 27 notification, the Contractor is responsible for carrying out any necessary due diligence regarding the material and ensuring that all EPA guidelines relating to that Regulation 27 notification have been complied with before the soil is imported into the site. Where feasible, appropriate, and available Regulation 27 materials arising from other sites will be used in the development of this site.

The Contractor is responsible for ensuring all applicable regulatory requirements under waste, planning and other laws are complied with prior to movement of excavation material.

The EPA has produced the following guidance to assist the completion of by-product notifications:

- By-product – Guidance Note (May 2020) – A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No 126 of 2011); and
- Guidance on Soil and Stone By-products (June 2019) (in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011).

It is noted that the European Communities (Waste Directive) Regulations 2011 (S.I. No 126 of 2011) were amended *inter alia* by the European Union (Waste Directive) Regulations, (S.I. 323 of 2020).

1.4.2.2 Soil Recovery at Sites Holding Waste Facility Permits or EPA Waste Licences

Where removal of wastes from the Proposed Development is unavoidable it will be delivered by the contractor only to facilities which are authorised under the Waste Management Act, 1996 as amended and which hold the appropriate Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence in place.

The Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. 821 of 2007), as amended sets out the classes of waste activity requiring waste facility permits and certificate of registration. The most relevant class of activity in relation to soil recovery facilities is:

Class 5 (Third Schedule, Part 1 of the Regulations) for the *"Recovery of excavation or dredge spoil, comprising natural materials of clay, silt, sand, gravel or stone and which comes within the meaning of inert waste, through deposition for the purposes of the improvement or development of land, where the total quantity of waste recovered at the facility is less than 100,000 tonnes."*

For waste facility permits and certificate of registration the capacity is typically a lifetime capacity, and when reached, the facility typically closes. Waste facility permits and certificates of registration are granted to private operators by local authorities.

EPA licensed waste activities authorised to accept soil and stones for recovery and disposal include soil recovery sites, landfills, transfer stations and materials recovery facilities. These typically handle a larger tonnage of wastes than facilities holding Certificates of Registration or Waste Facility Permits. EPA Waste Licences typically include an annual maximum intake capacity and a maximum lifetime capacity for the licenced facility.

Where the Contractor proposes to deliver excavated materials from the Proposed Development to facilities holding a Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence, the Contractor is responsible for ensuring the authorisation is valid and allows acceptance of the relevant List of Waste Code. A copy of the authorisation will be included in the CDWMP, and evidence will be provided that the proposed facility will have capacity to accept the required quantity of waste from the Proposed Development.

1.5 Proposed Construction Methodology and Material Usage

1.5.1 Site Preparation

The construction of the Proposed Development will require site clearance as part of the Proposed Development. As outlined in Chapter 5 (Construction Strategy) of Volume 2 of the EIAR, vegetation such as trees, climbing plants, shrubs, or vines are required to be removed at some locations prior to local works commencing. Site clearance to remove any unwanted materials and equipment may also be required.

This will also include certain utility diversions and protection depending on the size, number and nature of the utilities impacted by the construction of the Proposed Development. Chapter 5 (Construction Strategy) notes that specific utility diversions include surface water drains, foul and combined sewers, watermains, overhead and underground electricity cables, gas mains and telecommunication and cable services.

The Contractor's update of the CEMP will include the following:

- The extent of the areas to be cleared and the potential types and volumes or arisings;
- The location of any structures to be demolished;
- Statutory requirements; and
- Specific environmental requirements and seasonal requirements.

1.5.2 Site Offices and Construction Compounds

As outlined in Chapter 5 (Construction Strategy), Construction Compounds are required at specific site locations, such as the proposed substation locations, as well as at locations where structural works are required such as at bridges. There is also a need for Construction Compounds to support line-wide works, known as line-wide compounds. These Construction Compounds will support activities such as the installation of the track, under track crossings (UTXs), overhead line equipment, signalling, communications, and power systems.

Construction Compounds will only be in place for the duration of the Construction Phase of the Proposed Development. The location, size and suitability of the compound will ultimately be at the discretion of the Contractor once they are located within the Proposed Development boundary and site access is approved by the Local Authority.

The location and layout of the Construction Compounds selected by the Contractor will however have to incorporate the protection and mitigation measures outlined in the EIAR and conform to the requirements outlined in the planning conditions.

1.5.3 Material Quantities

Excavation works will be required for the Proposed Development. Earthworks which are likely to generate large quantities of materials are the excavation activities for the substations required for the electrification of the rail-line and upgrade works to the existing Drogheda, Clongriffin, Malahide and Howth Junction & Donaghmede Stations. The suitability of excavated materials will be assessed in accordance with the requirements of TII Specification for Roadworks and NSAI standards and reused wherever possible.

For more details on the proposed excavation activities refer to Chapter 4 (Description of the Proposed Development) and Chapter 5 (Construction Strategy) of Volume 2 of the EIAR. Further information on waste and resource management, including estimated quantities of materials produced and imported, lists of waste permitted and licenced facilities within the regions surrounding the Proposed Development, is available in Chapter 19 (Material Assets: Resources and Waste Management) in Volume 2 of the EIAR. This chapter also identifies potential for reuse and recycling of materials and materials optimisation.

1.5.4 Demolition Plan

A demolition plan must be prepared in advance for each structure to be demolished. The plan will be developed by the main Contractor and will include the following:

- Details of ground removal and/or backfilling;
- Details of the principal materials of construction and the plan for handling such materials, including both non-hazardous and hazardous materials;
- The procedures for the demolition of each structure, with a detailed sequence of demolition;
- Protection and control measures; and
- Methods for the handling and disposal of waste such as the means of transport of waste material from the site, the time and frequency of waste material movement offsite and a methodology for recording the materials generated and disposed of. All waste materials removed from site must be collected by a licenced waste collection contractor and delivered to a licensed waste facility, as required under the Waste Management Act 2006, as amended.

1.5.5 General Construction and Demolition Works

Construction works, site offices and temporary works facilities will generate construction and demolition waste. Construction waste can vary significantly from site to site but typically would include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Bituminous mixtures;
- Metals;
- Wood; and
- Other.

The hazardous waste streams which could arise from construction activities include the following:

- Waste electrical and electronic equipment (WEEE) components;
- Batteries;
- Asbestos;
- Wood preservatives;
- Adhesives;
- Paints;
- Liquid fuels; and
- Contaminated soil.

An overview of the methods to manage the primary waste streams expected is presented below. The main types of construction waste presented will be:

1.5.5.1 Excavated Material

In instances where short-term temporary storage is unavoidable, the storage method will inform the potential use due to the potential for certain types of material to degrade if left uncovered (including topsoil or mud).

1.5.5.2 Concrete

Waste concrete will arise during the Construction Phase of the Proposed Development. It is proposed that segregation facilities will be provided to ensure that recovery and recycling of concrete will be prioritised. Source segregation containers for residual concrete waste will be located at the waste storage area for subsequent separation and recovery at a remote facility. This will ensure the reduction of energy and carbon dioxide emissions by avoiding disposal which in turn reduces project costs.

1.5.5.3 Metals

Metal waste has a significant scrap value. Although it is now common practice for sites to segregate metals for reuse and recycling, there are still sites where metal is thrown away with residual waste. One of the primary sources of metal waste is steel reinforcement. Wastage of steel reinforcement will be reduced by ordering made to measure steel from the manufacturer and detailed scheduling of all reinforced concrete structural elements.

Skip hire companies may provide free skips for the storage of scrap metal on sites and this will be investigated prior to construction commencing. When metal storage containers are full they will be removed by the waste storage Contractor and sent to a licenced metals recycling facility.

1.5.5.4 Timber

Timber waste will be stored separately as it is readily contaminated by other wastes and if it is allowed to rot, it will reduce the recyclability of other stored wastes. Any pallets will be returned to the supplier for re-use. Offcuts and trimmings will be used in formwork where possible. A container for waste wood will be covered where possible and will be placed in the waste storage area. The waste wood will be collected by a licenced waste collection contractor who will transport it to a wood recycling facility for chipping.

Treatment of timber with chemicals and the overuse of nails will be minimised and avoided as this will make it difficult to reuse/recycle the timber afterwards. The utilisation of reclaimed timber products will also be investigated.

1.5.5.5 Packaging and Plastic

Packaging waste can become a major problem on construction sites. Double handling will be avoided by segregating packaging wastes immediately after unwrapping. Many suppliers are now prepared to collect their own packaging for recycling, and this will also be investigated prior to works commencing.

It is intended that, where possible, materials with recycled packaging will be purchased. Waste packaging will be segregated and stored in separate containers, preferably covered, in the waste storage area for collection by the waste management collection Contractor and onward distribution to packaging recycling facilities.

1.5.5.6 Blocks and Bricks

The careful storage of these raw materials will significantly reduce the volume of these wastes arising on site. The most likely wastes produced will be off-cuts, trimmings and waste arising from breakages. Every effort will be made to use broken bricks and off-cuts.

1.5.5.7 Hazardous Waste

Demolition and excavation material that is deemed hazardous will be treated at an authorised facility either in Ireland or abroad. Export of hazardous waste from the Proposed Development outside of the State is subject to a Europe-wide control system founded on Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (known as “the Transfrontier Shipment Regulations”), as amended. This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007 (S.I. 419 of 2007), as amended, which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. In 2021 in Ireland, 466,941 tonnes of hazardous waste was generated and of this, 48% was exported for treatment (EPA, 2023). The above procedures will be applied to any hazardous waste generated during the Construction Phase. Export of hazardous waste from site to outside of the State will comply with the procedures set out in this legislation.

Hazardous liquid waste arising from the construction process will require careful handling. Oils, paints, bitumen, adhesives and chemicals will be kept in a separate contained storage area which will be locked when not in use. Hazardous liquids will be stored at least 10m from any watercourses. Lids will be kept on containers in order to avoid spillage or waste by evaporation. Waste oils, paints and chemicals, including the containers, will require careful handling and disposal. These will be stored in a containment tray with a capacity to contain 110% of the volume of the largest container.

Fuels and chemical will be stored in double-skinned containers or within a bund, i.e., an impervious structure with the capacity to contain 110% of the volume of the largest tank stored within it. All containers will be carefully labelled.

1.5.5.8 Food Waste

Site staff generate food waste and packaging waste. Designated receptacles will be provided to allow for the segregation and storage of individual waste streams. These will include receptacles for food waste (i.e., brown bin for waste foods and peelings), dry mixed recyclables, (i.e., green bin for packaging, plastics, metals, wood, paper, cardboard and tetrapack) and residual waste (i.e., black bin for mixed food and packaging waste). Separate receptacles for the recyclable fractions may be provided such as plastics, metals and glass. This will be detailed in consultation with the selected waste management Contractor.

1.5.5.9 Other Wastes (Residual)

Waste material other than those outlined above can constitute a significant proportion of the total waste generated by a construction site. This waste is normally made up of residual, non-recyclable waste such as soiled paper, cloth, cardboard or plastics, as well as food waste and general waste found on the site, including plastic bottles, bags, cans etc. Given the heterogeneous nature of this material, it is most important that residual waste is kept separate from the other waste streams to avoid contamination. This material will be stored in a dedicated container in the waste storage areas.

Container size and collection frequency will be assessed with the waste management Contractors as works proceed. All residual wastes will be dispatched to a suitably licensed facility for disposal. Other construction and demolition waste material will be collected in receptacles with mixed construction and demolition waste materials for subsequent separation and disposal at a segregation facility.

1.6 Costs of Waste Management

As required by the Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects (EPA, 2021), this section addresses costs of waste management.

While landfill disposal has been the most commonly used method for waste management in Ireland in the past, waste to energy incinerators are also now in operation at Poolbeg, Dublin 4 and in Carranstown, County Meath.

Typically, the current cost of disposal of waste to landfill in Ireland exceeds €170 per tonne. In accordance with the Waste Management (Landfill Levy) Regulations 2015 (S.I. 189 of 2015) as amended, the 'landfill levy' is €75 per tonne for waste disposed to landfill. Disposal of hazardous waste can cost from €350 per tonne upwards.

In addition to landfill operator fees and landfill levies there are additional costs included in the 'true cost of resource management' including:

- The purchase cost of waste materials (including imported soil);
- Handling costs;
- Storage and transportation costs; and
- Revenue generated from sales.

Therefore, in order to reduce costs associated with waste management, surplus materials should be reused and recycled, where possible and materials should be carefully stored and handled to minimise risk of damage.

1.7 Assignment of Responsibilities

Copies of the CDWMP will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the CDWMP and informed of their responsibilities.

The nominated Resource Manager (RM) responsible for implementation of this CDWMP will be identified prior to construction commencement. The RM will be responsible for informing Contractor staff and subcontractors of content of the CDWMP and for maintaining and keeping the records set out in Section 1.9. In the event of the RM leaving the project team, the Contractor will nominate a suitable replacement.

The RM will be responsible for conducting ongoing resource audits at the site during construction. The RM shall ensure that where training is required regarding the handling and management of wastes on site that this is provided to staff as required.

1.8 Training

In addition to ensuring that all site personnel receive copies of the CDWMP, the RM will also include the CDWMP in site induction training and toolbox talks, where required. All site personnel will be instructed about the objectives of the plan and informed of their responsibilities as a result of its provisions. Where source segregation and material re-use techniques apply, each member of staff will be given instructions on how to comply with the CDWMP. Site notices will be designed to reinforce the key messages within the plan and will be displayed prominently for the benefit of staff.

1.9 Waste Records

When establishing the system for managing the details of all arisings, movement and treatment of construction and demolition waste in the CEMP, the use of electronic tools should be considered to provide for convenient recording of information in a useful format such as “Smart – waste”.

The Contractor will be required to arrange for full details of all arisings, movements and treatment of construction and demolition waste to be recorded during all stages of the Proposed Development. Each consignment of construction and demolition waste removed from the site will be documented in the form of a Waste Movement Record form, which will ensure full traceability of the material to its final destination. Separate record forms will be completed in respect of each waste transfer that takes place. The Contractor will also receive printed records from the waste collection Contractor employed, detailing the name, address and authorisation details of all facilities and locations to which waste and materials from the Proposed Development are delivered. These records will record the quantity of waste in tonnes delivered to each facility and the date of the waste movement. They will also identify the material that is recovered and disposed of. All such records will be retained in a designated location and made available for auditing of the CDWMP.

1.10 References

Department of Environment, Climate and Communications (DECC) (2020). A Waste Action Plan for a Circular Economy - Ireland's National Waste Policy 2020-2025.

Department of Environment, Climate and Communications (DECC) (2021). Whole-of-Government Circular Economy Strategy.

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

EPA (2023). Hazardous Waste Statistics for Ireland. Latest Reference Year: 2023. Available from https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/hazardous/ [Accessed: June 2023].

European Commission (EC) (2020). EU Circular Economy Action Plan. A new Circular Economy Action Plan for a Cleaner and More Competitive Europe.

Health and Safety Authority (HSA) (2013). '*Asbestos-containing Materials (ACMs) in Workplaces*', Practical Guidelines on ACM Management and Abatement.

EC (2016). Construction and Demolition Waste Management Protocol.

Government of Ireland (2022). Circular Economy and Miscellaneous Provisions Act 2022.

Iarnród Éireann (2021) Sustainability Strategy 2021-2030.

Legislation

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste

Waste Management Acts, 1996 to 2011 and regulations made under the acts.

Waste Management (Collection Permit) Regulations, 2007 (S.I. 820 of 2007) as amended.

Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste

Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007).

Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189/2015).

