

EirGrid

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Glossary of Terms

Term, Abbreviation or Acronym	Description
AA	Appropriate Assessment
BS	British Standard
BSI	British Standard Institution
СЕМР	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
СМР	Construction Management Plan
CRWMP	Construction Resource and Waste Management Plan
СТМР	Construction Traffic Management Plan
DMP	Dust Management Plan
EIAR	Environmental Impact Assessment Report
EIRP	Environmental Incident Response Plan
EnCoW	Environmental Clerk of Works
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
FCC	Fingal County Council
GDPR	General Data Protection Regulation
ha	hectare
HDD	Horizontal Directional Drilling
IEMA	Institute of Environmental Management and Assessment
IFI	Inland Fisheries Ireland
ISMP	Invasive Species Management Plan
ISO	International Organization for Standardization
LED	Light-emitting diode
МСС	Meath County Council
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
PIR	Passive Infrared Sensor
PSCP	Project Supervisor for the Construction Phase
PSDP	Project Supervisor Design Process
RAMS	Risk Assessments and Method Statements
SHESQ	Safety, Health, Environment, Security and Quality
SWMP	Surface Water Management Plan
тсс	Temporary Construction Compound
ТІІ	Transport Infrastructure Ireland

1. Introduction

1.1 The Purpose of the Construction Environmental Management Plan

This Construction Environmental Management Plan (CEMP) has been prepared to present the approach and application of environmental management and mitigation measures for the construction of the East Meath-North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). It aims to ensure that adverse effects and impacts from the Construction Phase of the Proposed Development, on the environment and the local communities, are avoided or minimised.

The purpose of this CEMP is to document and describe the main activities that will be undertaken to facilitate the Proposed Development and to provide a framework of environmental protection measures that will be implemented prior to commencement of and throughout the duration of the Construction Phase.

The construction contractor, once appointed, will be required to update this CEMP with details of the plans and procedures for their specific activities on-site, including method statements. Such plans and procedures must adhere to the requirements as delineated in this CEMP, representing the minimum standards to which the appointed contractor must adhere. As such, this CEMP is an iterative document that will be subject to further iterations through collaboration between the developer and the relevant planning authority, for example on matters of detailed design and / or in response to any relevant conditions of approval set by the consenting authority.

The Proposed Development will be undertaken by an appointed contractor, that will be appointed by the Electricity Supply Board (ESB). The appointed contractor will be responsible for updating the CEMP for approval by the ESB and agreement with the planning authority, prior to the commencement of works. In the event that planning approval is given, any condition(s) relating to a CEMP which may be attached to such an approval, will be implemented in accordance with the requirements of the condition.

The appointed contractor's method statements will be prepared in accordance with this CEMP. The updated CEMP will set out the detailed approach and methodology which the appointed contractor will follow in scheduling and undertaking the work. The method statements will also incorporate the control measures detailed in the CEMP, in addition to specified conditions that may be prescribed in any approval from An Bord Pleanála for the Proposed Development and measures provided in the Environmental Impact Assessment Report (EIAR) (included in the planning application pack) in relation to environmental protection associated with the activities outlined in this CEMP.

1.2 Objectives of the CEMP

The purpose of the CEMP is to:

- Provide a mechanism for ensuring the delivery of mitigation measures to avoid or minimise environmental impacts;
- Ensure compliance with legislation and identifying where it will be necessary to obtain authorisation from relevant statutory bodies;
- Provide a framework for compliance auditing and inspection to ensure the agreed environmental aims are being met; and
- Ensure a prompt response to any potential non-compliance with legislative requirements, including reporting, remediation and any additional mitigation measures required to prevent a recurrence.

The requirements of the CEMP will be implemented in full by the appointed contractor.

1.3 Compliance with Legislation, Standards and Guidance

There is a broad range of legislation covering different aspects of environmental protection and requirements for avoidance or mitigation and these are detailed throughout Volume 2 of the EIAR which is included in the planning application pack. These are supported by additional statutory guidance; 'standards', such as Irish Standards or International Organization for Standardization (ISO) Standards; and other 'best practice' guidance, including industry codes of practice. Where applicable, references to specific legislation, standards and guidance are included within each subsequent section of this CEMP.

This CEMP will be kept under review and updated as required as a result of new or amended legislation, standards and guidance, subject to approval by the planning authority.

This CEMP summarises the requirements from legislation and codes of practice which apply to the works being undertaken, including the following:

- Number 10 of 2005 Safety, Health, and Welfare at Work Act 2005 (as amended);
- S.I. No. 291 of 2013 Safety, Health and Welfare at Work (Construction) Regulations 2013, as amended by S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021;
- S.I. No. 299 of 2007 Safety, Health, and Welfare at Work (General Application) Regulations 2007 (Revised) (Updated to 24 May 2023), as revised by S.I. No. 255/2023 Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2023;
- S.I. No. 218/2001 Safety, Health, and Welfare at Work (Confined Spaces) Regulations, 2001;
- S.I. No. 99/2023 European Union (Drinking Water) Regulations 2023;
- S.I. No. 272/2009 European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended);
- S.I. No. 9/ 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended);
- S.I. No. 113/2022 European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022;
- Number 1 of 1977 Local Government (Water Pollution) Act, 1977 (Revised) (Updated to 14 October 2021);
- S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 (as amended);
- Number 39 of 1976 Wildlife Act, 1976 (as amended);
- Environmental Protection Agency (EPA) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects (EPA 2006);
- Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016); and
- Control of water pollution from linear construction projects. Site guide (C649) (CIRIA 2006).

1.4 Supporting Plans and Documents

The following reports have been prepared for the Proposed Development and this CEMP should be read in conjunction with these reports:

- EIAR (included in planning application pack);
- Natura Impact Statement (NIS) and Appropriate Assessment (AA) Screening Report (both included as standalone documents in the planning application pack);
- Environmental Incident Response Plan (EIRP) (included as Appendix A in this CEMP);

- Construction Traffic Management Plan (CTMP) (included as Appendix B in this CEMP);
- Construction Resource and Waste Management Plan (CRWMP) (included as Appendix C in this CEMP);
- Surface Water Management Plan (SWMP) (included as Appendix D in this CEMP); and
- Non-Native Invasive Species Management Plan (ISMP) (included as Appendix E in this CEMP).

Table 1 lists the plans that will be developed or updated by the appointed contractor in accordance with the CEMP for each stage of the Proposed Development to set out in detail the management systems, procedures and approaches that will be implemented during construction to comply with the principles set out in the CEMP.

Plan/Strategy	Description
Environmental Incident Response Plan (EIRP)	The EIRP establishes procedures that could 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 for affecting health, property, and the environment and will detail the contractor's response in the event of any pollution incident on site. The EIRP has been included as Appendix A in this CEMP and will be updated as required by the appointed contractor.
Construction Management Plan (CMP)	A detailed construction plan and schedule will be developed for Proposed Development to ensure that the construction phasing allows for maximum efficiency.
Safety, Health and Environment Plan	The Safety, Health and Environment Plan will detail relevant safety, health and environmental information relating to all construction activities.
Project Environmental Management Plan (PEMP)	The PEMP will detail the environmental mitigation measures that will be implemented during each stage of the construction works and will be in accordance with the CEMP.
Construction Traffic Management Plan (CTMP)	The CTMP details the strategy and mitigation measures to be used to limit the impact on existing users of the public highway network. The CTMP has been included as Appendix B in this CEMP and will be updated as required by the appointed contractor.
Dust Management Plan (DMP)	The DMP will provide detail for the management of dust which is likely to arise during the Construction Phase of the Proposed Development.
Construction Resource and Waste Management Plan (CRWMP)	The CRWMP is an action plan for the management of waste which is likely to arise on site during the Construction Phase of the Proposed Development. The CRWMP has been included as Appendix C in this CEMP and will be updated as required by the appointed contractor.
Surface Water Management Plan (SWMP)	The SWMP details the control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase. The SWMP has been included as Appendix D in this CEMP and will be updated as required by the appointed contractor.
Non-Native Invasive Species Management Plan (ISMP)	The Non-Native ISMP contains management recommendations in respect of preventing the spread of and managing a range of non-native invasive species along the Proposed Development. The Non-Native ISMP has been included as Appendix E in this CEMP and will be updated as required by the appointed contractor.

Table 1: Plans to be Prepared or Updated by the Appointed Contractor

1.5 Roles and Responsibilities

Establishing roles and responsibilities on-site is important to ensure the successful construction of the Proposed Development, including the implementation of this CEMP, as well as subsequent updates by the appointed contractor. The responsibilities of the organisations and personnel who will be responsible for implementing, monitoring, responding to, and updating the CEMP are described in Table 2.

1.5.1 Project Supervisor for the Construction Phase

A Project Supervisor for the Construction Phase (PSCP) will be appointed for the Proposed Development when the contractors are appointed to carry out the works. The PSCP will be responsible for developing the Construction Phase Safety and Health Plan, coordinating the works of the appointed contractor and providing the Project Supervisor Design Process (PSDP) with information required in the Safety File. Upon their appointment, the appointed contractor will be appointed the role of PSDP and will take on the role of the PSCP.

1.5.2 Project Supervisor Design Process

The ESB or an ESB appointed contractor or designer will be PSDP for the detailed design stage of the Proposed Development. This will ensure that they are addressing and coordinating safety and health matters from the very early stages of the Proposed Development.

Role	Responsibility						
Senior Project Manager	• Overall responsibility for ensuring conformance with the CEMP and incident investigation.						
Project Supervisor (PSCP) EirGrid	 Overseeing Construction Phase health and safety; Ensuring all staff, site visitors and delivery drivers receive a relevant project induction as appropriate; and Investigate an investigation into any incident. Undertakes a Client Engineering function, including technical oversight of construction in regular liaison with the ESB Networks; and EirGrid Agricultural Liaison Officers (ALO) and Community Liaison Officers (CLO) will liaise with the lead project and lead regidents. 						
ESB Engineering and Major Projects (ESB EMP)	 With the tandowner and tocal residents. Project leader for construction of the Proposed Development will implement a scope of work agreed with EirGrid including environmental mitigation measures; Discharges the conditions of planning permission, including preparation of any details to be submitted to, and agreed with the planning authorities prior to commencement of the Construction Phase; Appoints contractor(s) to undertake the construction of the Proposed Development, with the scope of the contract including the preparation of the detailed site-level CEMP and associated method statements. The site-level CEMP and method statements will be approved by the ESB and the Project Ecologist prior to the commencement of any work; Responsible for appointment of a suitability qualified Project Ecologist to ensure all environmental and ecological mitigation measures detailed in the appointed contractor site-level CEMP and any associated method statements are implemented in full, as well as on-site monitoring and reporting; Monitor the Construction Phase of the Proposed Development and ensure works are being carried out in accordance with the appointed contractor's approved method statement(s) and safety procedures etc.; Technical and Environmental consultants to the ESB will be responsible for the provision of methodologies to the appointed contractor; and Environmental oversight of construction in liaison with the Project Ecologist, who will liaise with relevant statutory agencies such as the National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland (IFI), Meath County Council (MCC) and Fingal County Council (FCC) 						
Safety, Health, Environment, Security and Quality (SHESQ) Manager	 Reviewing risk assessments and method statements (RAMS); Manager of the Safety, Health and Environment Plan; Reviewing, updating and issuing the CEMP; Incident investigation. Liaison with the emergency services; Site inspection; Reviewing applications for environmental consents and permits; and Sensible monitoring. 						
Project Environmental Manager or Environmental Clerk of Works (EnCoW)	 Site inspection; Producing and maintaining Consents Register; Preparing and submitting applications for environmental consents and permits; Liaison with third parties and licensing authorities; Organising environmental surveys and monitoring; and Discharging consent conditions. 						
Waste Manager	 Responsible for the Construction Resource and Waste Management Plan; Ensure objectives and measures contained within this CEMP are transposed and implemented including associated target re-use / recycling rates; Facilitate effective communication of the waste management objectives with all operatives associated with the Proposed Development; and Maintain accurate records on the quantities of waste / surplus materials generated and the cost associated with waste generation and management. 						
Emergency Response Team	 Responsible for coordinating and implementing the Environmental Incident Response Plan; This team will be trained in emergency response procedures and will be familiar with the specific environmental risks and hazards associated with the construction works; and 						

Table 2: Responsibilities of the Likely Environmental Construction Team

Role	Responsibility						
	A Lead member of this team should be appointed to be responsible for the management, communications, and reporting during an emergency incident.						
Community Liaison Team	• The appointed contractor will appoint a team, who will be expected to interface with the ESB and EirGrid's Community Liaison Team to ensure the successful delivery of the Proposed Development in so far as communities are concerned.						

1.6 The Appointed Contractor

An appropriate contractor will be appointed for the Proposed Development by the ESB and will be required to implement the CEMP in full. The appointed contractor will be responsible for updating and implementing the CEMP through contractual agreements with the ESB, in compliance with the minimum requirements as set out in the CEMP.

For each work element, the appointed contractor will prepare or update the relevant method statement / management plans as detailed in Table 1. The appointed contractor will also have consideration of safety, health and environmental management as outlined within this CEMP.

Environmental issues that have the potential to arise during the construction of the Proposed Development will be reviewed at the inaugural meeting and subsequent regular meetings will be held by the appointed contractor. Daily toolbox talks will be held by the appointed contractor to inform the construction staff of any environmental issues and any changes to the CEMP.

The ESB, and the appointed contractor will ensure that all staff and subcontractors are trained and competent in the management of environmental impacts to a level that is appropriate to their role.