European Communities (Waste Directive) Regulations 2011 (S.I. No 126 of 2011)

European Union (Waste Directive) Regulations, (S.I. 323 of 2020)

Appendix F: Incident Response Plan

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APPENDIX A5.1 – APPENDIX F: INCIDENT RESPONSE PLAN

1.1 Introduction

This Incident Response Plan (IRP) describes the procedures, lines of authority and processes that will be followed to ensure that incident response efforts are prompt, efficient, and appropriate to particular circumstances. It has been developed to provide the information that each employee may need in order to respond to an emergency and to handle it effectively.

1.2 Objective of the Plan

The primary objective of this document is to:

- Ensure the health and safety of workers and visitors at and in proximity to the site;
- Minimise any impacts to the environment and to ensure protection of the water quality and the aquatic species dependant on it;
- Protect property and operations at the proposed site and to minimise the impact on the continuity of business; and
- Establish procedures that enable personnel to respond to incidents with an integrated multi-departmental effort and in a manner that minimises the possibility of loss and reduces the potential.

1.3 Responsibility

It is the responsibility of the Site Environmental Manager (SEM) to maintain and update this IRP as required.

This IRP will be reviewed on an ongoing basis and amended, as necessary, when one or more of the following occur:

- Applicable regulations are revised;
- The Plan fails in an emergency;
- The project changes in its design, construction, operation, maintenance, or other circumstance in a way that materially increases the potential for impacts on the environment, workers or visitors to the site; and/or; and
- Amendments are required by a regulatory authority.

1.4 Other Plans

Iarnród Éireann has a Major Emergency Plan prepared in accordance with the Government's Major Emergency Management Framework. This plan details the initial contact that should be made in the case of an emergency incident as well as those responsible for following up once an emergency event is declared. This plan will be available to the Contractor and may be referred to during both the construction and operation phases.

1.5 Response Planning

1.5.1 Incident Response Plan

The Contractor's Environmental Operating Plan (EOP) will include an Incident Response Plan, which will detail the controls to be adopted to manage the risk of pollution incidents and procedures to be followed in the event of any pollution incidents.

The Incident Response Plan will include the following, as appropriate:

- Reference to the Method Statements and Management Plans for other construction activities, insofar as they are relevant for the purposes of mitigating against health and safety and pollution incidents;
- Procedures to be adopted to contain, limit and mitigate any adverse effects, as far as reasonably practicable, in the event of a health and safety or pollution incident;
- Details of spill clean-up companies appropriate to deal with pollution incidents associated with the materials being used or stored on site;
- Procedures to be followed and appropriate information to be provided in the event of any incident, such as a spillage or release of a potentially hazardous material;
- Procedures for notifying appropriate emergency services, authorities, the Employer's Representative and personnel on the construction site;
- Procedures for notifying relevant statutory bodies, environmental regulatory bodies, local authorities and local water and sewer providers of pollution incidents, where required;
- Maps showing the locations, together with address and contact details, of local emergency services facilities such as police stations, fire authorities, medical facilities and other relevant authorities; and
- Contact details for the persons responsible on the construction site and within the Contractor's organisation for pollution incident response.

1.5.2 Incident Investigation and Monitoring

The Contractor will investigate and provide reports on any health and safety or pollution incidents to the Employer's Representative, including, as appropriate:

A description of the incident:

- Contributory causes;
- Adverse effects;
- Measures implemented to mitigate adverse effects; and
- Effectiveness of measures implemented to prevent pollution.

The Contractor will undertake appropriate monitoring of the procedures and measures set out in the management plans for construction activities required to prevent health and safety or pollution incidents to ensure they are being adequately implemented.

The Contractor will monitor the effectiveness of the procedures and measures implemented in the event of an incident and the effectiveness of the response procedures set out in the Incident Response Plan to identify any areas where improvement is required.

1.6 Incident Response Planning

The following sets out an example outline for an Incident Response Plan. The contractor will populate the IRP and include for review dates and personnel to which it will be distributed.

<table>
<tr><td colspan="2">Name and address of the Client:
Iarnród Éireann
Iarnród Éireann HQ,
Connolly Station,
Amien Street,
Dublin 1
The contact within the Client organisation: _____ tel no:_____</td></tr>
<tr><td colspan="2">Site Location:
TBC by Contractor when preparing IRP</td></tr>
<tr><td colspan="2">Overview of Activities on Site:
TBC by Contractor when preparing IRP</td></tr>
<tr><td colspan="2">Description of the proposed development and surrounding area:
TBC by Contractor when preparing IRP</td></tr>
<tr><td colspan="2">Potential Incidents:
Potential incidents requiring emergency response procedures include:
Fuel and oil spills;
Road traffic accidents involving chemical or biological spills;
Earth slippages;
Fires;
Extreme rainfall events
Activities resulting in noise and vibration, air pollution, hazardous substances or impacts on water;
Waste management; and
Discharge of effluent
The contractor will update the list of potential incidents based on their proposed construction methods and programme for the DART+ Coastal North an include, as a minimum, the following:
The measures to be taken to avoid or reduce the risk potential;
Procedures to be put in place to deal with the risk;
Person responsible for dealing with incidents;
Procedures for alerting key staff;
Standby/rota systems;
Clearly defined roles and responsibilities;
Names of staff and contractors trained in incident response;
The types and location of emergency response equipment available and appropriate personal protective equipment to be worn;
A system of response coordination;
Off-site support; and,
Particular emergency service or persons to be notified in case of incident.</td></tr>
<tr><td>Date and version of the plan:</td><td>Name and position of person responsible for compiling/approving the plan:</td></tr>
<tr><td>Review Date:</td><td>Date of next review:</td></tr>
</table>

Objectives of the IRP: To ensure works are carried out in such a way as to avoid injury, health hazards or pollution incidents, however, should any such incident occur, procedures and measures will be implemented to contain, limit and mitigate the effects as far as reasonably practicable.		
List of external organizations consulted in the preparation of the IRP: TBC by Contractor when preparing IRP		
Distribution of the IRP		
Recipient	**No. of copies**	**Version**
TBC by Contractor when preparing IRP		

1.7 External Contacts

The table below provides an example record of external contact details to be revised and updated as required by the main contractor and its staff.

External Contacts		
Contact	**Office Hours**	**Out of Hours**
Dublin City Fire Service	0761 10 2982	999 / 112
Gardaí: Emergency	999 / 112	999 / 112
St. James's Hospital	(01) 410 3000	999 / 112
Dublin City Council Major Emergency Planning Department	(01) 222 2222	999 / 112
Fingal County Council Emergency Planning Department	(01) 890 5000	
Meath County Council Emergency Planning Department	(046) 909 7000	
Louth County Council Emergency Planning Department	(042) 933 5457	
ESB	1850 372 757	1850 372 757
Bord Gáis	1850 200 694 / 1850 20 50 50	
Waste Management Contractor	TBC	
Specialist Advice	TBC	
Specialist Clean up Contractor	TBC	
Dublin City Council	(01) 222 2222	
Fingal County Council	(01) 890 5000	
Meath County Council	(046) 909 7000	
Louth County Council	(042) 933 5457	
NPWS	(01) 888 3200	

1.8 Internal (Contractors) Contacts

The table below provides an example record of internal contact details to be revised and updated as required by the main Contractor and its staff.

Internal Contacts		
Contact	**Office Hours**	**Out of Hours**
Names and positions of staff authorised/trained to activate and coordinate the IRP	TBC	
Other Staff	TBC	
Managing Director	TBC	
Site Manager	TBC	
Health & Safety Manager	TBC	
Site Environmental Manager	TBC	

1.9 Chemical Product and Waste Inventory

The below table provides an example for outlining an inventory of chemical products and waste. This shall be populated and updated as required by the main Contractor.

Inventory of Chemical Products and Wastes						
Trade Name / Substance	**Solid / Liquid / Gas or Powder**	**UN Member**	**Maximum Amount**	**Location Marked on Site Plan**	**Type of Containment**	**Relevant Health and Environmental Problems**

1.10 Pollution Prevention Equipment Inventory

The below table provides an example for outlining an inventory of pollution prevention equipment. This shall be populated and updated as required by the main Contractor.

Inventory of Pollution Prevention Equipment (on and off-site resources)			

Appendix G: Construction Traffic Management Plan (CTMP)

CONTENTS

1. APPENDIX A5.1 – APPENDIX G: CONSTRUCTION TRAFFIC MANAGEMENT PLAN (CTMP)

1.1 Introduction

This document is the Construction Traffic Management Plan (CTMP) for the DART+ Coastal North Project, hereafter referred to as the Proposed Development. The CTMP is prepared as part of the Construction Environmental Management Plan, which sets out the appropriate environmental management of the project through the construction stage. The CTMP focuses on the management of traffic during the construction phase. The CTMP is a live document that will be reviewed in subsequent design phases and expanded upon, where necessary. The measures outlined in this document are subject to conditions attached to any decision to grant approval by An Bord Pleanála (ABP), further design stages and appointment of a main contractor. Pertinent issues have been reviewed to ensure a holistic approach has been taken with regard to the traffic management measures proposed.

1.2 Purpose of the Report

The CTMP has been prepared to identify and describe the locations where the Proposed Development interacts with the public road network and to identify appropriate and safe methods of access for construction traffic during the Construction Phase of the project. The CTMP has also been prepared to describe the traffic management required to undertake the works and for the transportation of construction materials, equipment and personnel along the public road network to facilitate the construction of the Proposed Development. When the Contractor is appointed, they may propose additional or alternative traffic management arrangements. Meantime this document provides an indication of construction traffic management requirements.

1.3 Development Description

The proposed DART+ Coastal North development ('the Proposed Development'), will modify the current rail network between Dublin City Centre (north of Connolly Station) and Drogheda MacBride Station. The Proposed Development extends across four local authority areas including Louth, Meath and Fingal County Council, as well as Dublin City Council. The total length of the Proposed Development is approximately 50 kilometres.

A detailed description of the proposed DART+ Coastal North project is provided in Chapter 4 (Description of the Proposed Development) and in Chapter 5 (Construction Strategy) in Volume 2 of the EIAR.

The key infrastructural components of the DART+ Coastal North project include:

- Extension of existing 1500V DC electrification, which currently terminates at Malahide, as far as Drogheda MacBride Station (approximately 37km); this includes:
    - The installation of foundations, masts, and overhead wires to supply power to the railway;

  - Undertaking upgrades to existing signalling, telecoms, and power supplies to support the planned increase in train services, including the introduction of new electrical substations at key locations alongside the railway line:
    - Drogheda;
    - Bettystown;
    - Gormanston;
    - Balbriggan;
    - Skerries North;
    - Skerries South;
    - Rush & Lusk (this location also incorporates an overhead line equipment (OHLE) maintenance compound); and
    - Donabate.
  - Undertaking improvements / modifications to bridges spanning the railway arising from track reconfigurations and / or meeting required electrical clearances;
  - Undertaking localised bridge modifications to enable OHLE to be fixed to bridges carrying the railway;
  - Canopy modifications at Drogheda MacBride Station to accommodate OHLE clearances; and
  - Modified railway boundary fences to protect the public from contacting the overhead line.
- Infrastructure works to facilitate the increase in service frequency and capacity, in specific areas of intervention as outlined below:
  - works around Howth Junction & Donaghmede Station;
  - works around Clongriffin Station;
  - works around Malahide Station & Viaduct;
  - works to the existing user worked level crossing (XB001) south of Donabate; and
  - works around Drogheda MacBride Station.
- Modifications to existing depots at Drogheda and Fairview to support the new train fleet, including the provision of additional train stabling at Drogheda;
- Ancillary civils, utility diversions, drainage, and power work to cater for the changes.

The key interventions in each zone are presented in Table 1-1.

Table 1-1 Key Infrastructural Elements in each Geographic Zone.

Zone	Activity
Zone A	This zone from north of Connolly Station to south of Howth Junction & Donaghmede Station includes the following works: • Minor upgrades and internal modifications to Fairview Depot and sidings; and • New drainage connection to combined sewer on Alfie Byrne Road.
Zone B	This zone from south of Howth Junction & Donaghmede Station to north of Malahide Viaduct (including Howth Branch) includes the following works: • Modification of Howth Junction & Donaghmede Station Accesses and Footbridge (OBB17A); • Construction of the Howth Junction & Donaghmede Station Platform 2 Extension; • Construction of a new crossover on the Howth Branch Line at Howth Junction & Donaghmede Station (Howth Junction Turnback); • Construction of two new turnouts on the Up Dublin Line, and a new Loop Line to the east of Clongriffin Station. (Clongriffin Turnback); • Construction of a new retaining wall at Clongriffin Station, utility diversions and associated earthworks; • Construction of new Underbridge UBB19A (Mayne River), UBB18D culvert extension and embankment north of Clongriffin Station; • Construction of a new central turnback line north of Malahide Station, new crossover on the Up Dublin Line and new turnout on the Down Belfast Line. (Malahide Turnback); • Construction of new reinforced earth wall alongside the proposed Broadmeadow Way greenway and embankment widening, north of Malahide Station; • Modification of Underbridge UBB30 (Malahide Viaduct) to support OHLE; • Closure of (user worked) level crossing (XB001); • Construction of a new Otter Crossing, adjacent to the Underbridge UBB31 (River Pill); • OHLE and Signalling, Electrification and Telecoms (SET) modifications at Malahide, Howth and Clongriffin; and • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works north of Malahide Turnback.
Zone C	The zone from the north of Malahide Viaduct to south of Gormanston Station (Fingal boundary) includes the following works: • Construction of Donabate Substation compound; • Modification of Underbridge UBB36 (Rogerstown Viaduct / Estuary) to support OHLE; • Construction of Rush and Lusk Substation and OHLE maintenance compound; • Upgrade of existing station access road junction at Rush and Lusk Station; • Track lowering at Overbridge OBB39 (carrying Station Road / R128);

Zone	Activity
	• Track lowering at Overbridge OBB44 (carrying local road in Tyrrelstown Big); • Construction of Skerries South Substation compound; • Construction of Skerries North Substation compound; • Track lowering at Overbridge OBB55 (carrying Lawless Terrace / R127); • Modification of Underbridge UBB56 (Balbriggan Viaduct) to support OHLE; • Construction of Balbriggan Substation compound; • Road overbridge parapet modifications for compliant safety standards to: o OBB32A (carrying the Donabate Distributor Road), o OBB35 (access to Beaverstown Golf Club), o OBB38 (carrying Rogerstown Lane), o OBB41 (carrying local road in Rathartan), o OBB46 (carrying the L1285 / Baldongan Close), o OBB47 (historic access to Skerries Golf Club), o OBB49 (carrying Golf Links Road), o OBB55 (carrying Lawless Terrace / R127) and o OBB68 (local access adjacent Gormanston Camp). • Pedestrian footbridge parapet modifications for compliant safety standards to: o OBB33A (Donabate Station footbridge), o OBB38A (Rush & Lusk Station footbridge), o OBB51A (Skerries Station footbridge), o OBB54 (The Ladies Stairs) and o OBB57A (Balbriggan Station footbridge). • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Rush & Lusk, Tyrrelstown, Golf Links Road, Baldongan, and Balbriggan; and • Utility diversions.
Zone D	The zone south of Gormanston Station (Fingal border) to Louth/Meath border includes the following works: • Construction of Gormanston Substation compound; • Modification of Underbridge UBB72 (Laytown Viaduct) to support OHLE; • Construction of Bettystown Substation compound; • Track lowering at Overbridge OBB78 (carrying Colpe Road); • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Gormanston, Laytown, and Drogheda; • Road overbridge parapet modifications for compliant safety standards to: o OBB68 (Irishtown), o OBB77 (Colpe East), and o OBB78 (carrying Colpe Road). • Pedestrian footbridge parapet modifications for compliant safety standards to: o OBB74A (Laytown Station footbridge); and • Utility diversions.

Zone	Activity
Zone E	Drogheda MacBride Station and surrounds includes the following works: • Demolition and replacement of triple span Overbridge OBB80/80A/80B (Railway Terrace); • Realignment of Railway Terrace and McGrath's Lane; • Reconstruction of Underbridge UBK01 (R132/Dublin Road Bridge); • Reconstruction of Overbridge OBB81 (Drogheda Station Footbridge); • Modification to existing Platform 1 Station Canopy; • Construction of new Platform 4 (on the Drogheda Freight Sidings) and associated modifications to station car park and connectivity to Drogheda MacBride Station; • Track works on Drogheda Freight Sidings at Drogheda (Drogheda Turnback); • Construction of Drogheda Substation compound; • Civil Works on Light Maintenance Roads, Under Frame Cleaning (UFC) facility and Northern Headshunt; • Reprofiling existing earthwork bund at Drogheda Depot; • Track works on Stabling Roads 7a, 7b; • OHLE and Signalling, Electrification and Telecoms (SET) line-wide works; • Diversion of overhead power lines railway crossings into Under Track Crossings (UTX) at Drogheda; and • Utility diversions.

1.4 Site Access

1.4.1 Introduction

The Proposed Development requires works along the permanent way (railway) and at specific locations along the railway outside of the permanent way. To facilitate the works Construction Compounds are provided along the length of the railway adjacent to the specific works.

1.4.2 Construction Compounds

Construction Compounds of varying sizes and functions are required at specific site locations, such as structure modification works and/or associated railway works. The majority of Construction Compounds are temporary facilities that support the construction of the different elements of the Project. The compound duration is dictated by the full program of works. The life cycle of a Construction Compound ranges from several months to several years depending on its function.

The activities that will take place on these sites may include:

- Material unloading, storage and loading;
- Erection of prefabricated sections for construction;
- Use of welfare and on-site office space;

- Personnel and machinery access to the railway;
- Parking space for personnel and work vehicles;
- Lifting of material/precast elements, especially in the Construction Compounds corresponding to modification of existing overbridges (e.g. works to OBB80/80A/80B);
- Assembling of catenary cantilevers only in the SET Construction Compounds (the cantilevers consist of metallic bars that are connected by means of bolts);
- Heavy Goods Vehicles (HGV) and usual construction machines movement;
- Staff vehicles movement;
- Welding is not foreseen within the compounds (welding will be required on some track sections to join rails together);
- Road-rail Vehicles (RRV) access to track at the points set up for this purpose; and
- Construction traffic on the access routes for the material/equipment supply by HGV.

Where practical, material deliveries to and from the Construction Compounds will be timed so as to reduce the impact on local communities and residents and the general road network. The compound locations are listed in Table 1-2.

Table 1-2 Compound Locations.

Code	Zone	Location	Primary Discipline	Road / Rail Access Points
CC-2650	A	Fairview Depot (R834 Entrance car park)	Station	Road access point only
CC-2700	A	Fairview Depot (R834 Entrance car park)	Station	Road access point only
CC-3000	A	Fairview Depot (R807 Entrance car park)	Station	Road access point only
CC-9000	B	Howth Junction and Donaghmede Station (Donaghmede Entrance)	Station	Road and rail access
CC-9050	B	Howth Junction and Donaghmede Station (Kilbarrack Entrance)	Station	Road and rail access
CC-9100	B	Howth Junction and Donaghmede Station (Central Access)	Station	Road and rail access
CC-9200	B	Howth Junction and Donaghmede Station (Baldoyle Industrial Estate)	Station	Road and rail access
CC-10600	B	Clongriffin Station	Permanent Way	Road and rail access
CC-15900E	B	Malahide Turnback (Strand Court)	Permanent Way	Road and rail access
CC-15900W	B	Malahide Turnback (Bissett's Strand)	Permanent Way	Road and rail access
CC-16100	B	Malahide Turnback (Caves Strand)	Permanent Way	Road and rail access
CC-16250	B	Malahide Turnback (Marina Car Park)	Permanent Way	Road and rail access
CC-16400	B	UBB30 Malahide Viaduct	Structures	Road and rail access
CC-18800	C	Donabate Substation	Substation & SET line-wide works	Road and rail access

Code	Zone	Location	Primary Discipline	Road / Rail Access Points
CC-19800	C	Donabate Station	SET line-wide works	Road and rail access
CC-21500	C	UBB36 Rogerstown Viaduct	Structures	Road and rail access
CC-23500	C	Rush and Lusk Station	Substation & SET line-wide works	Road and rail access
CC-23772 (E)	C	Rush & Lusk	Utility Diversions	Road and rail access
CC-23772 (W)	C	Rush & Lusk	Utility Diversions	Road and rail access
CC-25626 (E)	C	Tyrrelstown	Utility Diversions	Road access
CC-25626 (W)	C	Tyrrelstown	Utility Diversions	Road access
CC-27460 (E)	C	Baldongan	Utility Diversions	Road access
CC-27460 (W)	C	Baldongan	Utility Diversions	Road access
CC-29000	C	Skerries South Substation	Substation	Road and rail access
CC-29140 (E)	C	Golf Links Road	Utility Diversions	Rail access only
CC-29140 (W)	C	Golf Links Road	Utility Diversions	Rail access only
CC-30200	C	Skerries Station	Permanent Way	Road and rail access
CC-32200	C	Skerries North Substation	Substation	Road and rail access
CC-34400 (E)	C	Balbriggan	Utility Diversions	Road access only
CC-34400 (W)	C	Balbriggan	Utility Diversions	Road access only
CC-36000	C	UBB56 Balbriggan Viaduct	Structures	Road and rail access
CC-37700	C	Balbriggan Substation	Substation & SET line-wide works	Road and rail access
CC-39800 (E)	D	Gormanston Station	Utility Diversions	39800
CC-39800 (W)	D	Gormanston Station	Utility Diversions	39800

Code	Zone	Location	Primary Discipline	Road / Rail Access Points
CC-40200	D	Gormanston Station	Permanent Way & SET line-wide works	Road and rail access
CC-41400	D	Gormanston Substation	Substation	Road and rail access
CC-44390 (E)	D	Laytown	Utility Diversions	New road access only
CC-44390 (W)	D	Laytown	Utility Diversions	New road access only
CC-44500	D	UBB72 Laytown Viaduct (South Abutment)	Structures	Road and rail access
CC-44600	D	UBB72 Laytown Viaduct (South Pier)	Structures	Road and rail access
CC-44700	D	UBB72 Laytown Viaduct (North Pier)	Structures	Road and rail access
CC-44900	D	Laytown Station	SET line-wide works	Road and rail access
CC-44920 (E)	D	Laytown	Utility Diversions	New road access only
CC-46900	D	Bettystown Substation	Substation	Road and rail access
CC-49600	D	OBB78 Track Lowering	Permanent Way	Road and rail access
CC-50270 (S)	D	Drogheda	Utility Diversions	New road access only
CC-50270 (N)	D	Drogheda	Utility Diversions	New road access only
CC-51700 (S)	D	Drogheda	Utility Diversions	New road access only
CC-51800	E	OBB80 (North)	Structures & SET line-wide works	Road and rail access
CC-51900	E	OBB80 (South)	Structures	Road and rail access
CC-52050	E	Drogheda Substation	Substation	Road and rail access
CC-52250	E	Drogheda Station	Station	Road and rail access
CC-52200	E	UBK01 Dublin Road Overbridge (Car Park)	Structures	Road and rail access

The appointed Contractor's CTMP will include measures for managing traffic accessing and egressing the Construction Compounds.

1.4.3 Compound Haulage Routes

Access to and egress from the Construction Compounds is assumed to be along pre-determined routes on the public roads in the vicinity of the specific Construction Compound.

Drawings showing the envisaged haulage routes for the various compounds are provided in Chapter 5 (Construction Strategy). Each route is based on the shortest route to the local, National Road, Regional Road and/or Motorway. It is anticipated that Contractor's CTMP will include measures for appropriate signage and communication to direct construction traffic along appropriate routes. It is anticipated that the appointed contractor will monitor the haulage routes for dirt and debris generated by the construction traffic and take appropriate action, such as road sweeping. An overview of the proposed haulage routes is provided below.

1.4.3.1 Construction Routing

To limit the impact of the construction of the Proposed Development on the road networks and sustainable transport networks, routing to compounds primarily, construction vehicles will make use of the national and regional road networks with limited use of any residential roads unless there is an absolute requirement to do so.

1.4.3.1.1 Zone A

Fairview Depot Modifications

Areas for Construction Compounds have been identified within the Fairview depot, these will be accessed via the existing depot accesses off the R807 and R834, as shown in .

Image 1-1 Fairview Depot Construction Compounds and Access Routing

1.4.3.1.2 Zone B

Howth Junction and Donaghmede Station Works

The nearest road link of strategic importance to these works is the R139 which joins the M1 in the west via the R139. The proposed construction compound would be accessed from the R139 via the Baldoyle Industrial Estate, see Image 1-2.

Image 1-2 Howth Junction Proposed Construction Compounds and Access Routes

Clongriffin Station Works

The nearest road link of strategic importance to the proposed Construction Compound is the R123 ("Moyne Road") to the north which joins onto the M1 to the west via the R107 and R139. It currently provides access for a new road leading to the ongoing housing construction adjacent to the station. It is proposed that this road will be shared between the appointed contractors for the Proposed Development and the housing developers. The Construction Traffic Management Plan (CTMP) provided in the Construction Environmental Management Plan (CEMP) in Appendix A5.1 in Volume 4 of this EIAR details the proposals for traffic management and will be further developed by the Contractor prior to construction, in liaison and with the agreement of the local authority.

Construction traffic will be restricted to the regional road network (R-routes) as far as possible. These routes are designed with the functionality of accommodating mobility needs of HGVs in mind. Options to travel along Station Road or Red Arches Road (local roads) are therefore not recommended. General construction access should be along the R123, R106 and R809. Details for appropriate traffic management will be further developed by the Contractor prior to construction.

The safe crossing of the Portmarnock Greenway and the safety of the Moyne Park community during construction will be detailed in the Contractor's CTMP.

Underbridge UBB20, where the R123 crosses under the railway, has a clearance of 3.85m. This will restrict larger construction vehicles; in which case such vehicles would access the site via the R106 Coast Road to the east.

Image 1-3 Clongriffin Construction Compound proposed Construction Access Route

Malahide Turnback and UBB30 Viaduct Works

Construction access by water has been ruled out due primarily to insufficient water depth, poor mooring opportunities for construction marine vessels and level differences.

The nearest road link of regional importance is the R106 Swords Road / Dublin Road / Main Street which joins the M1 to the west via the R132 and R125 at Junction 3. This road provides the best form of access to the site, through the village of Malahide, leading to the Malahide Wastewater Treatment Access Road. A low-clearance underbridge (UBB29) on Bissett's Strand (2.2m headroom) segregates access between the Construction Compounds on the east and west of the railway. Therefore, access to the Construction Compounds on the west of the railway will be accessed from the R106 via the L2130 and L2133 to the proposed site access point on Bissett's Strand.

Options from the R106 to/from the two Construction Compounds on the east of the railway were considered. New Street has Part 8 planning permission for pedestrianisation and is therefore not an option. Townyard Lane (northbound only) is very narrow with a lot of activity around the shop / restaurant area at the northern end. Old Street (northbound only) is relatively wider with on-street paid parking adjacent and is currently accommodating buses and heavy vehicles accessing a treatment plant in the Marina. James' Terrace (southbound only) is relatively wide with on-street paid parking, a bus stop and taxi lay-bye adjacent. It is therefore recommended that the main construction access route will be via Old Street (northbound) and James' Terrace (southbound).

General construction access along the public road will take place between 10am and 4pm avoiding peak hours and nighttime.

A high-level swept path analysis based on aerial photography and OS mapping was carried out along the proposed access routes. It was found that a standard construction vehicle (12m rigid truck) can be accommodated within the current available road cross-section. Larger vehicles, such as the 16.5m articulated truck would require additional traffic management, such as the removal of on-street parking in certain locations in order to be accommodated, especially if being used regularly throughout construction. It is therefore recommended that construction vehicles be restricted to 12m rigid trucks and that larger vehicles follow the permitting requirements for abnormal loads. In case of abnormal loads, the most appropriate access route will be determined by the contractor for the specific load and the specific vehicle type. The appropriate route for abnormal loads may be James' Terrace, in which case it may temporarily be required to be changed to accommodate two-way traffic, in order to accommodate an occasional articulated truck or abnormal load.

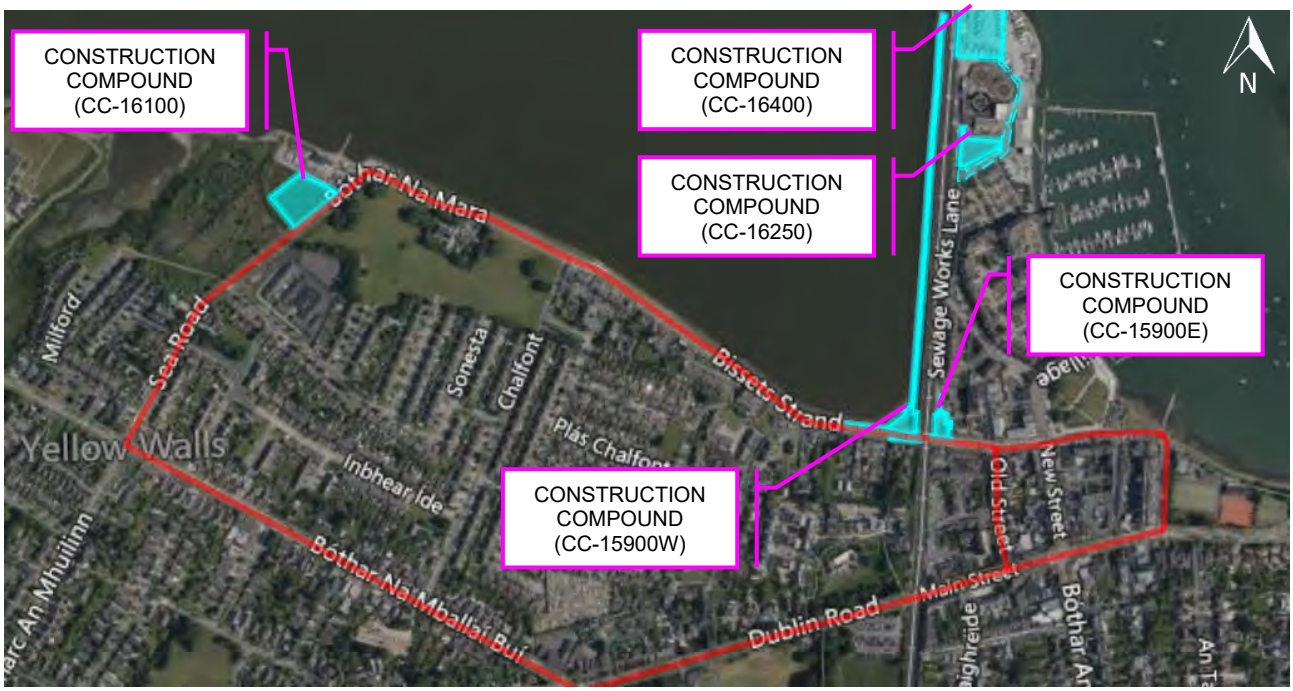

Image 1-4 Malahide Proposed Construction Compound and Access Routes

Image 1-5 Malahide Turnback – Proposed Construction Access Route (Source: ESRI)

1.4.3.1.3 Zone C

Donabate Substation

The nearest road link of strategic importance in this area is the R126 which links with the M1 to the west. Local site access will be a via a new access road off the L6165, this will also form the permanent access to the substation.