The appointed contractor's Project Environmental Manager or Environmental Clerk of Works (EnCoW) will have suitable environmental qualifications. The EnCoW will have the necessary experience and knowledge appropriate to the role (including experience of Horizontal Directional Drilling (HDD) and will be a member of a relevant professional body, such as the Institute of Environmental Management and Assessment (IEMA)). The suitability of qualifications / experience of the proposed EnCoW will be confirmed by a senior / principal environmental consultant / ecologist from the Employer's Representative. The EnCoW will be delegated sufficient powers under the construction contract so that they will be able to instruct the appointed contractor and any subcontractors to stop works, and to direct the carrying out of emergency mitigation / clean-up operations. The EnCoW will also manage consultation with environmental bodies including the National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI).

1.7 Structure of the CEMP

The remainder of this CEMP is split into two sections. Section 2 describes the general principles that will be adopted on the construction site(s). The general principles cover the following elements:

- General provisions;
- Health and safety;
- Construction programme;
- Construction hours;
- Construction arrangements;
- Construction site layout and appearance including proposed Temporary Construction Compounds (TCCs), HDD Compounds and working areas;
- Fencing;
- Traffic signs, road markings and lighting;
- Welfare;

- Pest control and invasive species;
- Utility works;
- Reinstatement;
- Approvals, consents and licenses; and
- Public engagement and communications.

Section 3 describes the mitigation measures that will be adopted during the construction of the Proposed Development. The mitigation measures that will be implemented to reduce risk will be on the following environmental aspects:

- Human Health;
- Air Quality;
- Climate;
- Noise and Vibration;
- Biodiversity;
- Soils, Geology and Hydrogeology;
- Hydrology;
- Archaeology, Architectural Heritage and Cultural Heritage;
- Traffic and Transport;
- Agronomy and Equine;
- Waste;
- Material Assets;
- Landscape and Visual; and
- Cumulative Impacts and Environmental Interactions.

2. General Site Operations

2.1 Objective

The main objective will be to undertake the Proposed Development having regard to the safety and security of the public and construction personnel while also mitigating the impact of general site operations on the environment.

2.2 General Provisions

The following will be adhered to in relation to the commencement of the Proposed Development by the appointed contractor:

- The updated CEMP and all relevant contract documents will be made available to all members of the team and to any subcontractors and their respective teams;
- Ensure all supervisors are familiar with these documents. All site managers/ officers will be clear on the details of the environmental constraints before the works commence. Ensure all on-site procedure manuals are implemented as necessary;
- Ensure induction training includes environmental issues. Ensure all members of the appointed contractor and subcontractor teams are briefed on all environmental procedures relevant to their operations before they begin work;
- Provide all method statements for each contractor and subcontractor operation at each works section; and
- Ensure personnel achieve appropriate training to ensure proper handling and storage of material, especially hazardous materials.

2.3 Health and Safety

The ESB are committed to ensuring the health and safety of persons working on projects and the protection of the environment is maintained in accordance with S.I. No. 291/2013 - Safety, Health, and Welfare at Work (Construction) Regulations 2013, as amended by S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021, and the principles and philosophy behind them.

In accordance with these regulations, the SHESQ Manager will prepare a Construction Phase Safety and Health Plan prior to construction works commencing (see Table 1). This Construction Phase Safety and Health Plan will ensure that adequate arrangements and welfare facilities are in place to cover:

- The safety of construction staff;
- The safety of all other people working at or visiting the construction site;
- The protection of the public in the vicinity of the construction site;
- Compliance with all Safety, Health and Welfare legislation listed in Section 1.3, any other relevant legislation and guidance documents;
- Emergency procedures being defined and adopted;
- Appropriate training and information being provided to personnel;
- The Construction Phase Safety and Health Plan will be reviewed and approved by the ESB or their representatives prior to construction commencing. It will be managed and implemented by the Project Supervisor and by the appointed contractor; and
- All staff, site visitors and delivery drivers will receive a relevant project induction by the Project Supervisor, as appropriate, to ensure that they are aware of site hazards and health, safety and environmental management requirements. Site staff will be briefed daily prior to work commencing.

2.4 Construction Programme

Subject to the grant of statutory approvals, it is anticipated that the Construction Phase will commence in Q2, 2026 with the underground cable element of the Proposed Development becoming fully operational after construction and testing in Q4, 2029.

The works at the Woodland Substation are expected to last approximately seven months, while the works at Belcamp Substation are expected to last approximately 17 months. Works to both substations will run concurrently with cable installation works.

Construction activities will gradually phase out from pre-construction to predominantly civil activities, followed by commissioning and testing.

In general, it is anticipated that construction will occur during normal working hours (i.e., Monday to Friday 7am to 7pm and Saturday from 8am to 2pm). There may be localised instances where night-time working is required to facilitate traffic management. However, work outside these hours and days will only be undertaken with prior agreement with Meath and Fingal County Councils.

Clearance of hedgerow, treeline or scrub vegetation, where required, will take place after 31 August and before 1 March in order to protect breeding birds (i.e., outside of the bird breeding season). Clearance may take place during the restricted period, if a suitably qualified ecologist has determined that nesting birds and other protected species are absent. Enabling works are provisionally programmed for Q3 2026. This will allow sufficient time for habitat clearance outside of the breeding season.

Any element of the Proposed Development requiring in-stream works in watercourses with fisheries value will be restricted to the fisheries open season (i.e., will only take place during the period July to September), unless there is an agreement in place with IFI.

The duration of the installation of each Joint Bay and each Passing Bay (Phase 1 of the works) will be approximately six days in total. Installation and reinstatement of the Joint Bays and Passing Bays is expected to start in Q4 2026 and last until Q3 2029.

The duration of the construction of each TCC will be approximately 20 days, though they will be in operation for the full duration of the Construction Phase. Construction of the TCCs / HDD Compounds is likely to begin in Q3 2026.

The duration of HDD works at each location will be approximately 54 days and will be undertaken during Phase 2 of the works. HDD works are likely to begin in Q3 2026 and be completed in Q2 2027.

Excavation and installation of ducts (Phase 2 of the works) are expected to progress at a rate of 50m per day. These activities are likely to begin in Q3 2026 and be completed in Q4 2027.

Installation and jointing of cables (Phase 3 of the works) is likely to begin in Q4 2026 and last until Q3 2029.

The proposed construction works are summarised schematically in Table 3.

Subject to the grant of consents, it is anticipated that construction (including testing, commissioning and energisation) of the Proposed Development will take approximately 42 months in total. However, safety requirements for the installation operations / procedures, detailed design considerations and weather conditions will ultimately dictate the final programme within the parameters assessed in the EIAR.

The majority of the construction activities will not be dependent on outages on the existing transmission system. However, specific activities associated with the connection at the existing Woodland and Belcamp Substations on to the existing transmission infrastructure will be planned and programmed into EirGrid's

multi-year outage programme, as the existing live infrastructure will need to be switched off during such connection activities. EirGrid, as Transmission System Operator, develops a detailed plan for such outages each year to ensure the safe and efficient undertaking of construction and maintenance activities involving, or in proximity to, existing infrastructure

Table 3: Indicative Construction Phase Programme	Table 3	3: Indicative	Construction	Phase	Programme
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Description	Est.	2026				2027				2028				2029			
	Construction Programme (Months)	Q1	Q2	Q3	Q4												
Proposed Development - Construction Du	ration																
Overall Construction Duration	42																
Preliminary & Planning Works	3																
Enabling Works (including TCC / HDD Compound, devegetation, temporary haul roads and permanent access tracks)	39																
Phase 1: Installation and reinstatement of joint bay and passing bays structures	34																
Phase 2: Excavation and Installation of cable ducts	12																
Phase 3: Installation and Jointing of Cables	32																
Substation works	24																
Testing & Commissioning	3																
Energisation and permanent works construction complete	3																

2.5 Construction Hours

The appointed contractor will endeavour to undertake construction works and other related activities between the following time periods:

- Monday to Friday: 07.00 to 19:00hrs;
- Saturday: 08:00 to 14.00hrs; and
- Sunday, bank holiday or night-time: No construction works to be programmed without prior agreement of planning authority.

Sunday and night-time working will not normally be required but may be required for specific works including traffic management reasons, requirement to use certain utility outages, or for other reasons. Where there are instances that night-time working is required, they will only be undertaken with prior agreement with the planning authorities, in this instance Meath County Council and Fingal County Council, and with appropriate engagement with any impacted stakeholders, such as adjoining residents.

2.6 Construction Arrangements

A detailed construction plan and schedule will be developed by the appointed contractor for the Proposed Development, following detailed design, to ensure that the construction phasing allows for maximum efficiency while minimising the potential for environmental impact.

2.6.1 Construction Staff

Construction of the Proposed Development will require the movement of workers to and from various points along the proposed cable route, throughout the entire Construction Phase. Due to the general rural nature of the Proposed Development route, it is expected that all workers will use private vehicles to travel to and park at a TCC (including the HDD Compounds). From each TCC / HDD Compound they will consolidate to a smaller number of light good vehicles (LGVs) to travel to specific construction locations. The appointed contractor will also be required to ensure that their staff may not park on public roads (except within the work areas).

Summing projections for required personnel for the entire Proposed Development's construction, the total average estimated number of daily workers at any time does not exceed 215 as shown in Table 4. The peak workforce attracted by any of the TCCs will be highest, with an estimated 80 workers at TCC3 at peak construction.

тсс	CC 2026 2027							2028				2029			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
тссо	0	0	0	0	0	0	0	0	6	33	45	14	8	0	
TCC1	32	50	46	22	24	30	13	5	5	5	5	5	5	8	
TCC2	20	7	27	54	6	5	7	16	16	7	5	5	5	8	
TCC3	45	80	20	34	52	5	5	7	11	15	17	16	9	8	
TCC4	24	25	54	26	19	21	16	17	5	5	5	5	5	8	
TCC5	25	17	5	55	48	14	5	7	17	16	17	20	7	8	
TCC6	12	5	5	24	45	45	45	45	24	6	5	5	5	8	
Total	158	184	157	215	194	120	91	97	84	87	99	70	44	48	

Table 4: Average Daily Workforce Numbers

Generally, the number of construction workers required during the Construction Phase at the substations is expected to peak at approximately 20 persons for each of the two substation sites. Crew sizes for the activities of cable trenching, ducting, and resurfacing is estimated at approximately 12 persons per crew with two crews (teams) working simultaneously. Crew sizes for the installation of the proposed underground cables is estimated at approximately six persons per crew. Additionally, it is estimated that there will be approximately up to four traffic management operatives with each crew. The project offices located at the TCCs is estimated at approximately five staff (engineers, project managers etc.) at seven locations.

2.6.2 Construction Traffic Movements

The estimated traffic movements associated with the construction of the Proposed Development are presented in Table 5. It should be noted though that the ultimate approach will be determined by the appointed contractor, within the parameters assessed in this EIAR.

TTM Sections	HGV Movements	LGV Movements	Total Movements	Number of Peak Days
1.01	75	134	209	2
1.02	107	117	224	2
1.03	55	7	62	2
1.04	77	5	82	2
1.05	14	1	15	13
1.06	64	9	73	6
1.07	22	5	27	3
1.08	64	7	71	2
1.09	24	2	26	16
1.10	37	6	43	3
1.11	20	3	23	4
1.12	71	7	78	6
1.13	13	3	16	3
1.14	31	4	35	2
1.15	40	0	40	40
1.16	62	6	68	3
1.17	52	153	205	2
1.18	14	1	15	16
1.19	94	9	103	5
1.20	23	2	25	18
1.21	86	8	94	6
1.22	14	1	15	13
1.23	49	10	59	1
1.24	74	8	82	4
1.25	12	1	13	17
1.26	41	4	45	2
1.27	89	9	98	6
1.28	117	11	128	6
1.29	56	7	63	3
1.30	155	177	332	3

Table 3. Abbioximale Estimale of Construction vehicle movements

Vehicle movements will take place in accordance with best practice, as per the British Standards Institution (BSI) British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - noise (BSI 2009).

2.7 Construction Site Layout and Appearance

The layout, appearance and operation of the construction site, site offices and compounds will be detailed prior to construction commencing and will comply with the commitments in this CEMP.

The setups as a minimum will consist of:

- Site offices;
- Welfare facilities and changing facilities;
- Suitable parking for site vehicles;
- Secure storage areas and delivery areas;

- Material lay down area / inspection area; and
- Plant storage and refuelling zones.

In particular, the layout, appearance and operation of the construction site, site offices, HDD Compounds and TCCs will be managed as follows:

- All working areas will be kept in a clean and tidy condition;
- Smoking areas at site offices, compounds and construction sites will be equipped with containers for smoking waste and will not be located at the boundary of working areas or adjacent to neighbouring land;
- All necessary measures will be taken to minimise the risk of fire;
- Workers will always maintain a reasonable and appropriate standard of dress and will not use foul language or display lewd or derogatory behaviour;
- Appropriate measures, such as use of enclosed containers, will be employed to store waste susceptible to spreading by wind or liable to cause litter;
- Fencing and other means of enclosure will be inspected daily, repaired and repainted as necessary;
- Adequate welfare facilities will be provided for all construction staff. All toilets will be serviced and kept clean;
- Good personal hygiene will be promoted by the appointed contractor for the workforce, particularly when using site canteens or mess facilities;
- Site accesses, accesses to site compounds and roads in the vicinity of site access points will be maintained and kept clean as required;
- Commitments relating to dust, odours and air pollution (see Section 3);
- Commitments relating to noise and vibration (see Section 3);
- Commitments relating to the handling, storage and disposal of materials (see Section 3 and Appendix C (CRWMP) and Appendix D (SWMP) of this CEMP); and
- A bunded 'wheel washing' station at each site will be established as best practice to avoid unnecessarily soiling the local roads with mud / detritus from the site vehicles. Also, daily road cleaning may be required.

Security lighting will be directional and cowled. The appointed contractor will regularly review security lighting in this regard, to inform adaptive management if necessary and report the monitoring findings regularly to the ESB and the local authorities as required.

2.7.1 Temporary Construction Compounds (including HDD Compounds)

The proposed TCCs will facilitate enabling works, site clearance, materials storage, welfare, structure installation and road surfacing. All TCCs will be secured with hoarding / fencing around their perimeter, as appropriate. TCCs will include facilities such as Construction Phase car parking, welfare facilities, and temporary material storage areas, as necessary. No living accommodation will be permitted on the construction site. Any sewage discharges from temporary welfare facilities will be connected to a sealed holding tank to be emptied and disposed of off site by a licensed contractor to an approved licensed facility. Temporary surface water drainage will also be provided to control run-off from the compound, including any runoff from trafficked areas such temporary access tracks, plant/equipment storage and car parking. Where a construction access track is required, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition.

All construction workers will be required to use the designated access / egress routes only. Storage of fuel and refuelling will be undertaken within bunded areas. Water will be brought to site via tankers, as required.

The TCCs will be located within the Planning Application Boundary and are as follows:

- TCC0: Chainage 0, located off the Redbog Road, with an approximate area of 1ha (refer to Image 1)
- TCC1: Chainage 3,550, located off the R156, with an approximate area of 0.8 hectares (ha) (refer to Image 2);
- TCC2: Chainage 10,600, located off the R156, with an approximate area of 1ha (refer to Image 3);
- TCC3: Chainage 21,600, located off the Ballymacarney Road, with an approximate area of 1.6ha (refer to Image 4);
- TCC4: Chainage 26,850, located off the R121, with an approximate area of 1ha (refer to Image 5);
- TCC5: Chainage 34,800, located off the Stockhole Lane, with an approximate area of 1ha (refer to Image 6); and
- TCC6: Chainage 37,700, located off the Stockhole Lane adjacent to Belcamp Substation, with an approximate area of 1.6ha (refer to Image 7).



Image 1: Proposed TCC0



Image 2: Proposed TCC1



Image 3: Proposed TCC2



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Image 5: Proposed TCC4



Image 6: Proposed TCC5



Image 7: Proposed TCC6

There will also be a Temporary HDD Compound at both the reception and launch locations at each HDD crossing. These compounds will not be used for the storage of materials for the wider route or for site offices but will be used to facilitate the works required adjacent to and under the motorways and railway. A laydown area is also required for each HDD crossing. The temporary HDD Compounds will be located within the Planning Application Boundary and are as follows:

• M3 HDD Compound West (HDD1a): Chainage 12,850, located off the Woodpark Road, with an approximate area of 0.23ha (refer to Image 8);

- M3 HDD Compound East and Laydown Area (HDD 1b): Chainage 13,050, located off the R147, with an approximate area of 0.31ha (refer to Image 8);
- M2 HDD Compound South (HDD 2a): Chainage 23,400, located off the R121, with an approximate area of 0.15ha (refer to Image 9);
- M2 HDD Compound North and Laydown Area (HDD 2b): Chainage 23,600, located off the R121, with an approximate area of 0.45ha (refer to Image 9);
- M1 HDD Compound West (HDD 3a): Chainage 34,250, located off the Stockhole Lane, with an approximate area of 0.22ha (refer to Image 10); and
- M1 HDD Compound East and Laydown Area (HDD 3b): Chainage 34,450, located off the Stockhole Lane, with an approximate area of 0.43 (refer to Image 10).



Image 8: Proposed M3 HDD Compounds and Laydown Areas (HDD 1a and HDD1b)

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Image 9: Proposed M2 HDD Compounds and Laydown Areas (HDD 2a and HDD 2b)



Image 10: Proposed M1 HDD Compounds and Laydown Areas (HDD 3a and HDD 3b)

2.8 Fencing and Other Means of Enclosure

The following measures will be implemented:

- Working areas will be appropriately fenced from members of the public and to prevent animals from straying onto a working area; and
- Fencing and other means of enclosure will be inspected daily, repaired and repainted as necessary. Any temporary fencing will be removed as soon as reasonably practicable after

completion of the works. On completion of the works, any permanent fencing required to denote the plant will be weld mesh in accordance with EirGrid Site Security standards.

2.9 Traffic Signs, Road Markings and Lighting

In the event that An Bord Pleanála decides to grant approval for the Proposed Development, Temporary Traffic Management designs (drawings and method statements) will be prepared by the appointed contractor in compliance with the former Department of Transport, Tourism and Sport (DTTAS) (now the Department of Transport) Traffic Signs Manual, Chapter 8, Temporary Traffic Measures and Signs for Roadworks (hereafter referred to as the Traffic Signs Manual) (DTTAS 2019), to facilitate the safe and efficient construction of the Proposed Development. As part of the design process, the appointed contractor will consult with Transport Infrastructure Ireland (TII) and with the Roads Departments of Meath and Fingal County Councils, as appropriate.

Details of the lighting will be provided during the detailed design stage. It may be necessary for temporary lighting, such as low lux level LED (light-emitting diode) or PIR (passive infrared sensor) activated lighting, to be provided at the TCCs or HDD Compounds for security purposes. Such temporary lighting will be directional and cowled so that lighting overspill and potential effects will be minimised, in so far as possible, as advised by the appointed contractor.

2.10 Welfare

No living accommodation will be permitted on the construction site. On-site welfare facilities will be provided for all site workers and visitors and will meet the requirements described in Section 2.7.

Wastewater from welfare facilities will be provided and managed by the appointed contractor. Where required, temporary welfare facilities (for example portable toilets) will be used, which will be collected as required for offsite disposal of the wastewater to a suitably licensed facility.

2.11 Pest Control and Invasive Species

The risk of infestation by pests or vermin will be reduced by implementing appropriate storage and regular collection of putrescible waste (waste that can rot). Waste will be stored and managed in line with the CRWMP in Appendix C in this CEMP, and if infestation is found, removal and prevention measures will be implemented promptly. Any pest infestation of the construction site will be notified to the local authority as soon as is practicable.

Best Practice as outlined in the Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (National Roads Authority 2010) will be followed. While the Proposed Development is not a road scheme, this guidance is considered to be the best available guidance. Please see Appendix E of this CEMP for further details on the management of invasive species.

2.12 Utility Works

Realignment, upgrade or replacement of utilities and services will be required in conjunction with, or to accommodate the Proposed Development. Any such works to utilities and services will be along or immediately adjacent to the Proposed Development. A list of utility and service works along the Proposed Development is provided in Chapter 17 (Material Assets) in Volume 2 and Appendix A4.1 in Volume 3 of the EIAR, respectively (included in the planning application pack).

Appropriate schedules will be provided by the ESB to the appointed contractor identifying all known utility infrastructure and any proposed diversions.

2.13 Reinstatement

All temporary works such as Passing Bays, HDD Compounds and TCCs, and working areas within the Planning Application Boundary will be restored to their current land use. The materials such as temporary culverts or roadside drains or stoning will be removed in the reverse of the process described above. Planting will be provided where existing vegetation has been removed for temporary works areas. Species-rich hedgerows will be provided where existing hedgerows are affected to seek to improve existing biodiversity levels. Trees will also be provided, where it is appropriate, ensuring sufficient set-back from the proposed cable route.

Permanent works will include the Joint Bays and 12 proposed permanent access tracks, and hardstanding areas around the off-road Joint Bays. These areas will be maintained by the ESB, as necessary. Hedgerows / treelines within the permanent easement will not be replanted. However, offsite compensatory planting will be undertaken considering all permanent losses within the easement.

The following will apply for field boundaries within the permanent easement:

- For field boundaries between the same landowner, affected hedgerows will be replaced with a suitable stock-proof fence. Where one currently exists, access will be provided with a gate (standard 3.6m width unless wider is required by the landowner);
- For field boundaries between different landowners, affected hedgerows will be replaced with a suitable stock-proof fence and no gates will be provided; and
- For field boundaries between different landowners on the Woodland Corridor, affected hedgerows will be replaced with a suitable stock-proof fence. A double gate will be provided so that access along the Joint Bay permanent access track is possible for ESB, but it will not be possible for adjacent landowners to access each other's land. The double gate will be a gate on either side of the landowner boundary and will ensure no issue with livestock escaping in the adjacent field. This will be one gate width (standard 3.6m width).

All affected landowners will be provided with detailed plans outlining the location(s) of permanent works on their land. The location of the cable route and associated permanent works will be provided to all statutory undertakers, Meath and Fingal County Councils, and will be included on ESB's register for its 'Dial Before You Dig' programme (ESB 2023).

The works within the substations will also be permanent features.

Affected roads will be resurfaced in agreement with Meath and Fingal County Councils in line with the principles of The Purple Book (Department of Transport, Tourism and Sport 2017).

2.14 Approvals, Consents and Licences

A Consents Register will be maintained by the Project Environmental Manager which will document all existing approvals, consents and licences and their respective conditions, and record all new applications for any approval, consent and / or licence made and the status of the applications.

2.15 Public Engagement and Communications

Communication with the public and other stakeholders aims to ensure awareness of the Proposed Development, to share information and elicit feedback. The appointed contractor will share important information with the public and other stakeholders, as required through the development of a communication strategy that will be produced prior to construction commencing. The communication strategy will include:

• List of environmental stakeholders;

- Road users the appointed contractor will ensure that traffic disruption is minimised during construction;
- Local population the appointed contractor will provide the local population and other stakeholders with advance notice of works in the area;
- Method and frequency of communication this can include personal contact, letter drops, emails, telephone, meetings / presentations, a dedicated website and other measures such as social media will be considered as required;
- Details of key contacts Employer, Project Manager / Supervisor, Emergency Response Lead and the appointed contractor's EnCoW; and
- Details of the consultation register a record will be maintained of all third-party communication and consultation. This includes consultation with statutory and non-statutory organisations, and members of the public.

The appointed contractor's Community Liaison Lead will interface with the ESB and EirGrid's Community Liaison Team to ensure the successful delivery of the Proposed Development in so far as communities are concerned. The Community Liaison Lead will liaise with the local community so that the community has a direct point of contact within the appointed contractor's organisation who they can contact for information purposes or to discuss matters pertaining to the Proposed Development. The Liaison Team will attend all community forum meetings for the Proposed Development and will provide an email and mobile number for all queries and complaints to be addressed. These contact details will be made available to all affected landowners, residents living adjacent to the Proposed Development, and to key stakeholders. All emails and telephone calls will be responded to within two working days, unless in exceptional circumstances. All communications will be logged in a General Data Protection Regulation (GDPR) compliant manner and shared with the ESB on a regular basis and on request. The Community Liaison Lead will provide the nature of the complaint to the Project Manager / Supervisor and a resolution will be agreed and actioned and communicated back to the person that made contact.

A dedicated website, email address, and telephone number will be made available to the public so that members of the public can be kept informed of traffic management, and to provide a point of contact for information on the Proposed Development, and as a place to ask queries and provide feedback. Other measures such as social media will be considered as required. The website will provide weekly updates on the Proposed Development and will be kept 'live' so that current information on traffic management is always available.

3. Environmental Management and Construction Principles

In order to minimise the impacts of the construction works on the surrounding environment, the appointed contractor will ensure compliance with environmental legislation and planning requirements (EIAR and NIS in this planning application, and any planning conditions subject to a grant of approval from An Bord Pleanála). A review of the key environmental risks associated with the construction of the Proposed Development has been undertaken.