Image 1-6 Donabate Substation proposed Construction Compound and Access Route

Rush and Lusk Substation and OHLE Maintenance Compound

The nearest road link of strategic importance in this area is the R127 which links Skerries, Balbriggan and Lusk with the M1. Local site access will be off the R128 (Station Road). The existing access into the station car park requires a sharp right turn, it is planned that this is realigned as part of the permanent works. Once undertaken it will enable improved access for both public and contractors' vehicles.

Image 1-7 Rush and Lusk Substation Construction Compound and Access Route

OBB39 Station Road/R128 Track Lowering Works

Given the proximity of the Road Rail Access Point (RRAP) and proposed line-wide construction compound at Rush and Lusk station a separate construction compound to support the track lowering work is not required.

OBB44 Tyrellstown Bridge Track Lowering Works

The proposed construction compound for these track lowering works is located to the West of OBB44 in agricultural land outside the IÉ land boundary. The nearest road of strategic importance is the R127 which joins the M1 via the R132 to the south-west. It is noted that Horestown Road and the adjoining lanes that would be used to reach the R127 are narrow and may constrain access to larger construction vehicles.

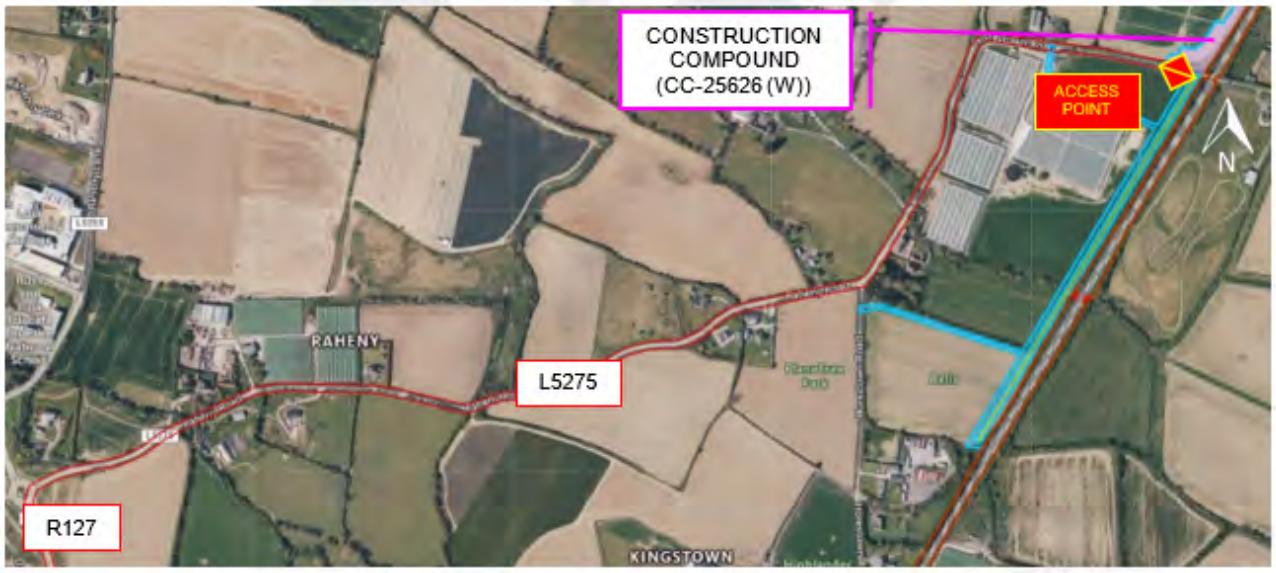

Image 1-8 Proposed access to OBB44 track lowering works Construction Compound

Skerries South Substation

The nearest road link of strategic importance in this area is the R127 which links Skerries, Balbriggan and Lusk with the M1. Local site access will be off the R127 via Golf Links Road avoiding the town and low clearance bridge to the east. A new access road will be created off the east embankment of the existing overbridge which will serve as the substation permanent access. A temporary access will be required just east of this point for the construction of the permanent access due to level differences.

Image 1-9 Skerries South Substation Construction Compound and Access Route

Skerries Track Paralleling Hut

The extent of the Construction Compound is shown in Image 1-10, with traffic management required for a portion of the Barnageeragh road to enable access during the civil works and equipment installation phases.

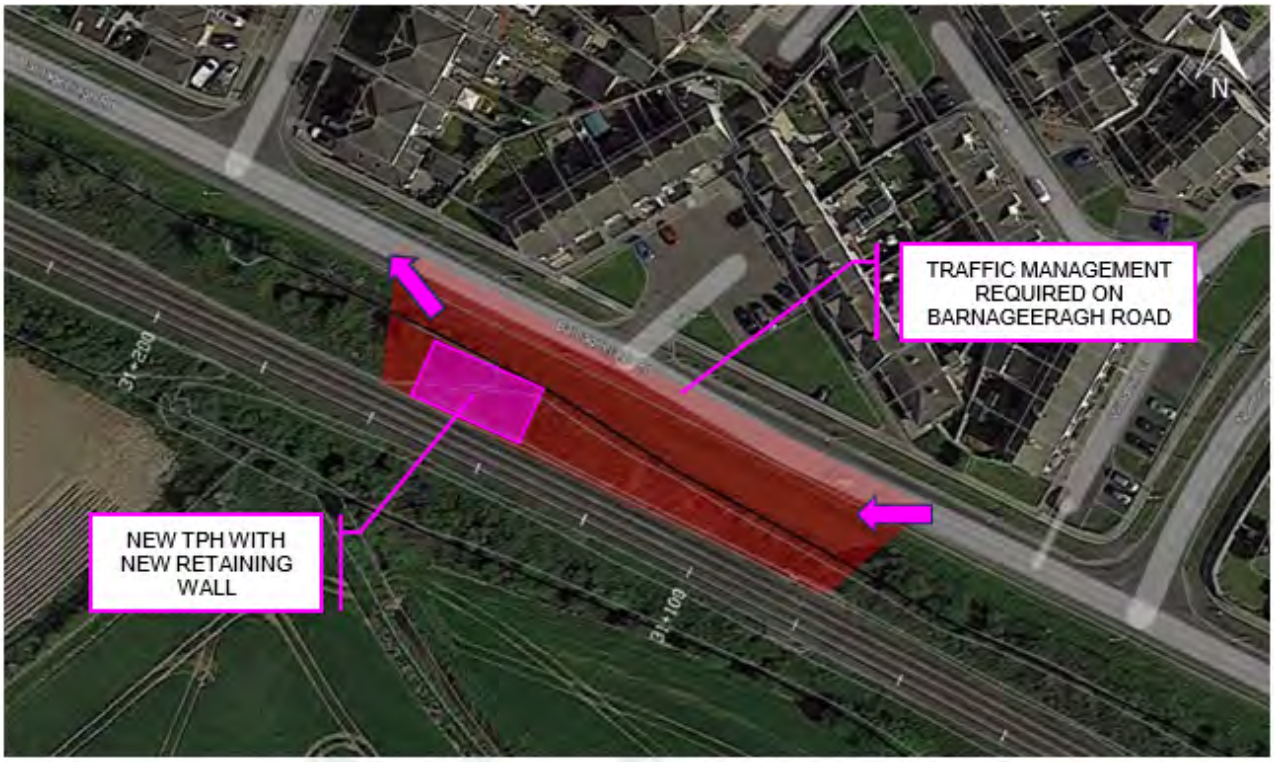

Image 1-10 Skerries Track Paralleling Hut Construction Compound and Access Route

Skerries North Substation

The nearest road link of strategic importance in this area is the R127 which links Skerries, Balbriggan and Lusk with the M1. However, at its nearest point to the site the R127 can only be accessed by passing under a nearby railway underbridge with a low clearance of 3.12m. Therefore, larger vehicles will have to access the Skerries North site via an alternative route to the South via the L1270. Local site access will be via a new section of road off the Barnageeragh Road/L1270, which will also serve as the substation access in the permanent case.

Image 1-11 Skerries North Substation Construction Compound and Access Route

UBB56 Balbriggan Viaduct Modification

Access to the construction compound from the M1 would be via the R122. Local access in Balbriggan would follow the one-way system along Quay Street and Mill Street. It is noted that the proposed redevelopment of the car park may alter the existing one-way system.

During construction it will be necessary to close Harbour Road at night on several occasions to site the crane there for the lifts of the individual footway sections. Traffic would need to be diverted west, further into the centre of Balbriggan. There are many one-way roads near Balbriggan Viaduct, so diverting a steady flow of traffic may be difficult outside of night-time possessions. Traffic management may be required for several of the one-way roads fed by Harbour Road to maintain access during the road closure.

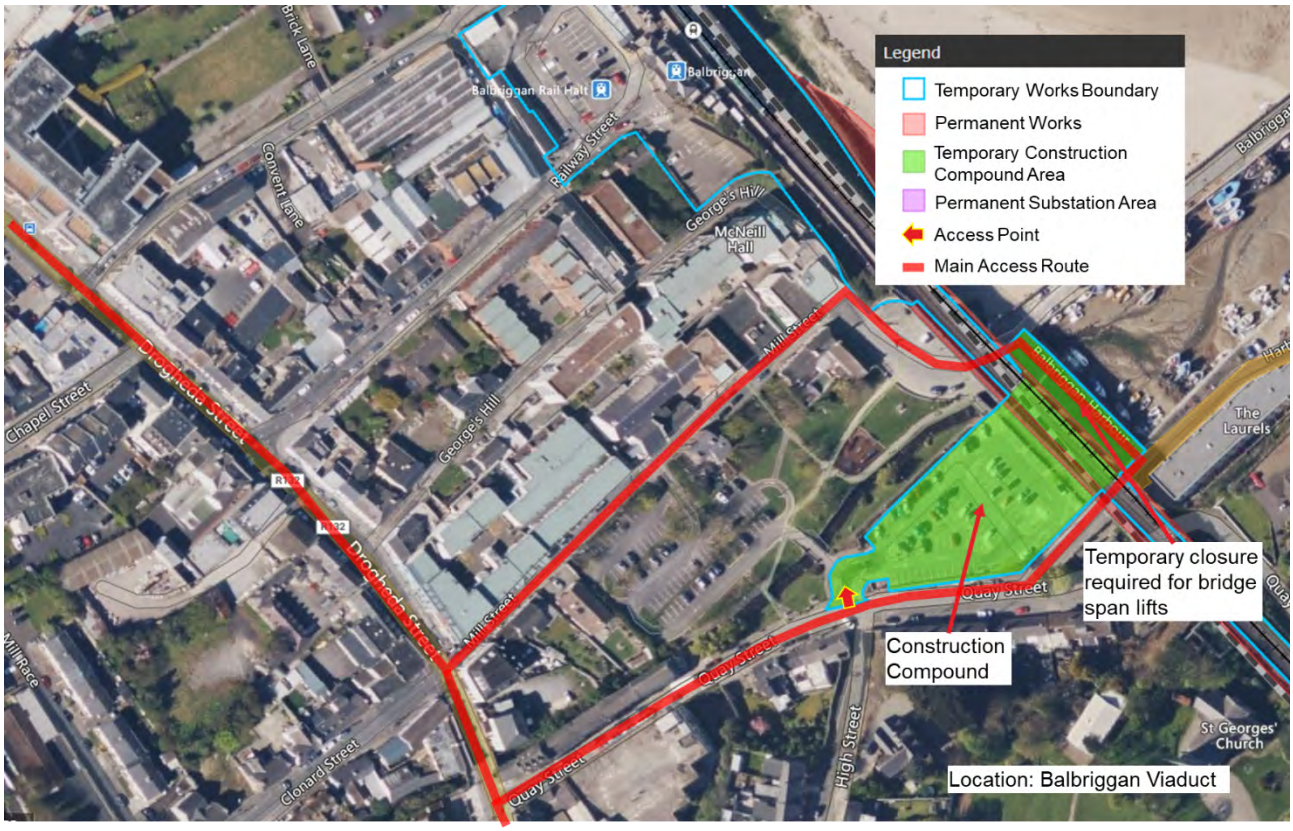

Image 1-12 UBB56 Balbriggan Viaduct Construction Compound and Access Route

Balbriggan Substation

The nearest road link of strategic importance in this area is the R132 which connects with the M1 in the north, avoiding routing through Balbriggan. This road is suitable to serve construction traffic. Site access will be via a new section of road off the R132, which will also serve as substation access in the permanent case.

Image 1-13 Balbriggan Substation Construction Compound and Access Route

Line-wide Construction Compounds

There are some line-wide compounds required within this zone, which will be located at, or adjacent to, existing IÉ maintenance compounds. In Zone C these are at Donabate and Skerries Stations, in addition to those already mentioned at Donabate Substation, Rush and Lusk Substation and Balbriggan Substation. The location and access routes for the Donabate and Skerries Station line-wide compound locations are identified in the following images.

Image 1-14 Donabate Station Line-wide Construction Compound and Access Route

Image 1-15 Skerries Station Line-wide Construction Compound and Access Route

1.4.3.1.4 Zone D

Gormanston Substation

The nearest road link of strategic importance in this area is the R132 which connects with the M1 in the south-west. This road is suitable to serve construction traffic. Site access will be via the new section of road off Irishtown, which will serve as substation access in the permanent case.

Image 1-16 Access to Gormanston Substation Construction Compound

UBB72 Laytown Viaduct Works

The site here is accessible from the regional road (R150) from the north or via Coastview Cottages, a local road from the south. The regional road is approximately 6m wide and the local road is narrow at approximately 3m width. The regional road to the north connects Julianstown and Laytown villages. The nearest road link of regional importance is the R132 Dublin Road that connects with the M1 in the south-west.

Construction access will be required at both the north and south of the viaduct. The southern local access road is narrow and would require additional traffic management measures to accommodate two-way construction traffic volumes. The clearance under the viaduct on this road is 4.26m. Where possible rail would be used as a means for delivering large construction materials such as the steel beams, subject to agreement between IE and the contractor.

Image 1-17 Access for vehicles to UBB72 Construction Compounds

Bettystown Substation

The nearest road link of strategic importance in this area is the R150 which connects with the M1 in the south via Colpe Road and the R132. Consultations will need to take place regarding optimum site access, which will either be via Ardmore Avenue or a new section of road which would need to be constructed off Narroways Road (L5362). These options are shown in the image below.