Required environmental mitigation and monitoring measures are laid out under the following environmental topics in Table 6:

- Human Health;
- Air Quality;
- Climate;
- Noise and Vibration;
- Biodiversity;
- Soils, Geology and Hydrogeology;
- Hydrology;
- Archaeology, Architectural Heritage and Cultural Heritage;
- Traffic and Transport;
- Agronomy and Equine;
- Waste;
- Material Assets;
- Landscape and Visual; and
- Cumulative Impacts and Environmental Interactions.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
Chapter 6 (Human Health)	HH1	6.5.1	Off-Road Sections and throughout (as required)	 The following mitigation measures, in relation to agronomy and equine, will be implemented in full to provide support to the farming community likely to be affected by the Proposed Development: The appointed contractor will be required to maintain close liaison with local community representatives and landowners and farmers to provide them with adequate progress information and advance notice of works. This will ensure that construction activities are planned around the reasonable access needs of the landowner, so that access is maintained when required by the landowner for farming activities, such as for example, forage and crop harvesting, fertiliser spreading, slurry spreading, and herding of livestock etc. Scheduling of works will be agreed with each landowner to facilitate the operation of the farm and minimise disturbance. Where it is necessary to move livestock along public roads or across the working area, this will be facilitated by the appointed contractor; and Where the working area severs land access or access to farmyards, the appointed contractor will ensure that there is adequate access provided to facilitate the farmer to effectively farm severed land. 	Construction
	HH2	6.5.1	Throughout (as required)	The CEMP, which is included as a standalone document in the planning application pack will be implemented.	Construction
	ННЗ	6.5.1	Throughout (as required)	 The following mitigation measures, in relation to traffic, will be implemented: An adopted, regulated and approved Construction Traffic Management Plan (CTMP) (refer to Appendix B of the CEMP which is included as a standalone document in this planning application pack) will be implemented; Signed diversion routes will be provided to mitigate journey disruption and to minimise potential driver delay. These are outlined in Chapter 14 (Traffic and Transport) but will be subject to final agreement with the Roads Authorities. Where practically achievable, diversion routes will not apply outside of the working area hours of operation; and Construction activity generated vehicles will travel on predefined construction access routes to and from the relevant working areas to reduce the effects on local traffic. 	Construction
	HH4	6.5.1	Throughout (as required)	 The following mitigation measure, in relation to air quality, will be implemented: 'Highly recommended' measures for 'medium risk' dust soiling impacts, as identified in the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.1) (IAQM 2023), will be implemented. 	Construction
	HH5	6.5.1	Throughout (as required) and at HDD Compounds (HDD 1 and HDD 2)	 The following mitigation measures, in relation to noise, will be implemented: Noise barriers will be installed around two of the Horizontal Directional Drilling (HDD) Compounds (HDD1 and HDD2) Compounds and acoustic enclosures will be placed around HDD plant; and British Standard Institute (BSI) British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) will be complied with. 	Construction

Table 6: Mitigation and Monitoring Measures (Pre-Construction and Construction Phases)

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	HH6	6.5.1	Throughout (as required)	 The following specific mitigation measures have been identified for human health and will be implemented during the Construction Phase: All proposed traffic diversion routes will remain suitable for walkers, cyclists and horse riders as well as motorised vehicles if these user types are known or anticipated to make use of the closed route; A Community Liaison Officer will be engaged who will act as a single point of contact for members of the community who may have concerns about construction related activities, collate data regarding issues raised by members of the community to enable them to be addressed, and who will act to resolve concerns in a timely manner; The Community Liaison Officer will be contacted either via telephone or by a suitable online feedback mechanism; and There will be specific liaison between the appointed contractor's Community Liaison Officer and the following facilities to develop targeted mitigation measures which will help to minimise adverse effects associated with increased traffic flows on nearby roads: Scoil Bhríde, Kilbride Road, Kilbride; Dunboyne Nursing Home, Harlockstown, Dunboyne; and Anovocare Nursing Home, Stockhole Lane, Cloghran. 	Construction
Chapter 7 (Air Quality)	AQ1	7.5.1	Throughout (as required)	Good practice dust mitigation measures to manage the generation of dust at source will be implemented. The proposed mitigation measures, as per the) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.1) (IAQM 2023).	Construction
	AQ2	7.5.1	Throughout (as required)	 Communication: A stakeholder communication plan will be developed and implemented and will include community engagement before work commences on-site; The name and contact details of the person(s) accountable for air quality and dust issues on the Temporary Construction Compound (TCC) and Horizontal Directional Drilling (HDD) Compound site boundaries will be displayed. This may be the environment manager / engineer or the site manager; and The head or regional office contact information for the developer and appointed contractor will be displayed. 	Construction
	AQ3	7.5.1	Throughout (as required)	 Site Management: All dust and air quality complaints will be recorded, cause(s) will be identified, appropriate measures to reduce emissions in a timely manner will be undertaken, and the measures taken will be recorded; The complaints log will be made available to the local authority when asked; and Any exceptional incidents that cause dust and / or air emissions, either on-site or off site, will be recorded in a log book, along with the action taken to resolve the situation. 	Construction
	AQ4	7.5.1	Throughout (as required)	Monitoring: • Regular site inspections to monitor compliance with the CEMP or equivalent management plan will be carried out, with inspection results recorded. The inspection log will be made available to the local authority when asked; and	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				• The frequency of site inspections by the person accountable for air quality and dust issues on-site will be increased, when activities with a high potential to produce dust are being carried out, and during prolonged dry or windy conditions. Regular site inspections to monitor compliance with the CEMP will be carried out and inspection results will be recorded.	
	AQ5	7.5.1	Throughout (as required)	 Preparing and maintaining the site. The site layout will be planned so that machinery and dust causing activities are located away from receptors, as far as is possible; Solid screens or barriers will be erected around dusty activities that are at least as high as any stockpiles onsite; Specific operations will be fully enclosed where there is a high potential for dust production and impacts on nearby receptors; Site runoff of water or mud will be avoided; Materials that have a potential to produce dust will be removed from site as soon as possible, unless being reused on-site. If they are being reused on-site, they will be covered as described below; and Stockpiles will be covered or fenced to prevent wind whipping. 	Construction
	AQ6	7.5.1	Throughout (as required)	 Operating vehicles / machinery and sustainable travel: All vehicle operators will be required to switch off engines when vehicles are stationary (i.e. no idling vehicles); and The use of diesel, or petrol-powered generators will be avoided. Mains electricity or battery powered equipment will be used, where practicable. 	Construction
	ΑQ7	7.5.1	Throughout (as required)	 Operations: Site personnel will only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction (e.g., suitable local exhaust ventilation systems); An adequate water supply will be made available for dust / particulate matter suppression, where required; Covered skips will be used; Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment will be minimised, and fine water sprays will be used on such equipment, wherever appropriate; and The appointed contractor will ensure that equipment is readily available on-site to clean any dry spillages. Spillages will be cleaned up as soon as reasonably practicable after the event using wet cleaning methods. 	Construction
	AQ8	7.5.1	Throughout (as required)	Waste management: Bonfires and burning of waste materials will be avoided.	Construction
	AQ9	7.5.1	Throughout (as required)	 Measures specific to trackout: Water-assisted dust sweeper(s) will be used on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use; Dry sweeping of large areas will be avoided; It will be required to ensure that vehicles entering and leaving sites containing friable materials are covered to prevent escape of materials during transport; 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 On-site haul routes will be inspected for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; All inspections of haul routes and any subsequent action will be recorded in a site log book; A surfaced haul route to the TCCs and HDD Compounds will be installed, which will be regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and will be regularly cleaned, if required; A wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable) will be implemented; It will be required to ensure that there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and Access gates will be located at least 10m from receptors, where possible. 	
Chapter 8 (Climate)	CL2	8.5.1.2	Throughout (as required)	 The following good practice measures will be implemented to reduce greenhouse gas (GHG) emissions during the Construction Phase of the Proposed Development: Investigating and implementing sustainable reuse of any materials won from excavation; The reuse, where possible of materials and waste generated from construction works; Procuring locally sourced materials where reasonably practicable to reduce transportation emissions; Careful consideration of material quantity requirements to avoid over-ordering and generation of waste materials, while also reducing transportation-related emissions; and The appointed contractor will develop and implement a plan to reduce energy consumption and GHG emissions throughout construction, including, for example: 	Construction
Chapter 9 (Noise and Vibration)	NV1	9.5.1.1	Throughout (as required)	Construction activities will comply with BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Vibration (BSI 2014b).	Construction
	NV2	9.5.1.1	Throughout (as required)	The appointed contractor will comply with local authority controls on noise and vibration during the Construction Phase of the Proposed Development.	Construction
	NV3	9.5.1.1	HDD Compounds (and throughout as required)	 Noise barriers will be installed around the following HDD Compounds, and acoustic enclosures will be placed around the HDD plant: HDD2 M2 Motorway (Chainage 23,550). Noise barriers will be placed on the perimeter of both launch and receiver HDD Compounds (HDD Compound 2a and 2b) to screen noise at the nearest sensitive receptors; HDD1 M3 Motorway (Chainage 12,800). Noise barriers will be placed on the perimeter of both launch and receiver HDD Compounds (HDD 1a and 1b) to screen noise at the nearest sensitive receptors; 	Pre-Construction / Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 The noise barriers will be within the Planning Application Boundary. The requirement for the noise barriers will be confirmed pre-construction through confirmatory assessment following detailed design for the HDD (within the parameters assessed in this EIAR). The location of the noise barrier will be set out and agreed with the local planning authority in advance of the works designed to keep noise levels within the specified limits. If it can be demonstrated to the local authorities that the barriers are not required, in accordance with the limits in this assessment, then they will not be provided, subject to agreement with the local planning authority; BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) states that a noise barrier which blocks the line of sight between the source and the receptor would result in an approximate attenuation of 10dB. Therefore, the noise barriers will be designed to block the line of sight between the noise source and the affected receptors; Noise barriers will comply with the standard BS EN 14388:2015 - Road traffic noise reducing devices. Specifications (BSI 2015); Portable acoustic enclosures will be placed around the HDD plant in HDD2 and HDD1 including the drilling rig and the generator. Acoustic enclosures will surround the noise source in order to reduce noise levels at nearby receptors; Local residents will be dealt with expeditiously and appropriate action will be taken; The routing, depth, locations, and rhel HDD locations. Monitoring by the appointed contractor of these locations will occur during the HDD works, and the surveys will be carried out. The volume of cuttings produced will also be monitored to ensure that no ever cutting team will be carried out. The volume of cuttings produced will also be monitored to enving team in apperiate onthe surveys will be curing dept locations as the drilling trig and the surveys. C	
	NV4	9.5.1.1	Throughout (as required)	The appointed contractor will develop and implement a Stakeholder Communications Plan which will facilitate	Pre-Construction
	NV5	9.5.1.1	Throughout (as required)	Only plant conforming with or better than relevant national or international standards (including BS 5228- 1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (BSI 2014a) and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration (BSI 2014b)), directives or recommendations on noise or vibration emissions will be selected and used. Construction plant will be maintained in good condition with regards to minimising noise and vibration emissions.	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	NV6	9.5.1.1	Throughout (as required)	Plant will be operated and maintained appropriately, with due regard for manufacturer recommendations. All vehicles, plant and equipment will be switched off when not in use.	Construction
	NV7	9.5.1.1	Throughout (as required)	Where practicable, gates (to TCCs, HDD Compounds and construction areas) will not be located opposite noise sensitive receptors.	Construction
	NV8	9.5.1.1	Throughout (as required)	Routes and programming for the transport of construction materials, spoil and personnel will be carefully selected to reduce the risk of increased noise and vibration impacts during construction.	Construction
	NV9	9.5.1.1	Throughout (as required)	Vehicle and mechanical plant / equipment used for the purpose of the works will be fitted with effective exhaust silencers, to be maintained in good working order and operated in such a manner to minimise noise emissions.	Construction
	NV10	9.5.1.1	Throughout (as required)	Construction plant and activities will be positioned appropriately to minimise noise at sensitive locations	Construction
	NV11	9.5.1.1	Throughout (as required)	Equipment that breaks concrete by pulverising or similar, rather than by percussion, will be used close to noise sensitive locations.	Construction
	NV12	9.5.1.1	Throughout (as required)	Mufflers will be used on pneumatic tools.	Construction
	NV13	9.5.1.1	Throughout (as required)	Works will be programmed to minimise the requirement for working outside normal working hours.	Construction
	NV14	9.5.1.1	Throughout (as required)	Unnecessary revving of engines and idling will be avoided.	Construction
	NV15	9.5.1.1	Throughout (as required)	Plant and vehicles will be started-up sequentially rather than all together.	Construction
	NV16	9.5.1.1	Throughout (as required)	Drop height of materials will be minimised.	Construction
	NV17	9.5.1.1	Throughout (as required)	Rubber linings will be used in, for example, chutes and dumpers to reduce impact noise.	Construction
	NV18	9.5.1.1	Throughout (as required)	Any plant, such as generators, which are required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen.	Construction
	NV19	9.5.1.1	Throughout (as required)	Low vibratory or non-vibratory plant will be used when working in close proximity to a vibration sensitive receptor.	Construction
	NV20	9.5.1.1	Throughout (as required)	Vibratory equipment will be started-up or turned off as far away from sensitive receptors as possible.	Construction
	NV21	9.5.1.1	Throughout (as required)	All site access roads will be kept even to reduce vibration.	Construction
	NV22	9.5.1.2	Diversion Routes	 The following mitigation measures will be implemented: Road closures and diversion routes will be minimised; and Suitable advanced warning of road closures will be provided to residents within 25m of the affected diversion routes. 	Construction
Chapter 10 (Biodiversity)	BD1	10.5.1	Throughout (as required)	An on-site Ecological Clerk of Works (ECoW) will be appointed by the appointed contractor to carry out pre- construction surveys to ensure that the ecological baseline remains current and, where required, will implement the	Pre-Construction / Construction

EIAR Chapter Miti Nun	tigation ımber	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				appropriate mitigation measures, as outlined in Chapter 10 (Biodiversity) and this Table. The ECoW will have sufficient experience to carry out the task(s) at hand and will be a member of a professional body, such as the Chartered Institute of Ecology and Environmental Management (CIEEM), or similar.	
BD2	02	10.5.2 Throughout (as required)	In advance of enabling works, the appointed contractor's EcoW will complete pre-construction confirmatory surveys of selected ecological features whose distribution is dynamic over time, and which are known to have the potential to occur within the Zone of Influence (ZoI) of the Planning Application Boundary. At this time, maximum effort will be adopted to survey those small number of areas that could not be surveyed during baseline data collection for this EIAR, due to site access limitations. The pre-construction confirmatory surveys will include:	Pre-Construction	
				 Bat trees previously identified as having roosting potential and within the Zol will be subject to preconstruction surveys. Bat surveys will be carried out in accordance with guidance from Bat Mitigation Guidelines for Ireland – 2 (Marnell et al. 2022), Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority (NRA 2006a)) and Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (Collins 2023). Surveys will be carried out by a licensed bat worker, who will determine the locations where they are required, using best practice techniques; Otter breeding / resting sites within the Zol of the Planning Application Boundary (minimum 50m from watercourse crossings, up to 150m at HDD Compound sites, will be subject to pre-construction surveys, where access allows (noting that guidance recommends 20m for non-breeding sites); Badger setts within the Zol of the Planning Application Boundary (minimum 50m, up to 150m at HDD Compound locations, will be subject to pre-construction surveys, where access allows). Further information relating to determining set activity and mitigation measures is provided in Mitigation Item BD15; Squirrel (grey and red), where dreys are identified within trees to be felled within the Planning Application Boundary will be subject to pre-construction surveys; Amphibians and reptiles: a pre-construction surveys; will be undertaken by the ECoW of previously identified areas that are suitable to host these species including reptile habitat (dry calcareous grassland, dry meadows and grassy verges and recolonising bare ground) and of amphibian habitat (drainage ditches and wet grassland) within the Planning Application Boundary will be subject to pre-construction surveys; particularly for the presence of sensitive aquatic fish and invertebrate species (e.g. white-clawed crayfish, eel, lamprey species, salmon, trout); Invasive species within the Planning Applicatio	

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	BD3	10.5.2.1	Throughout (as required)	Reporting The results of the pre-construction confirmatory surveys will inform the refinement of mitigation and monitoring measures (if required) in the appointed contractor's method statements (in accordance with the commitments set out in this EIAR and any conditions attached to any grant of planning), and all results will be incorporated into the appointed contractor's constraint mapping. Survey reporting and mapping will be provided to the Developer's Ecologist (ESB), EirGrid's Planning and Environmental Unit (PEU) within the Chief Infrastructure Office, and to any prescribed bodies as additionally required	Pre-Construction
	BD4	10.5.3.1.1	Throughout (as required)	by any planning conditions. The appointed contractor's EcoW will be on-site during the Construction Phase for any works deemed to be of sensitive nature due to the number of sensitive ecological receptors and the works taking place within watercourses connected to European sites.	Construction
				Where sensitive habitats or species have the potential to be impacted, the ECoW will be on-site to oversee the implementation all mitigation measures as described below. The EcoW will be at sensitive locations, for example, where there will be in-stream works and where a watercourse is hydrologically connected to European site, at locations where there is the potential for disturbance to Special Conservation Interests (SCI) birds, where hoarding will be erected, and in areas of vegetation reinstatement, including tree planting.	
				Table 10.29 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR outlines the location of proposed silt fencing, that will be installed to prevent any silt-laden runoff from impermeable surfaces, with the aim of preserving protected areas and areas of conservation and their associated habitats and species (further detail is provided in Mitigation Item BD7). To note, some of these locations are not yet determined. The final locations will be determined by the EcoW onsite to ensure that the locations are suitable and are in-line with the requirements of this EIAR, and any conditions attached to any grant of planning. The EcoW will be a member of a professional body, such as CIEEM, or similar, and will be suitably experienced for the task at hand.	
	BD5	10.5.3.1.1	Throughout (as required)	The ECoW will give toolbox talk to all site personnel to highlight any environmental sensitivities and the boundaries of sensitive habitats. Toolbox talks will include findings of pre-construction surveys on baseline changes and any adaptive mitigation measures required. The ECoW will propose adaptive mitigation measures in response to, for instance, extreme weather events (amber and red Met Éireann weather warnings which can be checked on the Met Éireann website (Met Éireann 2024), or new mitigation requirements arising from pre-construction surveys. Method statements in relation to trenched crossings will be agreed with Inland Fisheries Ireland (IFI) prior to the start of works. No sensitive works will be permitted without the prior approval of the ECoW. The ECoW will be able to demonstrate previous experience and will be a member of a profession body, such as CIEEM, or similar.	Construction
	BD6	10.5.3.1.2	Throughout (as	Pollution Control	Construction
			required)	The measures set out below will be implemented to ensure that there will be no pollution of surface water during the Construction Phase of the Proposed Development. The measures are included in the CEMP and Appendix D to the CEMP (Surface Water Management Plan (SWMP)) which are included as standalone documents in this planning application pack, and will also be incorporated into the appointed contractor's final CEMP, which is a key contract	

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EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	BD7	10.5.3.1.3	Throughout (as required)	 document that will be implemented in full by the appointed contractor. The CEMP will be updated to include any mitigation measures prescribed by An Bord Pleanála as a condition to any grant of planning permission. The CEMP has been developed in accordance with legislation and the following guidance documents and legislation: Construction Industry Research and Information Association (CIRIA) C532 Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al. 2001); CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane et al. 2006a); CIRIA C741 Environmental Good Practice on Site (Charles and Edwards 2015); Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2005); and S.I. No. 113/2022 - (European Union (Good Agricultural Practice for Protection of Waters) (Amended Regulations). Control of Silt-Laden Runoff Specific measures to control silt, as shown in Figure 10.11 in Volume 4 of this EIAR, will be implemented to prevent surface water flowing into surface water receptors: The appointed contractor will ensure no deleterious discharges are released from construction sites to the nearby water bodies during construction. If a discharge to a watercourse is necessary, the water will pass through a suitable drainage system such as a swale and / or silt buster prior to discharge. Levels of suspended solids in any discharge buring Construction Works in and Adjacent to Waters (1F1 2016), and flows will be controlled to levels appropriate to the receiving water. It is possible that such a discharge may require a licence under the Water Pollution Acts 1977 and 1990 (as amended), and the Arterial Drainage Act 1945 and 1995 (as amended). The appointed contractor will liaise with the regulatory authorities at an early stage to determine the need for licences and include the appropriate applicati	Construction
				staked at 2m intervals;	

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	BD8	10.5.3.1.4	Throughout (as required)	 Vegetation will be retained as far as practicable. However, where targeted vegetation removal is required, additional measures will be putel oback and not detached from the ground, the materials inserted and the turves replaced to hold the base in place; The vegetated turves will be prevented regularly by the ECoW and appointed contractor, and in particular following heavy rainfall; Silt fences will be inspected regularly by the ECoW and appointed contractor, and in particular following heavy rainfall; Silt fences will remain in-situ until the vegetation on the disturbed ground is re-established as determined by the ECoW; The fence will not be pulled from the ground, but cut at ground level and the stakes / posts removed; Should water build up behind the fences, the sediment will settle to the bottom. Water can be released, but sediments will remain; Two lines of silt fencing will be installed in sensitive areas, based on the ECoW; and Reinstatement of any banks affected by silt-laden runoff during construction will be reinstated back to pre-development conditions. Stockpiling of Materials The following mitigation measures will be implemented for the stockpiling of materials. Mobilisation sites will either be cleared in stages during the Construction Phase to prevent bare earth being exposed to ambient conditions for prolonged periods, or the bare earth will be immediately covered in a gravel / plastic covering to reduce the likellhood of sediment laden runoff following rainfall events. Stripped soil will be stockpiled more than 10m away from the surface intercept or drain, Stockpiles will be in a dry zone that is not subject to flooding (i.e., outside the 1:100 flood extent (1% Annual Exceedance Probability (AEP)). The following measures will be managed to prevent siltation of watercourses, to easing working area; For watercourse crossings, stockpiles will not be located	Construction
EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
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				• Providing bunds or another form of diversion to keep runoff from entering the stockpile area.	
	BD9	10.5.3.1.5	Throughout (as required)	 Storage of Materials The following mitigation measures will be implemented for the storage of materials: All oil and diesel storage facilities will be at least 30m from any watercourse, including surface water drains, and outside the 1:100 flood extent (1% AEP), unless prior approval is confirmed by the ECOW to reduce this distance; Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed (all teams will also carry spill kits and spill kits will be suitably sized to address the amount of pollutant substances being used); Storage areas for solid materials, including waste soils, will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow); 	Construction
				 Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills; and All containers of any size will be correctly labelled indicating their contents and any bazard warping signs 	
	BD10	10.5.3.1.6	Throughout (as required)	 Act containers of any size with be confectly labeled, indicating their contents and any nazard warning sights. Spills The following mitigation measures will be implemented across the Proposed Development to prevent spills: Fuel tanks, drums and mobile bowsers (and any other equipment that contains oil and other fuels) will have a secondary containment, for example double-skinned tanks; All tanks, drums and mobile bowsers will be located in a sealed impervious bund with sufficient capacity to contain at least 25% of the total volume of the containers or 110% of the largest container, whichever is the greatest; Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas; Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain; Where fuel is delivered through a pipe permanently attached to a tank or bowser: The pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use; The pipe will be fitted with a lock; The pipe will be fitted with a lock; The pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser; Tanks and bunds will be protected from vehicle impact damage;	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 For deliveries and dispensing activities, the appointed contractor will ensure that: Site-specific procedures are in place for bulk deliveries; and Delivery points and vehicle routes are clearly marked. Emergency procedures will be displayed, and suitably sized spill kits will be available at all delivery points, and staff will be trained in these procedures and the use of spill kits. 	
	BD11	10.5.3.1.7	Throughout (as required)	 Fuel and Oil Leaks from Vehicles and Plant The use of vehicles and plant poses similar risks to those posed by storage of liquids. Fuel and oil may leak from such equipment which may enter drains and / or watercourses, as well as contaminating the ground itself. The following mitigation measures will be implemented to reduce this risk: Vehicles and plant provided for use on-site will be regularly inspected to ensure they are free from leaks and promptly repaired when not in good working order; Sufficient spill kits will be carried on all vehicles; Vehicles and plant will not park near or over drains; Refuelling of vehicles and plant will be carried out on hardstanding, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas; and Vehicles and plant will be in good working order to ensure optimum fuel efficiency. 	Construction
	BD12	10.5.3.1.8	Throughout (as required)	 Concrete Where concrete is required on-site, the following mitigation measures will be implemented to reduce risks associated with concrete pouring: Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose; Established concrete washout management areas will be designated to control the discharge of concrete washout; An emergency response plan will be developed and communicated to site staff prior to the concrete pouring; The ECoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated; The ECoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary; When working in or near surface water and the use of introduced materials (e.g. oil) cannot be avoided, alternative materials such as biodegradable oils will be used; Placing of concrete in or near watercourses will be avoided, where possible, with a minimum separation distance of 20m, with exception to in-stream pours which will be undertaken within a sealed dry working area. The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, as far as practicable, and remote from water bodies or potential pathways to water bodies; 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 There will be no hosing of concrete, cement, grout or similar material spills into surface water drains. Such spills shall be contained immediately, and run-off prevented from entering the watercourse; Concrete waste and wash-down water will be contained and managed on-site to prevent pollution of all surface watercourses; and Washout from concrete lorries will not be permitted on-site and will only take place at the batching plant (or other appropriate facility designated by the manufacturer). 	
	BD13	10.5.3.1.9	Throughout (as required)	Breeding Birds Unless suitable mitigation is adopted, hedgerows, trees and scrub will not be removed within the breeding bird season (1 March to 31 August, inclusive) to avoid impacts on nesting birds. Where this seasonal restriction cannot be adhered to, habitats that need to be removed will be inspected by a ECoW suitably experienced in the identification of nests for the presence of breeding birds prior to clearance. When nesting birds are present, the ecologist will demarcate a suitable buffer around an active nest and clearance within this area will be postponed until the chicks have fledged. A suitable exclusion zone will be established by the ECoW. To reduce the potential of birds to nest, bird deterrents (e.g. flicker tape / compact discs) will be tied to habitat confirmed to be without nests and the habitat will be cleared within three days of the inspection. Otherwise, repeat inspections will be required to confirm the continued absence of nesting birds. If vegetation is to be cleared in the breeding season (under supervision of a suitably qualified ecologist), it will be chipped, removed or covered on the same day to prevent birds from nesting. Reinstated habitat including trees, hedgerows and grassland, will provide suitable habitat for breeding birds recorded in the study area, once established. The locations of trees that will be lost and retained are shown on Figure 18.2 to Figure 18.5 in Volume 4 in this EIAR (with discussion included in Appendix A18.2 in Volume 3 in this EIAR). It may be necessary for temporary lighting to be provided at the proposed TCCs and HDD Compounds for security purposes. However, temporary lighting will be controlled and directed in order to mitigate any potential	Construction
	BD14	10.5.3.1.10	Throughout (as required)	Impacts to birds as advised by the appointed Ecow. Bats Any roosts recorded during the pre-construction surveys, as outlined in Mitigation Item BD2, will be felled under a derogation licence. As part of the licence, mitigation measures such as the provision of bat boxes as alternative roosts will be required. The type and number of bat boxes (if required) will be relative to the species and conservation status of the roost to be impacted. In all instances, bat boxes will be sited in suitable, undisturbed locations, away from works during the Construction Phase, either on third party lands (subject to agreement with landowners) or in the instance of no landowner agreement on ESB-owned lands at Woodland and / or Belcamp Substations. The loss of trees with high potential for roosting bats will be mitigated on a 3-to-1 ratio with bat boxes, and moderate potential trees will be mitigated on a 2-to-1 ratio with bat boxes. A range of models determined by the appointed EcoW will be used, suited to the species recorded within the study area, and for different seasons. The boxes will be erected in a suitable location. It may be necessary for temporary lighting to be provided at the proposed TCCs and HDD Compounds for security purposes. However, temporary lighting will be controlled and directed in order to mitigate any potential impacts to bats as advised by the appointed EcoW.	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	BD15	10.5.3.1.11	Throughout (as required)	 Otter The following general mitigation measures for otter will be implemented during the Construction Phase, after otter pre-construction surveys have been carried out (refer to Mitigation Item BD2): Any excavations will be covered at night to prevent otter from falling in or becoming trapped; Should any otter be observed within the Planning Application Boundary or should any evidence of otter activity be found during the Construction Phase, works will cease immediately and the ECoW will be contacted for advice; and Although there are not predicted to be any impacts on otters, if confirmatory surveys identify likely disturbance of otters, further mitigation following the Guidelines for the Treatment of Otters (NRA 2008b) will be implemented by the ECoW to ensure no significant effects on otters arise. Should a non-breeding otter holt or rest site be identified, a buffer zone of 30m will be implemented around the feature. Where a resting place is confirmed to be a natal site, this will increase to 150m. Should works occur in the vicinity of otter holts with breeding females or cubs, screening will occur and working hours will be restricted. When holts are present, no wheeled or tracked vehicles will be used within 20m, and no light work will occur within 15m. Exceptions may be adopted under licence. Appropriate fencing will be set around areas associated with otters, before works commence, to mark the areas that cannot be accessed. Disused and inactive holts will be destroyed, after verified as inactive and after blocking and monitoring the entrances for a five-day neriod 	Construction
	BD16	10.5.3.1.12	Throughout (as required)	 Badger The following general mitigation measures for badger will be implemented during the Construction Phase to avoid / minimise impacts in accordance with the mitigation hierarchy, following the completion of the badger pre-construction surveys (refer to Mitigation Item BD2): Ground excavations will be covered at night to prevent badger from falling in or becoming trapped; Any works within 30m of an active sett will be supervised on-site for the full duration of those works by an ECoW (extended to 50m during the breeding season for a main sett where there is breeding activity); Breeding setts will not be interfered with or disturbed during the badger breeding season (December to June, inclusive); Only the use of hand tools will be permitted within 20m of an active sett; No heavy machinery will be used within 30m of a sett; During the breeding season, none of the construction works including ground excavation, and use of tools and heavy machines, will be undertaken within 50m of active setts, and blasting (if required) will not be undertaken within 150m of active setts. Should this not be possible, the ECoW will provide advice on how best to proceed. Mitigation measures will include sett screening and restricted working hours. The ECoW will be able to advise on any mitigation options such as sett screening and restricted working hours that may be available relative to the predicted scale and duration of impact (which is informed by the proposed works and sett specifics (i.e., sett type, level of sett activity, tunnel direction, type of substrate, vegetative cover, and topography)). It should be noted that for the HDD platforms, none of the badger signs were within 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 these distances. The nearest badger signs (prints) to the proposed HDD works under the M1 Motorway were approximately 1.15km away. The nearest badger signs (prints) to the proposed HDD works under the M2 Motorway were approximately 0.52km away. The nearest badger signs to the proposed HDD works under the M3 Motorway (a disused sett) was approximately 1.95km away; Night-time working will be restricted as far as possible within 100m of a sett; The use of noisy plant and machinery near badger setts will cease before sunset; and Any spoil heaps will be sited at a minimum distance of 30m from setts. 	
	BD17	10.5.3.1.13	Throughout (as required)	Red Squirrel Where pre-construction surveys identify potential dreys at risk from felling, vantage point watches (for individual trees) or transects (for hedgerows / groups of trees) will be conducted to visualise squirrels and identify if the squirrel is grey (invasive) or red (protected). Surveys will be conducted in the early morning, during the summer months. Where visualisations are inconclusive, hair tube surveys may be required, following the best practice guidance (i.e., Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009)). As grey squirrels are a scheduled invasive species, confirmed grey squirrel dreys can be felled without mitigation. In the event that confirmed or suspected red squirrel dreys require felling, felling will only be carried out from October to January, in consultation with the NPWS, from which a licence may be required, subject to survey findings.	Construction
	BD18	10.5.3.1.14	Throughout (as required)	Other Protected Mammals Removal and clearance of vegetation may affect small mammal species if present in these habitats. The following mitigation measures will be adhered to in order to minimise impacts to small mammal species: Any excavations will be covered at night to prevent small mammals from falling in and / or becoming trapped; Working at night will be prohibited where specific tasks such as vegetation removal and clearance are to be carried out; Any lights will be turned off after working hours; Noise levels will not exceed permissible levels for construction works (70 decibels (dB(A)), based on Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA 2004); and With the exception of permanent areas of hardstanding, the site will be re-vegetated at the end of the Construction Phase. 	Construction
	BD19	10.5.3.1.15	Throughout (as required)	Reptiles and Amphibians Removal and clearance of vegetation has the potential to affect amphibians or reptiles if present in these habitats. The following mitigation measures will be adhered to, to minimise impacts on amphibians or reptiles: • A toolbox talk will be carried out to ensure all site personnel are aware of these protected species and their mitigation requirements; • Vegetation will be cleared in the following two stages, during the reptile and amphibian active season, following the completion of the toolbox talk:	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 A hand-search will be undertaken by a licensed ECoW for any animals present within vegetation to be cleared, followed by a first cut of vegetation down to 210mm above ground-level using hand tools; and A second hand-search will be undertaken of vegetation to be cleared by an ECoW for any animals present, followed by the second cut of vegetation to ground-level (or as close as practicable). If any reptiles are found during the pre-construction surveys or during the construction works, they will be captured and translocated by a suitably qualified and experienced ecologist under licence to a previously identified receptor site; Where practicable, in the context of the Construction Phase, water levels will be maintained in any ponds or ditches potentially used by amphibians; and Habitat reinstatement will recreate the former habitats within the Planning Application Boundary (excluding woody vegetation that cannot be planted within the permanent cable easement and other permanent habitat losses). 	
	BD20	10.5.3.1.16	Throughout (as required)	Invasive Species A management plan for those Third Schedule invasive plant species recorded during the survey (refer to Table 10.23 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR) which have the potential to be impacted by the works will be included in the final CEMP for the Proposed Development (this will be adapted from Appendix E of the CEMP included as a standalone document in this planning application pack). The mitigation measures described below follow the recommendations set out in the Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA 2010) and will be implemented during the Construction Phase: • All staff will be informed of the proximity and identification of Giant hogweed and rhododendron and any other invasive species identified through toolbox talks; • Giant hogweed will be controlled chemically or physically; • The most effective chemical control for Giant hogweed is glyphosate. Foliar sprays of glyphosate are suitable for large infestations, and injection into the stem of the plant approximately 30cm above the ground with 5ml of a 5% v/v solution can be used where spot treatment is required. Chemical applications will be adopted before stem-elongation (mid-spring); • Giant hogweed physical control will include eradication of the plant, during the springtime, as follows: • Young plants can be readily pulled out the soil using hand tools; • Young plants can be readily pulled out the soil using hand tools; • Seed heads on old stems will be removed by individually bagging seed heads and cutting to prevent accidental spread of seeds; • Mowers, strimmers or weed-whackers will not be used; <t< td=""><td>Construction</td></t<>	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 Seed can be present in soil within 4m of established plants and it will not be transferred to other parts of a site; The top 5 cm of soil contains the majority of the seed, and will not be stockpiled within 10m of watercourse to prevents plant spread; and Giant hogweed material and infected soil will be stored on top of a membrane of fabric in a designated area for appropriate disposal; by a suitably qualified and licensed expert. Tracked machinery will be limited in the area and will be cleaned when leaving the site; Rhododendron will be controlled chemically or physically; Chemical control will be adopted during the active growth of the plant in late spring or summer (June to September). A variety of herbicides have proven effective for chemical control, including 2,4_glyphosate, dicamba and triclopyr. Chemical applications can include foliar spray, wiper applicator or spot treatment, stem-injection or cut-stump. Triclopyr will not be used during drought when temperatures are high; A range of physical control measures have been developed for rhododendron in response to the sensitivity of the site. These include: Uprooting by hand: roots are relatively shallow and can be toppled using a hand operated turfer or mechanical winch. Younger plants can be hand-pulled; Chainsaw cutting of root-ball: more effective on larger plants but restricted to soft soil areas. It can be used in combination with winching methods to reduce soil disturbance; and Exclusion zones will be eatblished where necessary to prevent the spread of invasive species; No machinery will be allowed within exclusion zones other than where necessary to undertake treatment measures; Any plant material and soil-containing plant material will be disposed of by a suitably qualified and licensed expert in accordance with the Guidelines on the Man	