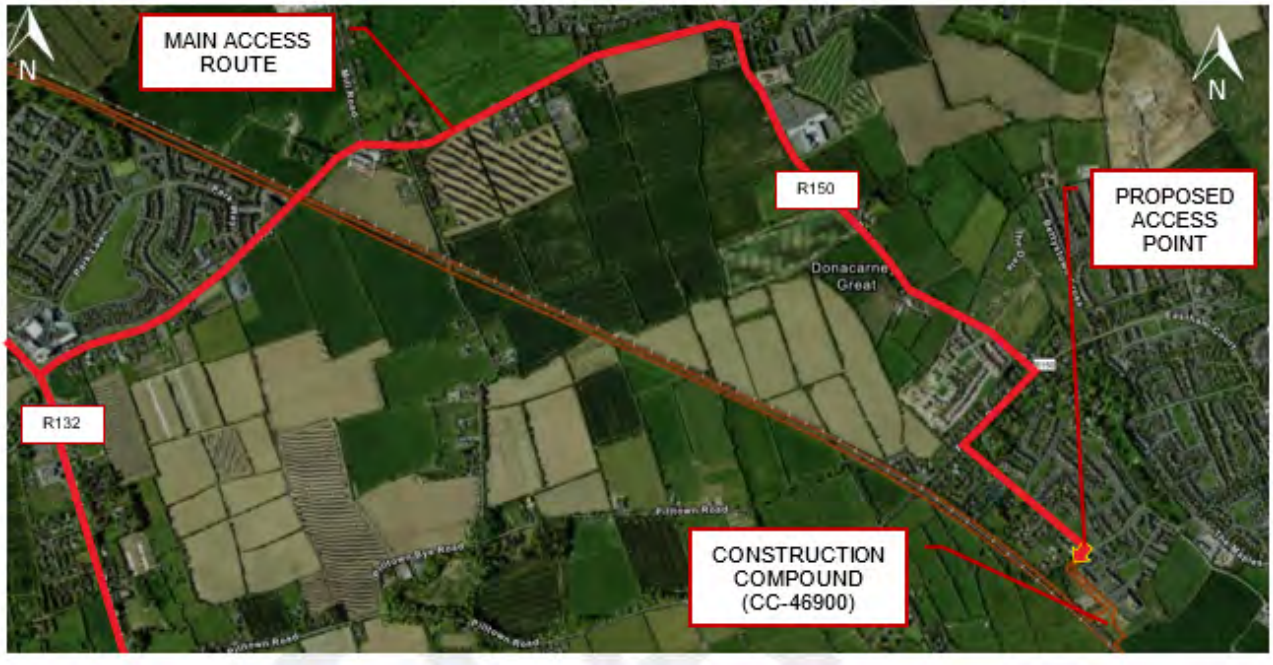

Image 1-18 Bettystown Substation Construction Compound and Access Route

OBB78 Colpe Road Bridge track lowering works.

The nearest road of strategic importance is the R132 which joins the M1 to the south-west near Gormanston. The Colpe Road joins the R132 at the small roundabout to the East. The proposed Construction Compound is located to the south-west of OB78 in agricultural land outside the IÉ land boundary. The bridge is surrounded by suitable fields, but the option shown is deemed to minimise the impact to residents to the north of the bridge.

Image 1-19 Access to OBB78 track lowering works Construction Compound

Line-wide Construction Compounds

There are some line-wide compounds located at existing maintenance compounds rather than at isolated works Construction Compounds. In Zone D these are at Gormanston Station (CC-41400) and Laytown Station (CC-44900). Their location and access routes are identified in the following images.

Image 1-20 Gormanston Station Line-wide Construction Compound and Access Route

Image 1-21 Laytown Station Line-wide Construction Compound and Access Route

1.4.3.1.5 Zone E

OBB80/80A/80B Railway Terrace / McGraths Lane Bridge

The nearest road link of strategic importance to the McGraths Lane Bridge is the R150 which connects with the M1 in the south via Colpe Road and the R132. Access to the main compound is planned to be via a new temporary road, just westward of a road recently built for a new housing development in the area. Although limited, some construction access is also likely to be required along Railway Terrace, part of this in conjunction with the installation of a signal equipment building (SEB) near the bridge. Construction traffic would approach Railway Terrace via the R132 to the south to avoid traffic routing through the centre of Drogheda.

Access to the two residential properties on the north side of McGrath's Lane and to the rear station depot entrance will be maintained during the replacement of the bridge via a new road link to Marsh Road (R150).

Image 1-22 Main access route to OBB80/80A/80B McGraths Lane Bridge Construction Compounds

UBK01 Dublin Road Bridge / OBB81 Drogheda Station Footbridge / Platform 4, Drogheda Freight Sidings

The nearest road link of strategic importance in this area is the R132 which connects with the M1 in the south, avoiding routing construction traffic through the centre of Drogheda. Clearance under UBK01 is 4.78m and hence any traffic needing greater clearance would need to access the site from the M1 in the west via Donore Road and the R132.

The R132 Dublin Road will need to be reduced to a single lane, with bi-directional flow operating under traffic lights throughout much of the works, anticipated to be over several months. At times, such as during demolition, the road will need to be closed completely, during which a traffic diversion will be in place. These periods are likely to be for only a few days at a time, limited to weekends. where traffic flow is maintained, provision will be made for safe pedestrian footways.

Image 1-23 UBK01/OBB81/Platform 4 Construction Compound and Access Routes

Drogheda Substation Depot

Contractors will predominantly use an access route through the west end of the station car park for construction access, through the constrained tunnel under the railway and then along the north side of the depot building. An alternative route could be from the east, via McGrath's Lane, though this may not be possible during OBB80 McGrath Lane bridge works.

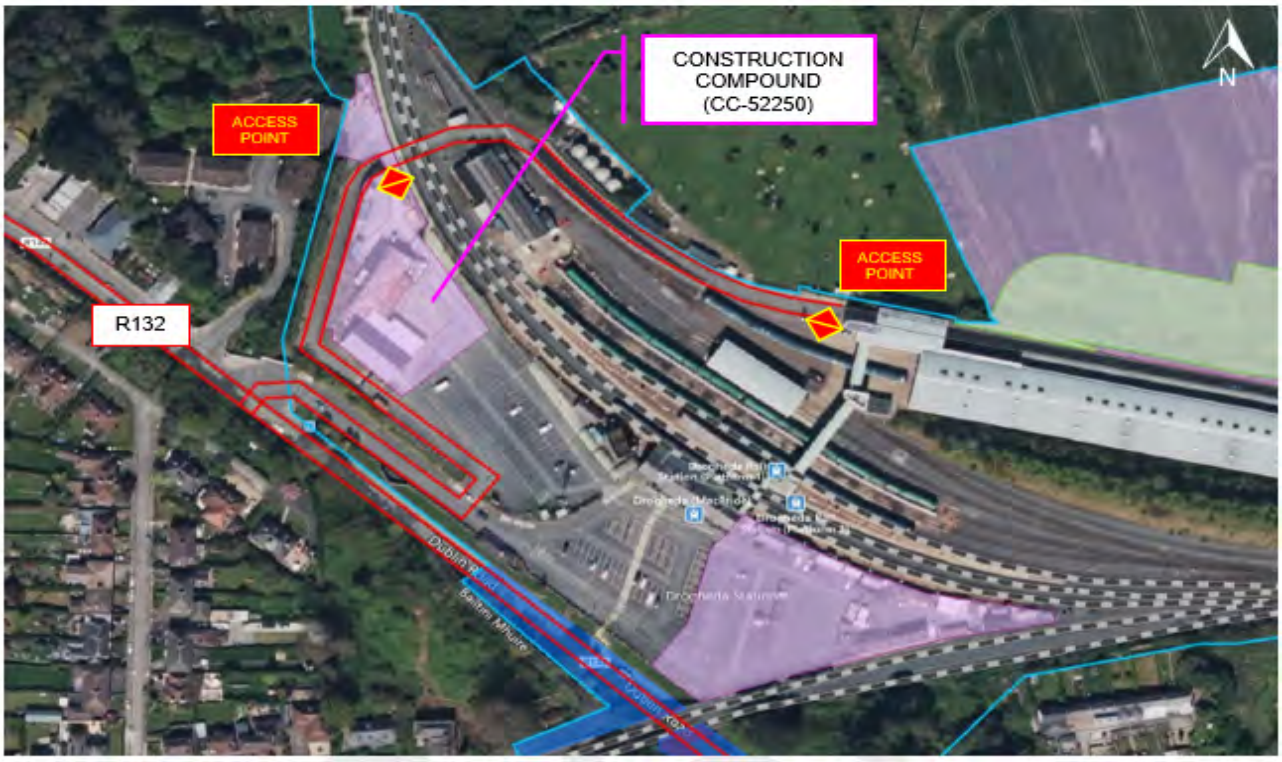

Image 1-24 Drogheda Substation Construction Compound and Access Route

Image 1-25 Drogheda Substation Construction Compound and Alternative Access Route

Depot Light Maintenance Roads and UFC facility

Access to the Depot Construction Compound will be via the same route as shown for the substation.

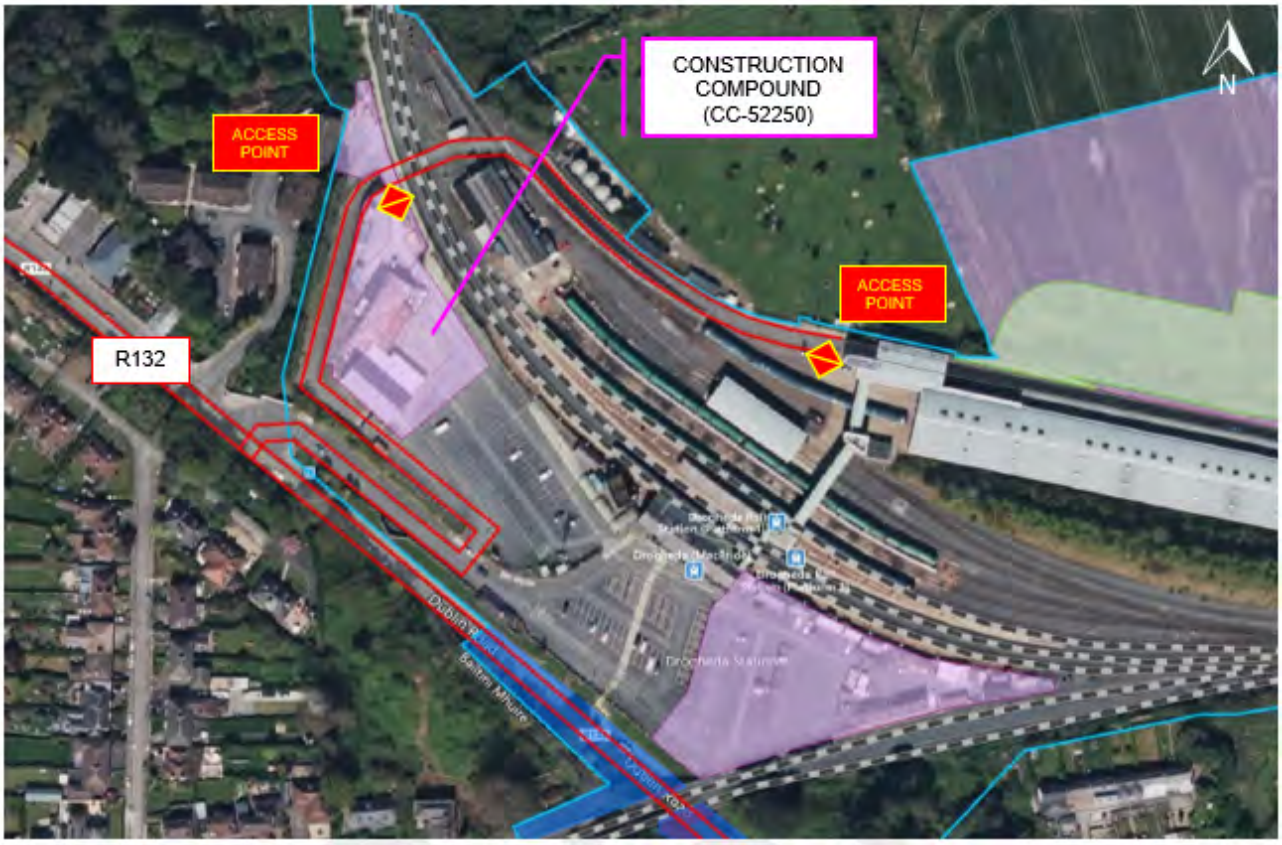

Image 1-26 Depot Construction Compound and Access Routes

1.4.3.2 Abnormal Loads

The M1 and M50 have been identified as a typical construction traffic and abnormal load designated routes, refer to S.I. No. 461/2010 – Road Traffic (Specialised Vehicle Permits) (Amendment) Regulations 2010. From the M1 and M50, Regional Roads (R-Routes) will be the main delivery routes to compounds as far as possible.

A review of the delivery routes to the compounds was carried out. The proposed delivery routes have been analysed, based on the Google maps visuals, OS, and topographical information available, to identify any potential pinch points for both abnormal loads and typical construction traffic.

Vehicle tracking was undertaken where more challenging sites were identified and additional land was taken where necessary to provide turning points.

The contractor will be required to inspect the delivery routes to identify any issues and propose remedial measures as part of the permitting requirements for abnormal loads. This should include a detailed swept path analyses for the contractor's specific vehicle type and weight (dimensions to be confirmed) to ensure that the specific abnormal load can be transported safely. Permits are managed by An Garda Siochana.

The transportation of abnormal loads will be limited to nighttime hours.

Local temporary access widening into the construction compounds will be incorporated to ensure abnormal loads can exit the public road during delivery.

A designated area for abnormal load parking will be made available within the contractor compound for unloading.

Temporary traffic arrangements will be in place to accommodate wide turning circles at compound access points, such as stop/go road closures or equivalent arrangements to maintain local access and safely accommodate through traffic.

A dry run will be carried out and measures to ensure public safety during abnormal load delivery will be identified.

These measures will be detailed in the contractor's CTMP and agreed by the contractor with the local authority and An Garda Siochana prior to delivery.

1.5 Envisaged Construction Traffic

1.5.1 Construction Traffic Impact Assessment

A Traffic Impact Assessment (TIA) was undertaken to determine impacts of the Proposed Development both during the Construction Phase and the Operational Phase (see Chapter 6 (Traffic and Transportation) in Volume 2 of this EIAR). The assessment included the analysis of baseline conditions, potential impacts associated with the Construction Phase and Operational Phase of the Proposed Development, appropriate mitigations and monitoring, and identifying residual effects. It was concluded that overall, the construction vehicles on the network represent a moderate, short-term, negative effect for the duration of construction, before returning to normal levels once the construction is complete.

1.5.2 Phasing

As with any construction project, the contractor will be required to a prepare a comprehensive traffic management plan for the Construction Phase. The purpose of such a plan is to outline measures to manage the expected construction traffic activity during the Construction Phase.

It will be the project contractor's responsibility to develop the CTMP further for the approval of local authorities.

1.6 Construction Management and Mitigation

The impact of the Construction Phase will need to be monitored and managed across the lifecycle of construction to ensure that all modes including those using the rail are impacted upon as least as possible. To assist in this a number of measures can be implemented including routing, hours of work, Construction Compound locations and traffic management, such as diversions and traffic signals to manage the road network.

In addition to this, the CTMP will be further developed and a Construction Stage Mobility Management Plan (CSMMP) prepared and both will be implemented by the contractor to ensure that staff movements and the works have as little an impact on the surrounding area as possible. Further detail relating to this is set out in Chapter 5 of the EIAR.

1.6.1 Bus

The existing bus network may be affected by construction works taking place at the bridges listed in Table 1-3. These routes are primarily impacted in Drogheda at the Dublin Road Bridge construction works.

Table 1-3 Future Bus Routes Affected by Bridge Modification Works.

Structure Name	Road / Bridge	Number of Proposed Bus Routes
OBB39	Rush & Lusk Roadbridge	L85, X76
OBB55	County Bridge/Public Road	L85
OBB78	Colpe Bridge/Public Road	910, 912
UBK01	Dublin Road Bridge	D4, D5, 101, 101X

Some bus services may require diversion and the contractor will consult with bus service providers if any services are potentially impacted by the works to avoid disruption to services.