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	BD21	10.5.3.2.1	Throughout (as required)	European Designated Sites The AA Screening Report determined that likely significant effects (LSEs) in the absence of mitigation on the following 14 European sites could not be excluded: Malahide Estuary SAC, Baldoyle Bay SAC, Malahide Estuary SPA, Baldoyle Bay SPA, North Bull Island SPA, South Dublin Bay and River Tolka Estuary SPA, North-West Irish Sea SPA, Rogerstown Estuary SPA, Ireland's Eye SPA, Lambay Island SPA, Skerries Islands SPA, River Nanny Estuary and Shore SPA, Boyne Estuary SPA, and Dundalk Bay SPA. Mitigation measures to protect these sites from pollution, mortality and disturbance are described in the Natura Impact Statement (NIS) (included as a standalone document in the planning application pack) and in the site-wide measures (see Mitigation Items BD5 to BD19). These measures will be implemented in full.	Construction
	BD22	10.5.3.2.3.1	Throughout (as required)	 Wintering Birds – Disturbance The following mitigation measures will be implemented to ensure that there will be no disturbance to Qualifying Interest (QI) species within functionally linked habitat during the Construction Phase of the Proposed Development: A 2m to 3 m high non-transparent visual and noise screening barrier will be erected along the perimeter of the site to block the construction works and the movement of machinery / workforce to minimise disturbance to protected birds in functionally linked habitats. This height will be achieved at the typical working level of plant and personnel and will be raised accordingly, if necessary, to ensure that the screening is of adequate height (i.e., no visual disturbance). Locations of the proposed screening are outlined in Table 10.30 in Chapter 10 (Hydrology) in Volume 2 of the EIAR and shown on Figure 10.11 in Volume 4 of this EIAR:	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
EIAR Chapter				 All plant will be operated in accordance with the manufacturer's recommendations including the use and maintenance of specific noise reduction measures to reduce the impact further: The use of mufflers on pneumatic tools; Effective exhaust silencers; Sound reducing enclosures; Machines in intermittent use will not be left idling and will be switched off during periods where they are not required; and Post construction, semi-natural habitats will be left to re-vegetate naturally from the seed bank within re-instated soils. Commercial seed mixes will only be used to reinstate vegetation on agricultural lands. 	
	BD23	10.5.3.2.4	Throughout (as required)	OtterIn line with the mitigation measures set out in the Guidelines for the Treatment of Otters during the Construction of National Road Schemes (NRA 2008b), namely, when holts are present, no wheeled or tracked vehicles will be used within 20m, and no light work will occur within 15m of any holts present. When a non-breeding otter holt or rest is is identified, a buffer zone of 30m will be implemented around the feature. When a breeding otter holt or resting site is identified, the buffer zone will be extended to 150m. Buffer zones will be fenced prior to works commencing. Moreover, should works occur in the vicinity of otter holts with breeding females or cubs, screening will occur and working hours will be restricted.Disused and inactive holts can be destroyed, after being identified as inactive holts and after their entrances have been blocked and monitored for a five-day period. Exceptions can be adopted under licence. The Guidelines for the Treatment of Otters Prior to Construction of National Road Schemes (NRA 2008b) state that a licence will be required for any works likely to cause disturbance (e.g., piling and blasting) to active breeding holts when present with 150m of	Construction
				a development. During the field surveys one potential otter holt with a slide was identified approximately 145m from the proposed cable route, one otter slide was identified approximately 173m from the proposed cable route and one otter spraint was identified approximately 26m from the proposed cable route (see Figure 10.7 in Volume 4 of this EIAR). Since the holt showed signs of otter use (a slide was recorded next to it), and due to its location near to a river, there is high potential for use. However, the nearest potential holt was 145m way, close to the 150m threshold, and did not have evidence of breeding otters. Therefore, there is no requirement for monitoring and works will be able to proceed under the supervision of an ECoW.	
	BD24	10.5.3.2.5	Throughout (as required)	Badger During the baseline surveys, it was identified that 10 badger setts / potential badger setts have the potential to be impacted by the Proposed Development, including two within 50m of the Planning Application Boundary and four between 51m and 150m. Exact locations of setts, are not provided due to persecution of this species. Sensitive information relating to the location of badger setts is provided in a confidential appendix (Appendix A10.1 and Figure 10.10), which are provided to An Bord Pleanála and the National Parks and Wildlife Service (NPWS) separately.	Pre-Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 The following pre-construction surveys and mitigation measures that follow the recommendations set out in the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2006b) will be implemented: Affected badger setts will be marked and the extent of bounds prohibited for vehicles will be clearly marked by fencing and signage. When there is the need to proceed with works close to active setts during the breeding season, mitigation measures, such as sett screening and restricted working hours will be adopted, prior expert consultation; To determine whether a sett is active or inactive, camera traps will be set up prior to the commencement of construction to monitor the entrance to the holes for a minimum of five days. If, after five days, there is no evidence that badgers are using the sett, it is presumed inactive, and no further actions will be required. However, this will only apply if the camera trap monitoring is carried out directly prior to the start of works, meaning that there was no change to the baseline. The use of the sett may change over time, so if there is a delay of more than 12 months prior to the commencement of the works from the date of the final camera monitoring, then a further badger survey will be undertaken to determine the staus of the hole; Disused and inactive sett entrances will be blocked to prevent reoccupation, and the disused or inactive sett will be destroyed using a mechanical digger after five days of monitoring, under the supervision of a suitably experienced and qualified EcoW; and No heavy machinery will be used within 30m of active badger setts. Lighter machinery (generally wheeled vehicles) will not take place within 10m of sett entrances. During the breeding season (December to June, inclusive), none of the above works will be undertaken within 50m of active setts, nor blasting or pile driving within 150m of active setts. 	
	BD25	10.5.3.2.5	Throughout (as required)	 Badger Where an active sett is required to be closed, the following mitigation measures presented in the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2006b) will be implemented: Active entrances will have one-way gates installed (plus proofing around sides of gates) to allow badgers to exit but not to return (inactive entrances will not require gates and may be soft and then hard-blocked as per inactive setts); The gates will be tied open for three days prior to the sett exclusion and sticks placed in the entrance to monitor sett activity; Gates will be left installed, with regular inspections, over a minimum period of 21 days (including period with gates tied open) before the sett is deemed inactive. Any activity at all will require the procedures to be repeated or additional measures taken; Sett destruction will commence immediately following the 21 day exclusion period, provided that all badgers have been excluded and will be conducted under the supervision of a suitably experienced and qualified ECoW; 	Pre-Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 Sett destruction is usually undertaken with a tracked 12 to 25 tonne 360 excavator, commencing at approximately 25m from the outer sett entrances and working towards the centre of the sett, excavating approximately 0.5m slices in a trench to a depth of 2m; Exposed tunnels will be checked for recent badger activity, with full attention paid to safety requirements in so doing; The sett will be destroyed from several directions, in the same manner, until only the central core of the sett remains. Once it is ensured that no badgers remain, the core will then also be destroyed and the entire area back-filled and made safe; and Sett excavation will, preferably, be concluded within one working day, as badgers may re-enter exposed tunnels and entrances. The NPWS Wildlife Licensing was consulted regarding licensing requirements for works in and around badgers and their setts. Section 23(7)I(iv) of the Wildlife Act outlines that if a licence or permission has been received from another public authority whose actions are directed by a statute or statutory instrument, further permission is not required from the NPWS for works affecting badgers (i.e., a licence will be issued by the relevant local authority if required rather than the NPWS). 	
	BD26	10.5.3.2.6	Works at watercourses throughout (as required)	Fish and Aquatic Invertebrates Mitigation measures regarding pollution control of surface water have been detailed in the site-wide mitigation measures (see Mitigation Item BD6 to BD12). These measures have been developed to protect water bodies, drainage ditches and ponds / lakes and the habitats and species that they support, and will avoid a reduction in water quality during construction. Although white-clawed crayfish were confirmed to be likely absent in 14 of the watercourses, on a precautionary basis, it can be considered that white-clawed crayfish have the potential to be affected by the Proposed Development through watercourse pollution or direct disturbance.	Construction
				 The following control measures will be implemented during the Construction Phase in or adjacent to a watercourse: In-stream works will not be carried out in watercourses frequented by salmon or trout during the Annual Close Season. The duration of the season varies regionally within the period from the beginning of October to the end of February, inclusive (IFI 2016). River and brook lamprey spawn during the period March to April / May. Therefore, translocation (fish rescue) and in-stream works will be undertaken outside of the spawning season. As the spawning season can vary regionally, work will be carried out in watercourses in the period June to September to minimise the impact on fish. This mitigation will also protect white-clawed crayfish. The timing of works will be considered on a site-specific basis by the ECoW and in agreement with IFI; Operation of machinery in-stream will be kept to an absolute minimum. All construction machinery operating in-stream will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of in-stream works; The design of temporary settlement ponds, the outfalls from these temporary ponds and the construction method statements for their installation will be agreed with IFI prior to construction; The area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of outfalls / culverts; 	