1.6.2 Car Parking

In order to provide a number of the compounds over the construction period, there will be a temporary loss of car parking at locations along the length of the railway line, at 6 of the stations. Table 1-4 below sets out the number of spaces lost on a temporary or permanent basis as a result of construction.

Table 1-4 Parking Loss Due to Construction.

Code	Location	Temporary		Justification
		Public Access Parking	Private Access Parking	
CC-2650	Fairview Depot (R834 Entrance car park)	none provided	15	Minor modifications to depot for greater output of cleaning for increased fleet. Modifications on east and west platforms for suitable access and services for cleaning staff.
CC-2700	Fairview Depot (R834 Entrance car park)	none provided	5	
CC-3000	Fairview Depot (R807 Entrance car park)	none provided	15	

Code	Location	Temporary		Justification
		Public Access Parking	Private Access Parking	
CC-9050	Howth Junction and Donaghmede Station (Kilbarrack Entrance)	10	none provided	The compounds are required for construction of platform extension, new crossover, and increased station access.
CC-9200	Howth Junction and Donaghmede Station (Baldoyle Industrial Estate)	none provided	80	
CC-15900	Malahide Turnback (Strand Court)	none provided	10	This current car park will be mostly used as an access route for the construction of a turnback north of Malahide station.
CC-15900W	Malahide Turnback (Bissett's Strand)	10 on-street parking bays	non provided	The Bissett's Strand cross-section will be required for turning movements and access into this compound.
CC-16250	Malahide Turnback (Marina Car Park)	60	none provided	The marina car park will act as the largest compound for the continuation of works for the turnback.
CC-19800	Donabate Station	150	none provided	The Donabate Station car park area is a potential line-wide compound, which supports the new OHLE construction works.
CC-23500	Rush and Lusk Station	30	none provided	Land acquired for access to construction compound at the southern end of the car park on the eastern side of the rail line.
CC-36000	UBB56 Balbriggan Viaduct	20	none provided	Car park will act as a compound for construction taking place to the adjacent viaduct for a pedestrian footway.
CC-52250	Drogheda Depot/Station	30	none provided	The site at the northern end of the Train Station car park will be used throughout the development of the Depot Light Maintenance Roads and UFC facility
CC-52200	UBK01 Dublin Road Overbridge (Car Park)	110	none provided	The Dublin Road Overbridge will be replaced in two phases, with the station car park acting as the main construction compound.

In order to determine if the temporary loss of parking to accommodate the construction works at Howth Junction and Donaghmede Station, Donabate Station, Rush and Lusk Station and Drogheda MacBride Station would impact on the users of the car parks, a survey of the number of spaces used at each location was undertaken during the morning peak in January 2020, pre COVID-19 by Iarnród Éireann. Given that usage of station car parks has largely reverted to pre-COVID levels, this is considered representative of current parking uptake at stations. The results of the survey are in Table 1-5.

Table 1-5 Station Parking Results.

Zone	Station	Existing			During Construction	
		Number of Spaces	Number of Spaces Occupied during AM Peak	Number of Spaces Remaining Available	Number of Spaces Lost	Number of Spaces Remaining Available
B	Howth Junction and Donaghmede Station (Kilbarrack Entrance)	25	22	3	10	**0**
C	Donabate Station	351	143	208	150	**58**
C	Rush and Lusk Station	432	233	199	30	**169**
E	Drogheda Station (Main Carpark (Depot and Overbridge) and Marsh Road)	386[1]	206	180	110	**70**

The results set out in the table above illustrate that generally three of the car parks are underutilised with a number of spaces remaining available for use. Once the spaces lost during construction of the Proposed Development is taken into account and assuming the same levels of use as identified during the survey, at Donabate, Rush and Lusk and Drogheda MacBride stations there is still a significant number of spaces remaining available at each car park.

At the Drogheda MacBride station there are two compounds. The Drogheda Depot/Station compound is the site at the northern end of the car park and will be used throughout the development of the Depot Light Maintenance Roads and UFC facility, requiring the removal of 30 spaces for a duration of approximately 11 months. The UBK01 Dublin Road Overbridge compound is the site at the southern end of the car park and will be used for the replacement of the Dublin Road Overbridge, requiring the removal of 110 spaces for a duration of approximately 19 months. Surveys have shown that 180 parking spaces are currently underutilised at the station car park (which includes the northern end of the car park, the southern end of the car park and the March Road car park towards the west). However, during the construction of BEMU 53 spaces will be permanently removed from the Marsh Road car park towards the west. In addition, anecdotal evidence exists to suggest that an overspill in parking regularly occurs onto the public road network from the main car park at the station. This would suggest that the required 140 spaces during construction works cannot be easily accommodated. Therefore, in order to mitigate this potential impact, it is recommended that the contractor be limited to only occupy a maximum of 110 spaces at any one time during the overall period of works, these to be within one or both of the two compounds. It was observed that the Marsh Road car park is currently underutilised, and it will therefore increase in utilisation during construction with proper wayfinding implemented by the contractor during construction.

[1] Drogheda MacBride station provides a total of 386 car parking spaces, of which 288 are located in the main car park and 98 in the secondary car park off Marsh Road.

The contractor will minimise the construction compound footprint throughout the construction programme and return the maximum number of car spaces back to public use when construction works are completed and the compounds are no longer required.

1.6.3 Railway Track Possessions

The construction impacts of railway track possessions are shown in Table 1-6. No significant impacts are foreseen on the Belfast – Dublin line as works will take place at night-time or over weekends. Replacement bus services will be provided where rail services are impacted during these times.

Table 1-6 Rail Possessions.

Work area	Location	Works proposed	Railway Impact
Fairview depot	Fairview depot	Minor modifications to the depot including new cleaning facilities.	Trackwork likely to be performed during night-time possessions.
Howth Junction	Howth Junction and Donaghmede Station	Platform extension, track works, station entrance and footbridge modifications.	Weekend day-time possessions may be required for large lifts. Trackwork likely to be performed during night-time possessions.
Clongriffin	Clongriffin Station	Construction of new turnback on Platform 0 including retaining wall to east of tracks.	Trackwork likely to be performed during night-time possessions.
Malahide	Malahide Turnback	Construction of a turnback on a widened embankment between the Strand Road underbridge (UBB29) and the Malahide Viaduct (UBB30). Construction of a new modular reinforced earth wall and earthworks slope on the west side of the existing embankment.	Weekend day-time possessions may be required for enabling works. Trackwork likely to be performed during night-time possessions.
Malahide	Malahide Viaduct	Addition of 3No. OHLE supports to viaduct.	Minimum of six weekend day-time possessions likely required along with regular night-time possessions.
Donabate	XB001 Level Crossing	Level crossing to be closed.	Likely to be performed during night-time possessions.
Donabate	Traction Substation	Temporary Construction Compound to support line wide OHLE installation and construction of permanent substation.	Line-wide work likely to be performed during night-time or weekend possessions.
Donabate	OBB32A	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.
Donabate	Donabate Station	Temporary Construction Compound to support line wide OHLE installation.	Line-wide work likely to be performed during night-time or weekend possessions.
Donabate	OBB33A	Parapet modifications to footbridge.	Likely to be performed during night time possessions.
Donabate	OBB35	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.

Work area	Location	Works proposed	Railway Impact
Rogerstown	Rogerstown Viaduct	Addition of 2No. OHLE supports to viaduct abutments.	Minimum of four weekend day-time possessions likely required along with regular night-time possessions.
Donabate	OBB38	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.
Rush and Lusk	Rush and Lusk Traction Substation	Temporary Construction Compound to support line wide OHLE installation and construction of permanent substation.	Line-wide work likely to be performed during night-time or weekend possessions.
Rush and Lusk	OBB38A	Parapet modifications to footbridge.	Likely to be performed during night time possessions.
Rush and Lusk	OBB39	Track lowering.	Minimum of two weekend day-time possessions likely to be required.
Donabate	OBB41	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.
Rush and Lusk	OBB44	Track lowering.	Minimum of two weekend day-time possessions likely to be required.
Baldongan	OBB46	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.
Baldongan	OBB47	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.
Skerries	OBB49	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.
Skerries	Skerries Station	Temporary Construction Compound to support line wide OHLE installation.	Line-wide work likely to be performed during night-time or weekend possessions.
Skerries	OBB51A	Parapet modifications to footbridge.	Likely to be performed during night time possessions.
Skerries	OBB54	Parapet modifications to footbridge.	Likely to be performed during night time possessions.
Balbriggan	OBB55	Parapet modifications to road overbridge and track lowering.	Minimum of two weekend day-time possessions likely to be required. Parapet modification likely to be during night time possessions
Balbriggan	Balbriggan Viaduct	Addition of 2No. OHLE supports to viaduct.	Night-time possessions for large lifts and prep works.
Balbriggan	OBB57A	Parapet modifications to station footbridge.	Likely to be performed during night time possessions.
Balbriggan	Balbriggan Traction Substation	Temporary Construction Compound to support line wide OHLE installation and construction of permanent substation.	Line-wide work likely to be performed during night-time or weekend possessions.
Gormanston	Gormanston Station	Temporary Construction Compound to support line wide OHLE installation.	Line-wide work likely to be performed during night-time or weekend possessions.

Work area	Location	Works proposed	Railway Impact
Gormanston	OBB68	Parapet modifications to road overbridge.	Likely to be performed during night time possessions.
Laytown	Laytown Viaduct	Addition of 2No. OHLE supports to viaduct.	Likely night-time possessions for delivering materials to southern pier.
Laytown	Laytown Station	Temporary Construction Compound to support line wide OHLE installation.	Line-wide work likely to be performed during night-time or weekend possessions.
Laytown	OBB74A	Parapet modifications to station footbridge.	Likely to be performed during night time possessions.
Drogheda	OBB78	Parapet modifications to road overbridge and track lowering.	Minimum of two weekend day-time possessions likely to be required. Parapet modification likely to be during night time possessions
Drogheda	OBB80	Temporary Construction Compound to support line wide OHLE installation and reconstruction of overbridge.	Weekend day-time possessions for demolition and large lifts. Night-time possessions for OHLE/track level works.
Drogheda	UBK01	Dublin Road bridge reconstruction.	Weekend day-time possessions for demolition and large lifts. Night-time possessions for access to track level works.
Drogheda	OBB81	Station footbridge reconstruction.	Night time possessions for demolition and reinstatement.
Drogheda	Drogheda Station	New platform 4 on Drogheda Freight Sidings.	Any trackwork likely to be performed during night-time possessions.
Drogheda	Depot and stabling roads	Minor modifications to the depot including new cleaning facilities and stabling roads.	Any trackwork likely to be performed during night-time possessions.

The Drogheda Freight Sidings will be impacted by the bridge works at UBK01 (Dublin Road Bridge). The Drogheda Freight Sidings will need to be closed for intermittent periods leading up to the installation of a new bridge deck when closure may be required for a small number of weeks.

It is planned to retain as much functionality of the railway line as reasonably possible during the works, dropping services down to one track at a time (as opposed to full closure) where safe to do so.

1.6.4 Temporary Traffic Management

Temporary traffic management measures, such as road closures and diversions, will be required during the Construction Phase to facilitate the completion of the works.

A selection of specific areas that have been identified as requiring temporary traffic management measures for partial and full road closures are listed in Section 1.6.4. Additional areas will require traffic management following the progression to future design stages and construction.

Road closures and temporary traffic management will be designed and implemented in accordance with the Traffic Signs Manual with prior agreement of the Local Authority and An Garda Síochána. It will be the responsibility of the Contractor to prepare detailed Construction Traffic Management Plans for each phase of the construction activities which impact on the public road network.

A description of some of the works impacting the road network and proposed mitigation is provided below. This will be further developed by the contractor.

1.6.4.1 Partial Road Closures

Some of the works resulting in partial road closures and proposed mitigation is provided below, in Table 1-7. This will be further developed by the contractor. Stop-go traffic management may be required during periods of partial road closures.

Table 1-7 Proposed Partial Road Closures due to Construction.

Road	Closure Type	Reason	Approximate Duration
R126	Partial	Utility diversion	4 weeks
Donabate Station access (Turvey Avenue)	Partial	Utility diversion	1 week
R128	Partial	Utility diversion	2 weeks
Horestown Road	Partial	Utility diversion	1 week
L1285	Partial	Utility diversion	2 weeks
L1357 Barnageeragh Road	Partial	New Track Paralleling Hut (TPH)	12 weeks
L1270	Partial	Skerries South substation access	2 weeks
L1270	Partial	Utility diversion	1 week
R127	Partial	Utility diversion	2 weeks
R127	Partial	Utility diversion	4 weeks
R127	Partial	Utility diversion	1 week
Seapoint Lane	Partial	Utility diversion	1 week
Harbour Road	Partial	UBB56 modification	1 week
L1620 Station Road	Partial	Utility diversion	1 week
Coastview Cottages	Partial	UBB72 modification	8 weeks
L5615	Partial	Utility diversion	1 week

Road	Closure Type	Reason	Approximate Duration
Local Road?	Partial	Utility diversion	1 week
Wheaton Hall Road	Partial	Utility diversion	1 week
McGrath's Lane	Partial	OBB80/80A/80B reconstruction	104 weeks
R132	Partial	UBK01 widening	26 weeks
St Mary's Villas	Partial (May have periods of full closure at weekends)	UBK01 widening	26 weeks Some weekends

The construction works will impact on the Broadmeadow Way greenway (if in place prior to the commencement of construction) with the full width of the greenway being reduced for the duration of construction (18 months). Working space will vary along the wall but will be kept to the minimum to ensure a minimum 3m width of greenway is maintained to reduce the impact on the newly constructed greenway. Phasing of the work in small sections will also be used to limit the impact to the greenway and the existing embankment. The phasing and reduced width sections will continue over the full construction duration.

1.6.4.2 Full Road Closures

A description of some of the works resulting in full road closures and proposed mitigation is provided below. This will be further developed by the contractor.

1.6.4.2.1 Beaverstown Golf Club Access

An existing Eir cable crosses the railway just to the south of the overbridge (OBB35) carrying the access road for Beaverstown Golf Club. This needs to be diverted underground. A temporary work area is required to either side of the bridge. The road will need to be temporarily closed (full road closure) under traffic management for the duration of the diversion, likely for approximately 3 days, and temporarily closed (partial road closure) for approximately 1 week.

Pedestrian access to the golf club will be maintained during both full and partial closures. Upon agreement with Eir, it may be possible to carry out these works at nighttime to minimise disruption to the Beaverstown Golf Club.

1.6.4.2.2 Rogerstown Lane

The existing overhead line, OH-DV5 that crosses the railway line is planned to be diverted along Rogerstown Lane over OBB38. Rogerstown Lane will need to be temporarily closed (full road closure) under traffic management for the duration of the diversion in that area, approximately a week. The existing field accesses would be used to access the agricultural land areas.

Local access for all modes will be maintained throughout the road closure and construction period.

1.6.4.2.3 Balbriggan Viaduct (UBB56) Modifications

Pedestrian access

The walkways adjacent to the viaduct would need to be closed for several weeks. It would be preferable to only close one at a time to provide ongoing pedestrian connectivity to either side of the bridge. If this is not possible the alternative walking route is shown in the following Image 1-27. This route is to be planned and agreed with any other development plans that may be ongoing, or previously completed, in this area.