EIAR Chapter Mitigation EIAR Location **Description of Mitigation or Monitoring Measure** Implementation Number Section Phase Reference Any de-watering flows will be directed to the construction drainage system and to the settlement pond (or . other) treatment system; Sediment mats / silt traps or similar will be located immediately downstream of the works within and • adjacent to the watercourses. These will be inspected daily, maintained and cleaned regularly by the ECoW during the course of site works. Diversion of water to and from a temporary diversion channel will only take place during the period March to September (IFI 2016) or as agreed with IFI; Small check dams will be constructed in the cut-off watercourse to trap any sediment, and a sediment trap ٠ will be provided immediately downstream of the diversion to the existing watercourse; and Where in-stream bed material is to be removed, coarse aggregates, if present, will be stockpiled at least • 10m away from the watercourse for replacement following reinstatement of a watercourse channel. Watercourse banks affected during construction in / near a watercourse will be reinstated back to pre-construction conditions. BD27 10.5.3.2.6 Works at Fish and Aquatic Invertebrates Construction watercourses Where open trenching is proposed, site restoration works will be carried out following completion of the crossing, in agreement with IFI (see Table 10.29 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR for a list if these throughout (as watercourses). These works may include riverbank and gravel replacements. In all cases, the site will be restored postrequired) installation. An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions (Met Éireann red, amber, yellow warnings will be monitored daily by the ECoW by accessing the Met Éireann website (Met Éireann 2024)). Works will be stopped where a red weather warning is issued. Where an amber warning is issued, works will be monitored by the ECoW and stopped where deemed appropriate based on the site conditions. Fish and Aquatic Invertebrates BD28 10.5.3.2.6 Works at Construction watercourses Additional mitigation measures that will be undertaken to protect fish species are as follows: throughout (as ٠ Where in-stream trenching is to be carried out, the area will be dewatered to provide a dry works area; required) The impermeable barrier will be tailored to the watercourse in question, as per consultation with IFI to-date, ٠ and where technically feasible, fluming will be preferred to over pumping techniques to provide the dry working area (refer to Chapter 4 (Proposed Development Description) for details); Netting, sandbags and / or dumpy-bags filled with rock will be installed upstream to prevent fish travelling ٠ downstream into the working area: Fish will be removed from the working area through electrofishing and moved upstream of the dammed . area: and Once construction is completed, the watercourse will be re-wetted under the direction of the ECoW. Water ٠ will be released slowly and silt mats, sediment traps and haybales will be used to avoid a sudden influx of sediment to the system. A silt buster will be used where required. BD29 10.5.3.2.7.1 Throughout (as Reinstatement – General Requirements for All Hedgerows Construction required) The following mitigation measures will be implemented during the Construction Phase:

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 All planting will be native (only) and of local provenance, taking account of the vegetation that has been removed and typical species of the local landscape; A post-consent / pre-construction baseline survey of all hedges to be removed will be carried out to characterise its canopy, understorey and field layer species, and associated features (ditches, earth banks, walls etc.) to inform reinstatement; Unless otherwise agreed with the Developer (ESB) and the local authority, the appointed contractor will reinstate hedgerows and treelines to a species-rich condition (i.e., five native woody species per 30m (excluding brambles), with no use of commercial seed), comprising only native species. All other sites will be returned as close as possible to their pre-existing condition, using the same woody species removed, under the supervision and direction of the appointed contractor's EcoW; Hedging / hedgerow plants will be planted as a staggered double row, six plants per metre with 330mm between rows. Suitable individual protection from browsing animals will be provided by tube, spiral or similar held in place with a short cane. Group protection of new planting will be provided by suitable fencing, but individual plant protection of spirals will be provided to protect against browsing animals. Mulch mats or similar weed suppression materials (restricted to a biodegradable specification) will be used to promote successful establishment; The appointed contractor will make orders by the scientific name to ensure native plants are delivered and not a cultivated variety; Nurseries prefer to grow trees to order, so the appointed contractor will make the order as soon as possible (up to a year in advance) to ensure that the required species and stock specification can be secured; Consideration will be given to the procurement of planting so that there are suitable lead-in times to ensure that plants are of the right age / height requ	
	BD30	10.5.3.2.7.2	Throughout (as	Reinstatement – Specific Requirements for Hedgerows and Trees Within the Cable Easement	Pre-Construction /
			required)	At the time of writing, the latest EirGrid Functional Specification for Underground Cables (EirGrid 2021) stated: "The easement area shall be cleared, and kept clear, of trees and other vegetation with deep root systems as these may damage the cable".	
				Since publishing this specification, EirGrid has identified precedence from Germany and the Netherlands for safely planting certain shrubs over High Voltage (HV) underground cables. EirGrid has engaged closely with the ESB, and relevant Dutch and German Transmission System Operators across Europe, to understand feasibility of planting over HV underground cables in Ireland. A Draft Over Cable Planting Strategy is in advance development in consultation with ESB, for which the Design Risk Assessment (DRA) was ongoing at time of writing (including calculations to assess a possible cable de-rating). The draft strategy combines the requirement for a minimum cable burial depth of 1m (to top of Cement Bound Granular Mixture in the cable trench), use of a high performing Root Barrier Membrane, and a	

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	Mitigation NumberEIAR Section ReferenceIBD3110.5.3.2.7.3T		strictly defined shrub species list with known maximum root depths of less than 1m. It is possible that the DRA may conclude that over cable planting cannot be delivered while guaranteeing cable performance and security. There are also risks that the strictly defined shrub species list is not compatible with landowner farm boundary requirements and / or agricultural farm payments. As such, applying a precautionary principle, offsite compensatory planting is assumed for all permanent losses within the permanent easement (losses are outlined in Table 10.26 in Chapter 10 (Biodiversity) in Volume 2 of the EIAR).		
				Subject to consent, the offsite compensatory planting will commence in advance of, or in parallel with, the Construction Phase of the Proposed Development. EirGrid has identified candidate sites in County Meath and County Dublin in consultation with a charity partner, who provides compensatory planting options on third-party lands. Whether these candidate sites or other sites are used for compensatory planting, there will be no planting in semi- natural habitats of significant ecological value, which will be verified by the suitably qualified ecologist employed the compensation supplier. Offsite compensatory planting will deliver 130% of trees permanently lost within the Planning Application Boundary.	
	BD31	10.5.3.2.7.3	Throughout (as required)	Reinstatement – Specific Requirements for Semi-Natural Grasslands The appointed contractor's ECoW will develop site-specific reinstatement plans for all semi-natural habitats (including dry calcareous grassland, and dry meadows and grassy verges). These plans will be provided to the Developer's Ecologist (ESB), and the Planning and Environmental Unit in EirGrid's Chief Infrastructure Office. In accordance with the All-Ireland Pollinator Plan 2021-2025 (National Biodiversity Council (NBDC 2021)), commercial seed mixes will not be sown with the objective of restoring biodiversity. Seeds of certain plant species, such as wildflowers and certain species included in multi-species mixtures, are not subject to the seed certification schemes as implemented by the European Union Member States and The Organisation for Economic Co-operation and Development OECD-designated authorities in respect of third countries, so there is no guarantee of the species mix or its provenance. Furthermore, even where harmful weed species are not present, seeds of non-local origin (even if the species are native) introduce new genetic strains which may displace or compromise the local, naturally-occurring flora (Dublin Naturalists Field Club 2021). As such, in the site-specific habitat reinstatement plans for semi-natural habitats, the appointed contractor's ECoW will adopt the following approach, subject to consultation with the NPWS: • Where it is deemed appropriate to allow habitats to re-vegetate naturally (e.g. roadside verges, where similar habitats; • Use of commercial seed in semi-natural habitats will only be permitted where local seed is not available, or where local seed establishment has failed, and if both: • Certified native by the Department of Agriculture, Food, and the Marine; and W	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	BD32	10.5.3.2.7.4	Throughout (as	Reinstatement – General Requirements for Roadside Verges and Agricultural Areas	Construction
			required)	The requirements that will be followed for use of seed in grassland reinstatement are:	
				 Commercial seed mixes will only be used on agricultural lands. All other areas will be left to naturally revegetate from the seed bank within reinstated soils; All seed mixes will be certified native by the Department of Agriculture, Food, and the Marine; and In agricultural areas, the rate of seeding, time and method of sowing, including the application of fertiliser, will be agreed with an experienced agronomist and will follow the guidance on reseeding – Pocket Manual for Reseeding (Teagasc 2020). 	
	BD33	10.5.3.2.7.5	Throughout (as required)	Reporting All reinstated or indirectly impacted semi-natural vegetation will be inspected at the completion of the Construction Phase, at which time the appointed contractor's ECoW will provide written reports on habitat condition to the Developer's Ecologist (ESB), and EirGrid's Planning and Environmental Unit. At that time, the Developer's Ecologist (ESB) will determine what additional steps are required to assist vegetation growth and establishment. Additional steps will include any of the following; replacement tree planting, additional hedge mulch, protection from browsing animals, or sowing of locally harvested seed for semi-natural grassland, using a green hay approach.	Construction
Chapter 11 (Soils, Geology and Hydrogeology)	LSGH2	11.5.1	Throughout (as required)	The CEMP (included as a standalone document in this planning application pack) which includes good industry working practice and pollution prevention measures, with a particular focus on controlling run off and suspended solids, preventing accidental spillages, excavated material stockpile management, and ensuring safe storage of materials and product in sealed areas will be implemented.	Construction
	LSGH3	11.5.1	Joint Bays	Topsoil stripping will be undertaken in some areas of the proposed cable route as part of constructing with the Joint Bays. A Soil Management Plan will be developed for the Proposed Development, which will include measures for segregation of soil types and to maintain soil quality during movement, stockpiling and subsequent placement.	Construction
	LSGH4	11.5.1	Throughout (as required)	Risks to workers from ground gas when working within confined spaces will be mitigated through the development and adoption of an appropriate safe system of work, including the use of personal protective equipment (PPE) and Respiratory Protective Equipment (RPE) as a last resort.	Construction
	LSGH5	11.5.1	Throughout (as required)	Prior to the Construction Phase commencing, appropriate health and safety and waste management procedures for working with potentially contaminated soils (including asbestos) and water will be established, including the development and adoption of safe systems of work, including the use of PPE as a last resort. With specific regard to asbestos in soils (as identified at one location) a competent asbestos specialist will develop a plan to manage risks taking into account guidance presented in Asbestos-containing Materials (ACMs) in Workplaces – Practical Guidelines on ACM Management and Abatement (Health and Safety Authority (HSA 2013), and Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance (shortened name CAR-SOIL TM) (CL:AIRE 2012). The plan will include the use of appropriate PPE and RPE and the carrying out of air monitoring during works at relevant locations. In addition, all staff working with soils potentially containing asbestos will be trained to identify asbestos containing material.	Pre-Construction
	LSGH6	11.5.1	Throughout (as required)	To mitigate potential risks from radon migration into excavations and other enclosed spaces during the Construction Phase, an occupational monitoring programme will be implemented by the relevant contractor(s) to identify whether radon migration and build up is occurring in areas where the risk is considered to be present. The monitoring will be	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				undertaken in accordance with the EPA Protocol for the Measurement of Radon in Homes & Workplaces (EPA 2019). If	
				the workplace reference level of 300Bq/m ³ (becquerels per cubic metre of air) is exceeded, mitigation measures will	
				be required during the Construction Phase, such as development of safe systems of work to ensure protection of personnel, potentially including measures such as use of PPF, RPF and working time restrictions	
	LSGH7	11.5.1	Throughout (as	A watching brief will be implemented to identify the potential presence of previously unidentified contamination.	Construction
			required)	Personnel appointed by the appointed contractor will be appropriately trained in ground contamination identification	
				(including Asbestos Awareness Training) if involved in earthworks activities. Any such instances of previously	
				unidentified contamination will be recorded, the associated risks assessed, and a remedial strategy developed by the	
				appointed contractor to manage the identified risks as appropriate.	
	LSGH8	11.5.1	Throughout (as	Specifically relating to individual receptors, such as groundwater dependent terrestrial ecosystems (GWDTEs) and	Pre-Construction /
			required)	groundwater abstractions, the following mitigation measures will be implemented, prior to the commencement of,	Construction
				and throughout the duration of the Construction Phase to limit these impacts:	
				• The CEMP will include good industry working practice and pollution prevention measures, with a particular	
				focus on controlling runoff and suspended solids, preventing accidental spillages, excavated material	
				stockpile management, and ensuring safe storage of materials and product in sealed areas;	
				 Orsce Elevation with be further consulted during the defaulted design stage regarding the Duriboyine abstractions. This will include relayant aspects of the CEMD in addition to aspecing a method statement. 	
				within the final CEMP for the works in the relevant location (notentially including monitoring and reporting	
				requirements).	
				Where trenching is carried out outside of existing roads, the methodology to backfill trenches will ensure	
				that the backfill is not creating preferential subsurface flow pathway. Soil compaction will be undertaken,	
				and where needed on off road sections, additional clay bunds will be installed within the trench in areas that	
				are adjacent to or in proximity to potential GWDTEs;	
				 Clay bunds are proposed to be installed along the proposed cable trench, with an increased 	
				frequency between approximate Chainages 2,200 to 2,650, 2,750 to 2,850, 26,200 to 26,250,	
				and around Chainage 12,500 in proximity of the potential GWDTEs to prevent the formation of a	
				drainage pathway.	
				Should any unknown private supplies be identified in the vicinity of the proposed cable route, the supply will be granitated and if granitated an elementiate supply	
Chanter 12	11//4	12 5 1 1	Throughout (ag	will be monitored and, if required, an alternative supply will be provided.	Dra Construction /
(Hydrology)	нті	12.5.1.1	Inroughout (as	General Mitigation	Pre-Construction /
(Hyurology)			requireu)	Construction Phase	Construction
				The CEMP, which is included as a standalone document in the planning application pack) and its associated	
				appendices (Appendix C - Construction Resource Waste Management Plan (CRWMP) and Appendix D	
				SWMP will be implemented in full. General measures to control and manage activities, surface water.	
				drainage and waste at the surface to prevent issues are outlined within Sections 1 to 5 of the SWMP and	
				Sections 1 to 4 of the CEMP. The measures include general mitigation to control accidental spillage or	