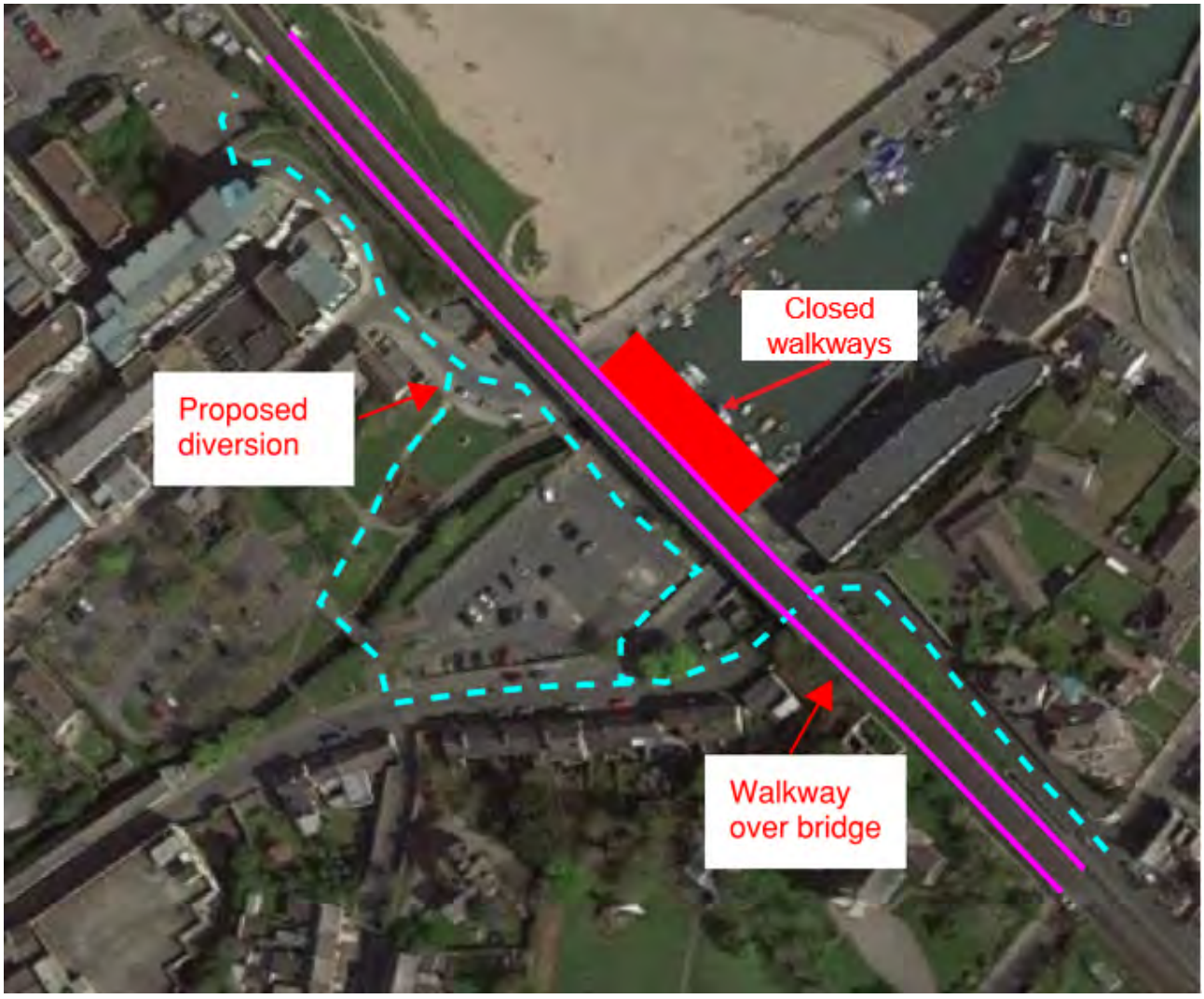

Image 1-27 Pedestrian diversion during UBB56 modification

Harbour Road

It will be necessary to close Harbour Road over-night on several occasions, or over a small number of weekend days, to site a crane for lifting large structural sections onto or off the Balbriggan viaduct (UBB56). Traffic would need to be diverted west, further into the centre of Balbriggan.

There are many one-way roads near Balbriggan Viaduct, so diverting a steady flow of traffic may be difficult outside of night-time possessions. Some form of traffic management may be required for several of the one-way roads fed by Harbour Road to maintain access during the road closure. The proposed traffic diversion is illustrated in Image 1-28. Local access will be maintained throughout the road closure period.

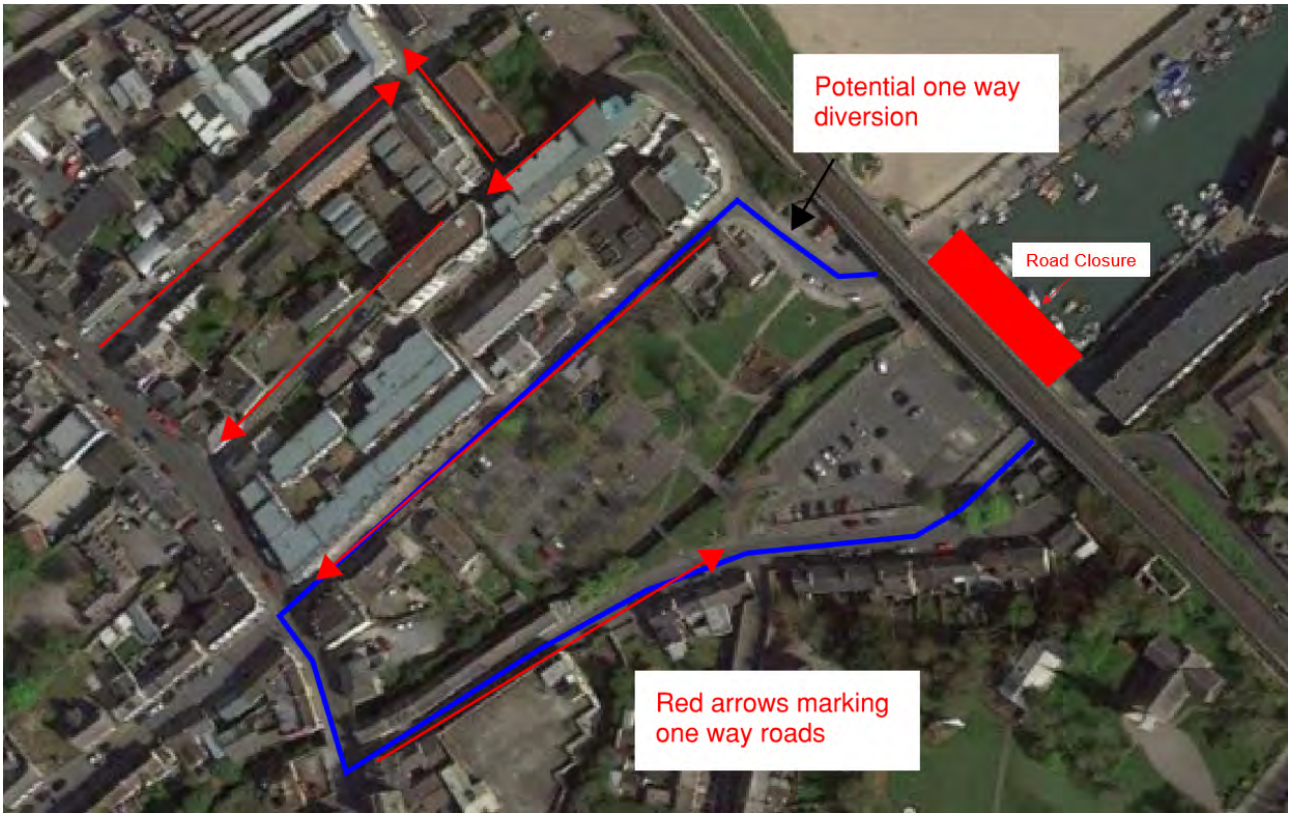

Image 1-28 Potential traffic diversion during UBB56 construction

1.6.4.2.4 L1620 Station Road

An existing Eir cable crosses the railway at Gormanston Station and is planned to be diverted underground. A temporary work area is required to either side of the bridge, OBB 66. The road will need to be temporarily closed (full road closure) under traffic management for the duration of the diversion, likely for approximately 3 days, and temporarily closed (partial road closure) for approximately 1 week. Pedestrian access will be maintained during both full and partial closures.

Access to Gormanston station will be maintained throughout the road closure and partial closure.

1.6.4.2.5 R132 Dublin Road Bridge (UBK01) – Drogheda

For the modification works at the Dublin Road bridge (UBK01) in Drogheda, there will be some weekends where full closure of the R132 road will be required and other extended periods where the road will be reduced to a single lane under a traffic light contra-flow system. Removal and installation of bridge deck units is when total closure will be required; work on abutments is when single lanes will need to be put into operation.

During modification, the road will need to be closed completely, during which a traffic diversion will be in place. These periods are likely to be for only a few days at a time, likely taking place over weekends where reasonably practicable. Whenever there is at least one lane of traffic open under the bridge it is planned that there will be a public footpath kept open also.

This footpath is likely to be closed when the road is totally closed, for safety reasons. The proposed traffic diversion is illustrated below in Image 1-29. The proposed pedestrian diversion is in Image 1-30. Drogheda station access and local access will be maintained throughout the road closure period.

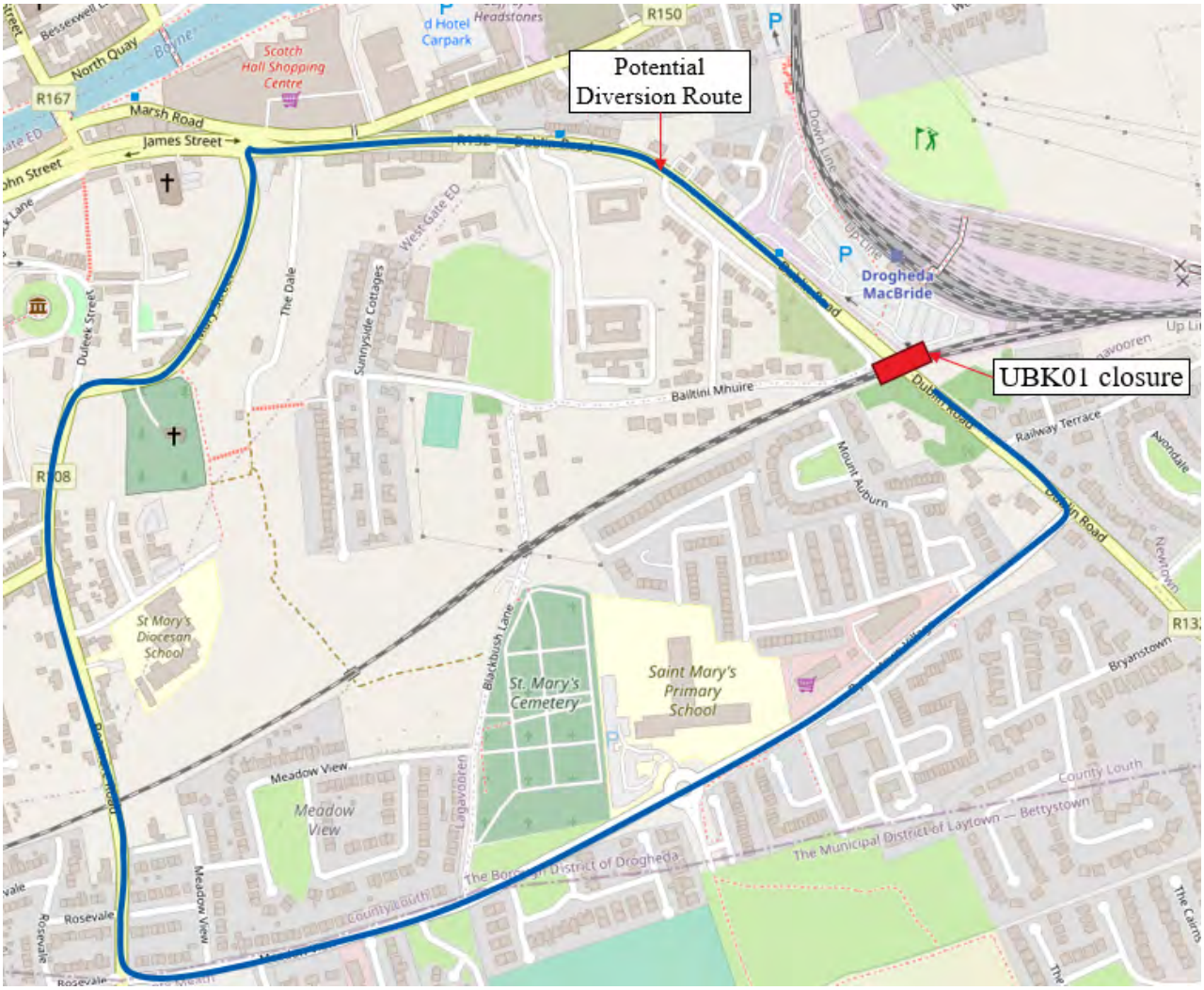

Image 1-29 Potential traffic diversion during UBK01 replacement works

Image 1-30 Potential pedestrian diversion during UBK01 replacement works

1.6.4.2.5.1 St. Mary's Villas Closure

St. Mary's Villas may have periods of closure where it leads down onto R132 Dublin Road, depending on later design, methodology planning and traffic management layouts. These periods are likely to be for only a few days at a time, probably over weekends. The proposed traffic diversion is illustrated below in Image 1-31. Residents of St. Mary's Villas will maintain access to their properties throughout the duration of the works and during periods of road closures.

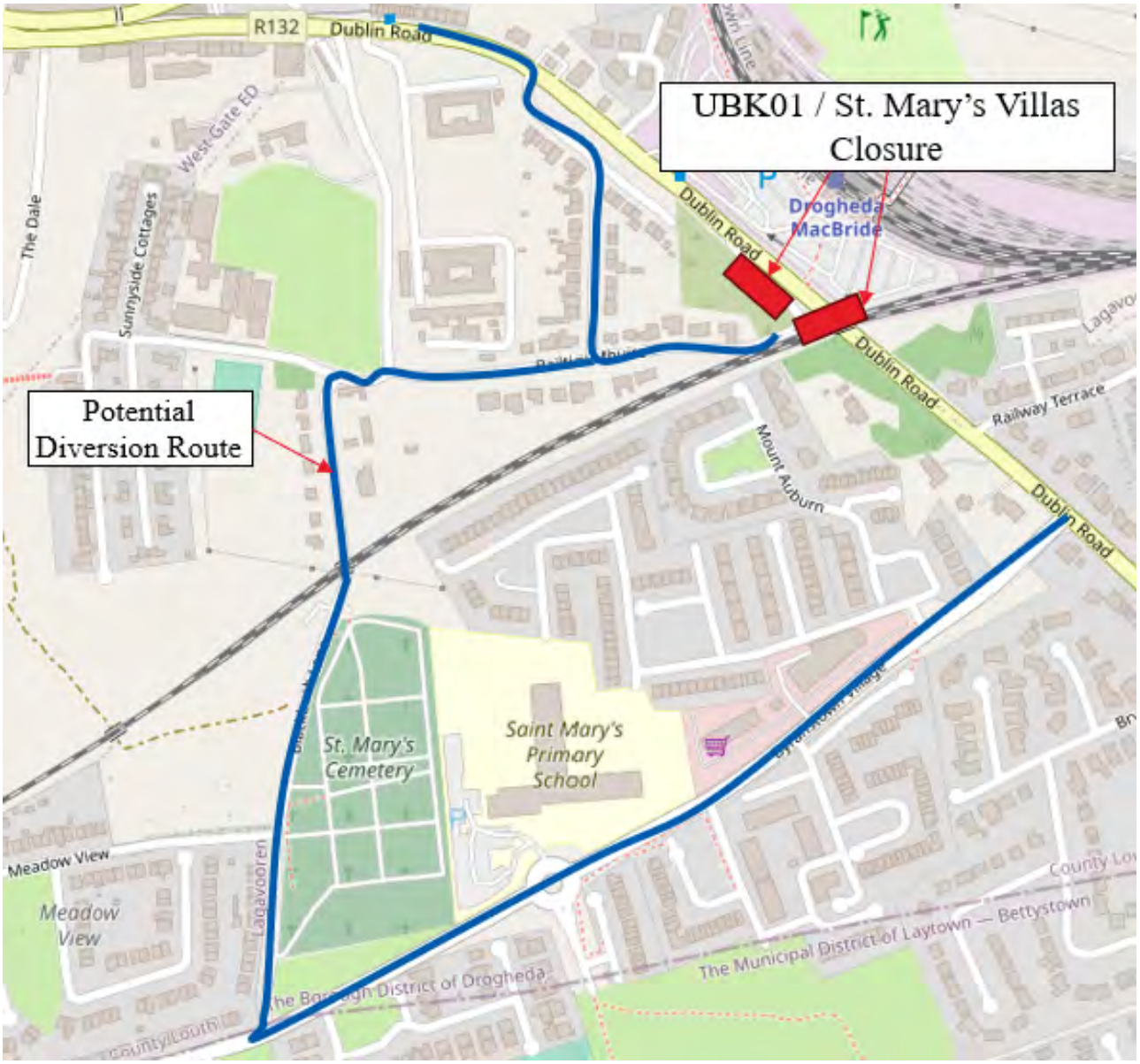

Image 1-31 Potential traffic diversion during St. Mary's Villas closure

1.6.4.2.6 Railway Terrace OBB80/80A/80B

Railway Terrace / McGrath's Lane, at Drogheda, will become a temporary cul-de-sac whilst the OBB80/80A80/B bridge is replaced. A temporary access road will be constructed to the north linking to Marsh Road (R150) to facilitate access for residents to properties on McGrath's Lane, to support the northern Construction Compound and to provide road vehicular access to the bridge site, see Image 1-32 for the potential traffic diversion during OBB80/80A/80B replacement works.

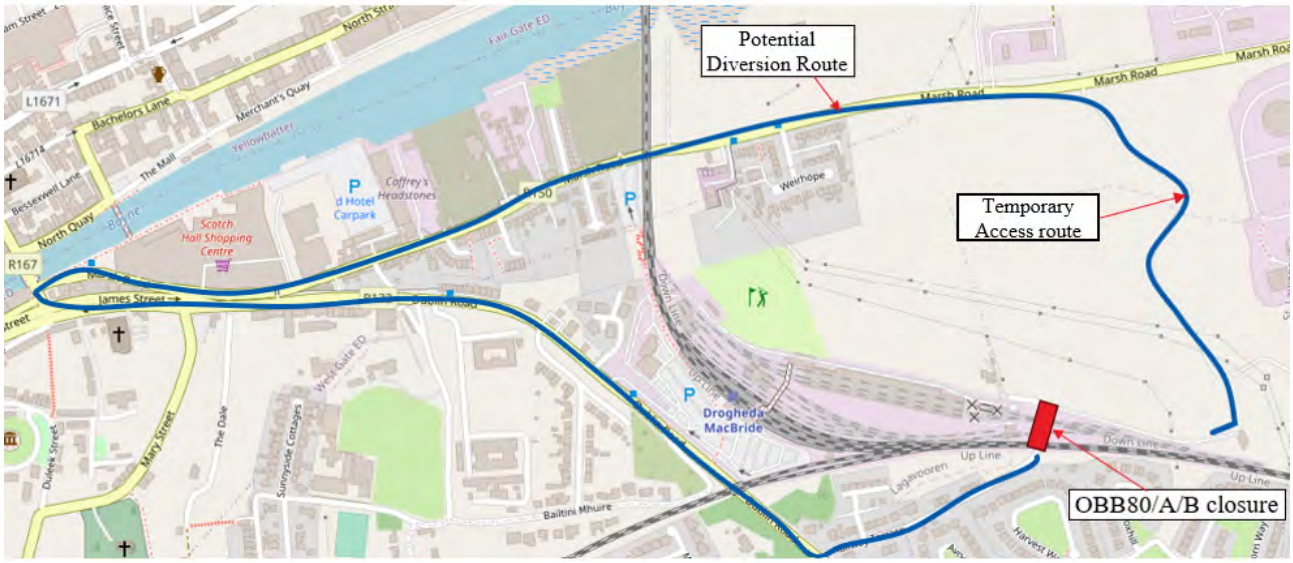

Image 1-32 Potential traffic diversion during OBB80/80A/80B replacement works

1.7 Interface with Other Projects

Interface liaison will take place on a case-by-case basis, 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 Development works, that temporary traffic management measures are implemented in a planned and coordinated manner and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

1.8 References

Department of Transport (DoT) (2021). Traffic Signals Manual, https://www.trafficsigns.ie/

Appendix H: Surface Water Management Plan

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1. APPENDIX H: CONSTRUCTION SURFACE WATER MANAGEMENT PLAN (SWMP)

1.1 Introduction

This Construction Surface Water Management Plan ("the SWMP") incorporates information on the control and management measures taken in order to avoid, prevent, or reduce any significant adverse impacts on the surface water environment during the Construction Phase of the DART+ Coastal North Project hereafter referred as the "proposed development".

During the Construction Phase of the proposed development, the control and management measures outlined below correspond to the best practice approaches that can be used to ensure construction does not increase pollution of watercourses or flood risk in line with River Basin Management Plans (RBMP) for Ireland.

1.1.1 Objectives

The main objectives of the SWMP are to:

- Ensure sediment and pollution control requirements are incorporated into the design stage and land requirements for the proposed development as far as practicable;
- Ensure flood risk controls are included in the design, where necessary;
- Minimise and if possible, avoid potential sediment and other contaminants such as fuel, concrete, oil, and other materials discharging into a watercourse;
- Minimise the duration and area of exposed ground which could potentially create runoff; and
- Provide appropriate control and containment measures on site in order to reduce any potential impacts in the event of an accidental spillage or site runoff and maintain sediment and pollution controls during the Construction Phase of the proposed development.

1.1.2 Potential Sources of Water Pollution

Potential sources of water pollution, such as sediment and surface water runoff, could arise from the following activities/areas:

- Earthworks – transportation, excavation, and processing of materials, within and outside the proposed development, together with materials deposition and temporary stockpiling (where required).
- Surface exposure is typically associated with the following activities within the proposed development:
    - Preparatory and vegetation clearance works, such as topsoil stripping, and
    - Tracking of machinery.
- Concrete activities – generation of highly alkaline silt (pH 11.5) through the use of concrete, grout, and other cement-based products during the construction of structures, OHLE foundations, carriageway and pavement works.
- Watercourse crossings – increased likelihood of impacts on water quality when construction occurs over or near surface waters (e.g., demolition works, bridge modifications, OHLE installation on overbridges and viaducts, Construction Compounds in the vicinity of watercourses).

- Construction Compound and machinery re-fueling areas.

Section 1.3 outlines mitigation measures, to be implemented by the Contractor, in order to reduce the likelihood of any pollution incidents occurring during the Construction Phase.

1.1.3 Duties and Responsibilities

The duties and responsibilities of key stakeholders are listed in Appendix D of the CEMP. Accordingly, the Site Environmental Manager, or equivalent, will be responsible for the further development, implementation, and maintenance of the SWMP.

1.2 Surface Water Receptors

The project site extends c. 50 km across four administrative/local authority areas including Louth, Meath and Fingal County Councils and Dublin City Council. The main surface water receptors in the project area include the rivers Boyne, Nanny, Delvin, Mayne, Pilltown and Liffey. There are 18no. watercourse crossings along the entire length of the proposed development.

The proposed development lies within the catchments of the Boyne (HA 07), Nanny-Delvin (HA 08) and Liffey and Dublin Bay (HA 09). The 2016-2021 WFD status of these water bodies show that the watercourses in the vicinity of the proposed development have “poor” status apart from one water body, the Tolka_SC_020. However, all waterbodies have set 2027 as a date to meet their environmental objectives.

1.3 Mitigation and Management Measures

1.3.1 Control of Sediments

1.3.1.1 Sediment Control Plan (SCP)

The development of a Sediment Control Plan (SCP) will be undertaken prior to commencement of construction by the appointed Contractor. This includes the monitoring of suspended solids and turbidity levels ensuring that sediment concentrations are up to standard prior to discharge.

Works in Flood Zones A and B should be avoided where possible. For any works in these flood zones, the Contractor will be required to provide appropriate mitigation measures within a method statement for the removal of materials to minimise potential sediment discharge into the nearest watercourse.

1.3.1.2 Runoff rates

- Works areas will be kept dry as far as reasonably practicable;
- Bunds of non-erodible material will be used adjacent to watercourses to avoid contaminated water entering the watercourse as far as reasonably practicable;
- Settlement tanks, silt traps/bags and bunds will be used where required to remove silt from surface water runoff. Sizing of the tanks will be based on best available guidelines such as CIRIA Technical guidance C648: Control of Water Pollution from Linear Construction Projects (CIRIA 2006). Any construction work within a 10m buffer zone must be provided with these measures to minimise sediment discharge to a watercourse;

- Weather conditions to be checked by Contractor and coordinated with any planning construction activities in order to minimise surface water runoff from the site.

1.3.1.3 Water Quality

The Contractor will be responsible for ensuring that surface water control measures, such as settlement areas or silt fences, are carried out/monitored daily. Additionally, water bodies crossed by the proposed development shall be visually inspected weekly by the Contractor.

Water pollution indicators include:

- Water colour and transparency changes;
- Increase of silt levels in the water;
- Oily sheen on the water surface; and
- Floating detritus, scums, and foams.

In case any contamination is observed, an investigation shall be carried out (depending on the source and nature) in order to prevent any further worsening contamination status, with any incidents being recorded and investigated in more detail to prevent a recurrence.

1.3.2 Construction Compound

As far as reasonably practicable Construction Compounds have been chosen to avoid high flood risk zones and maintain a minimum buffer of 50m from surface watercourses. An exception for this would be the construction of the new arch bridge at Clongriffin at the Mayne River water crossing parallel to the existing railway bridge. The Construction Compound at this location also encroaches on the Mayne River floodplain. At this location, it will be necessary to apply the following measures to mitigate the potential impacts:

- Obtain all necessary consents from the relevant authorities (IFI, OPW, etc.);
- Bank stabilisation and erosion protection should be in place for the entire construction period; and
- Reinstate banks that are affected by the works to original or better stable state.

Further details on the requirements for the Construction Compounds are provided in Section 2.2.9 of Appendix A5.1 (CEMP) in Volume 4 and in Chapter 4 (Description of the Proposed Development) in Volume 2 of this EIAR.

1.3.2.1 Materials/Fuel Storage

- Refuelling of all plant, machinery, and vehicles will be undertaken only in designated areas where leaks and spills can be contained relatively easily. Spill kits will be made available on all temporary and permanent construction sites. Refuelling areas must be kept at least 50m away from watercourses;
- Construction materials to be managed in a such a way as to effectively minimise the risk posed to the aquatic environment; and
- Excavated material to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses.

1.3.3 River and Stream Crossings

At all the 18no. watercourse crossings across the full area of the proposed development, the following best practice guidelines shall be followed at these crossing locations as far as reasonably practicable:

- The contractor shall guarantee, prior to construction commencement, that all construction equipment is in good working condition and that there is no need for refueling or maintenance at, or near, crossing locations;
- Fluids such as fuels and chemicals shall be handled carefully in order to avoid spillages;
- Establish a 50m distance between watercourses and fueling and maintenance works;
- All spillages must be contained and removed from site immediately; and
- The Ecological Clerk of Works (ECoW) shall be made aware of any accidental spills.

1.3.4 Use of Concrete

The use and management of concrete in or close to watercourses must be carefully controlled to avoid spillage which has a deleterious effect on water quality and aquatic habitats and species.

Where the use of in-situ concrete near and in watercourses cannot be avoided, control measures will need to be put in place. These are noted below:

- When working in or near the surface water and the application of in-situ materials cannot be avoided, the use of alternative materials such as biodegradable shutter oils shall be used;
- Any plant operating close to the water will require special consideration on the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). Care will be exercised when slewing concrete skips or mobile concrete pumps over or near the watercourses;
- Placing of concrete in or near the watercourses will be carried out only under the supervision of a suitably qualified Environmental Manager;
- There will be no hosing into surface water drains of spills of concrete, cement, grout or similar materials. Such spills shall be contained immediately, and runoff prevented from entering watercourses;
- Concrete waste and wash-down water will be contained and managed on site to prevent pollution of the watercourses;
- On-site concrete batching and mixing activities will only be allowed at the identified Construction Compound;
- Washout from concrete lorries, with the exception of the chute, will not be permitted on site and will only take place at the Construction Compound (or other appropriate facility designated by the supplier);
- Chute washout will be carried out at designated locations only. These locations will be signposted;
- The concrete plant and all delivery drivers will be informed of their location with the order information and on arrival on site; and,

- Chute washout locations will be provided with appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks. The clear water from the settlement tanks shall be pH corrected prior to discharge (which shall be by means of one of the construction stage settlement facilities) or alternatively disposed of as waste in accordance with the Contractor's Construction and Demolition Waste Management Plan.

1.3.5 Vehicles and Plant

- Vehicles and plant available for use on the proposed development will be regularly inspected to ensure optimum fuel efficiency in order to avoid any leakage and subsequently repaired when not in good working order;
- All vehicles to be equipped with spill kits; and
- Vehicles and plant will be parked at a safe distance from any drains in order to avoid any spillages.

1.4 Monitoring Requirements

The Site Environmental Manager will be responsible for the monitoring of the drainage system effectiveness during the Construction Phase of the proposed development in order to reduce the risk of discharge of silt-laden water into the receiving waters. The frequency of the monitoring will be associated with any observed weather changes and drainage conditions throughout the project.

Surface water control measures, such as settlement tanks, fuel storage areas, or silt fences, will be monitored daily by the Contractor, together with any water bodies crossed by the proposed development. Suspended solids will be monitored as well and included as part of the inspection.

Depending on the water quality parameters, an investigation will be undertaken to determine the cause of contamination and its original source. In order to prevent further contamination, a more detailed investigation will be carried out to prevent any possible recurrences. Relevant regulatory authorities will be informed, if required.

The contractor will be responsible for undertaking any investigation of the potential cause related to quality pollution indicators observed on site, with the immediate stoppage of any works. Sampling will be undertaken, following recording of the details of the activity identified as the main cause of the incident or potential activities capable of causing the incident, the nature of the impacts and mechanism of pollution, and measures proposed and implemented in order to avoid any reoccurrence.

Monitoring and transparent reporting will reduce the likelihood of any small incident becoming a serious one which would require regulatory action. A proactive approach should be taken in providing any relevant information to the regulator and the Client, which will reflect on how these events are handled professionally and taken seriously on site.

1.5 References

CIRIA (2001). Control of Water Pollution from Construction Sites. CIRIA Technical guidance C532.

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Transport Infrastructure Ireland (TII, formerly NRA) (2005). Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

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