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 increased runoff as a result of hardstanding or precipitation infiltration into stockpiles, exposed soils and silt; A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to the commencement of works. The role of the EnCoW will be to monitor and report on compliance with planning consents, environmental permits, legislation and mitigation. The EnCoW will be experienced in the types of construction works that are being carried out; Works will be carried out in accordance with the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland (IFI 2016); Works method statements will be agreed with IFI for all water body crossings, prior to works commencing at each crossing. The works method statement will include details on monitoring requirements for instream concrete pouring works and handheld turbidity monitoring for instream works. The method statements will ensure that: Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose; Established concrete washout management areas will be designated to control the discharge of concrete washout; An emergency response plan will be developed and communicated to site staff prior to the concrete pouring; The EnCoW and on-site personnel will monitor the concrete pour to identify any spills are promptly addressed and mitigated; and The EnCoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary. An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions. Met Éireann (red, amber, yellow) warnings will be monitored	
	HY2	12.5.1.2	Throughout (as required)	Surface Water Quality Protection Measures The following surface water quality mitigation measures will be implemented prior to commencement, and throughout the duration of the Construction Phase. Works will only be completed outside of any known seasonal restrictions including instream working restrictions which are generally confined to the summer/early autumn season (i.e., June / July / August / September): • Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location; • A buffer zone of 20m will be maintained between storage and working areas and Water Framework Directive (WFD) designated water bodies (as listed in Table 12.7 in Chapter 12 (Hydrology) in Volume 2 of this EIAR), taking account of the minimum working area required to facilitate the works;	Pre-Construction / Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 Oil or fuel stored in or adjacent to the works area will be kept in a bunded area (providing 110% capacity of the largest storage unit), at a minimum distance of 20m from any WFD designated water body, or any non-designated water body that appears on a 1:50,000 OS map. This will include all unnamed watercourses as listed in Table 12. 7 in Chapter 12 (Hydrology) in Volume 2 of this EIAR; Tracking beside streams and tracks will be avoided where practicable to avoid damage to the bankside. Where tracking of plant and machinery is necessary, steps will be taken to reduce the impact to channel banks through the provision of track mats to reduce the impacts on the substrate; Geotextile or timber matting will be used on soft ground unless the EnCoW advises, before or after monitoring, that use of a wide-tracked machine alone, will produce relatively lower siltation risk, than the installation and removal of bog mats; The time period over which areas of clearance are left open will be reduced insofar as is reasonably practicable; Re-instatement method statements will be subject to approval by the EnCoW. Species local to the surrounding area will be used in the reinstatement for any vegetation lost during construction, as described in Chapter 10 (Biodiversity) in Volume 2 of this EIAR; Concrete will be brought to site by covered truck; Wet concrete operations adjacent to water bodies will be avoided, where possible, with a minimum separation distance of 20m, with exception to in-stream pours which will be undertaken within a sealed dry working area. The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, where possible, and remote from water bodies or potential pathways to water bodies; In order to reduce the risk of contamination arising as a result of spills or leakages, measures including, but not limited to, the following will be employed: <l< td=""><td></td></l<>	

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	HY312.5.1.3Throughout (as required)Silt Control Measures The following mitigation measures will be imple • Silt control measures will be used to c access to surface drainage which could • Silt traps will be located in small drain large areas needs to be controlled; • Silt fences will be installed in the work • Where distances between the works at water body will be maintained; • Proposed construction access routes v water bodies is maintained; • Where an appropriate set back distance will 	 Silt Control Measures The following mitigation measures will be implemented during the Construction Phase: Silt control measures will be used to control silt generated from activities on-site and prevent it gaining access to surface drainage which could convey silt to larger streams and water bodies; Silt traps will be located in small drains where flow is small and silt fences will be located where runoff from large areas needs to be controlled; Silt fences will be installed in the working areas and not at the water body; Where distances between the works and water body allow, a minimum setback distance of 20m from the water body will be maintained; Proposed construction access routes will be delineated, such that an appropriate set back distance from water bodies is maintained; Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site; Where the site is constrained, the best available set back distance will be determined by the EnCoW, taking account of the minimum working area required to facilitate the works; Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins; and Cut-off ditches, berms or diversion channels will be utilised around working area boundaries, where possible, to limit surface water entering the excavated areas and silty water running off the site into surface water drains or watercourses. 	Construction		
	HY4	12.5.1.3.1	Throughout (as required)	 Silt Control Measures - Silt Traps The following requirements will apply during the Construction Phase: Silt traps will be placed in drains downstream of working areas where the volume of water flow is expected to be low and will be identified on-site by the EnCoW; Silt traps will be made of terram, not mesh; The silt trap will be staked into the banks of the drain / water body, such that no water can flow around the sides; The material will be bedded into the drain bed / water body to prevent water flowing beneath it; The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it; Inspections will be carried out daily during the proposed Construction Phase works by the EnCoW, and after heavy rains and / or strong winds; weekly on completion of the works for at least one month, and monthly thereafter until bare areas have developed new growth; Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom; The silt trap will not be pulled from the ground but cutaway at ground level and posts removed; and A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package. 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	HY5	12.5.1.3.2	Throughout (as required)	 Silt Control Measures - Silt Fences The following measures will be implemented in relation to silt fences during the Construction Phase: Silt fences will be installed prior to the commencement of works and will be inspected daily by the site team and EnCoW to inform adaptive management, as required. The locations of the same will be determined by the EnCoW; Site restoration post-works will be carried out, in agreement with IFI. These works will include riverbank stabilisation, gravel replacements, bank profiling and planting where required. In all cases, the site will be restored post-installation; Silt fences will be installed downslope of the area where silt is being generated; The silt fence will contain the area where silt is generated and will terminate on high ground (i.e., an elevated area not adjacent to any watercourse); The base of the silt fence will be bedded at least 15cm to 30 cm into the ground at 2m intervals. The manufacturer's installation instructions will be followed during installation to ensure that the silt fence is appropriately installed; Once installed, the silt fence will be inspected regularly by the EnCoW, daily during the proposed Construction Phase works, and regularly on completion of the works until bare areas have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately; Two lines of silt curtain / fence will be installed for the receptors outlined in Table 12.7 in Chapter 12 (Hydrology) in Volume 2 of the EIAR, unless otherwise agreed by the EnCoW; Any build-up of sediment along the fence boundary will be removed daily; Silt fences will be maintained until vegetation on the disturbed ground has re-established; The silt fencing will be left in place until the works are completed (which includes removed of any temporary ground treatment) and will remain in place until the works are completed and posts removed	Construction
	HY6	12.5.1.4	TCCs and HDD Compounds	 Construction Compounds / Laydown Areas The following measures will be implemented during the Construction Phase: All proposed TCCs and HDD Compounds will be secured with hoarding / fencing around the compound perimeters, as appropriate; Where temporary construction areas are required and existing hardstanding is not available, engineered stone fill will be laid, compacted, and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition; Temporary facilities will be provided at the TCCs / HDD Compounds, including Construction Phase car parking and welfare facilities and temporary material storage areas, as necessary.: 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	pter Mitigation EIAR Section Reference Location	 Where a construction access route is required, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition; All construction workers will be required to use the designated access / egress routes only. Storage of fuel and refuelling will be undertaken within bunded areas; Any discharges from temporary welfare facilities will be connected to either the existing sewage network (where available) or to a sealed holding tank to be emptied and disposed of off site by a licensed contractor to an approved licensed facility; Storage of fuel and refuelling will be undertaken within bunded hardstanding areas. Water will be brought to site via tankers, as required; and Where a potential flood event is forecast, plant and materials vulnerable to flooding in any 'at risk' compounds areas will be relocated to parts of the compound that are considered to be not at risk of flooding. 			
	HY7	12.5.1.5	Watercourse crossings	 Open Trench Water Crossings The following measures will be implemented during the Pre-Construction / Construction Phase: As with all construction works proposed, no works on water bodies will be allowed to commence until the relevant Risk Assessment Method Statements (RAMS) and pertinent Health and Safety documents are received from the specialist appointed contractor and are reviewed and agreed by the Client's representative; The appointed contractor documents will include method statements, open trenching risk assessments and environmental management plans specific to the area where the trenching is to take place. These plans will be submitted by the appointed contractor to the Employer's Representative on-site for review and comment, prior to commencing open trench operations; In addition to this, for the in-channel crossings, the appointed contractor will be required to prepare detailed construction method statements. Such method statements will be provided to IFI for approval; All open trenched water body crossings will take place during the June to September period in order to avoid the period of salmon and trout spawning, unless otherwise agreed with IFI. Consultation to-date with IFI indicates that for the crossings of the Tolka_020 (WB06), as a minimum, instream timing restrictions will apply as per the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016); and The ground preparation works (such as soil stripping and hardstand formation) adjacent to the water body crossing will be carried out in the same manner as that for other works activities. All clean coarse surface material (gravel, cobbles and boulders) on the riverbed or stream to a depth of 30cm will be removed. Where a depth of 30cm is not present, the full depth of the layer will be removed to where the substrate is mainly clay or sand. Any natural bed substrate removed from water bodies will be stored separately to other stockpiled mat	Pre-Construction / Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	HY8	12.5.1.5	Watercourse crossings	 Open Trench Water Crossings (continued) The following measures will be implemented during the Pre-Construction / Construction Phase: Where sites can be flumed, the diameter of the flume pipe will be chosen to accommodate flows at the time, with spare capacity to cover that predicted over the period that the works are expected to last. A clay material will be used around the flume pipe to create a seal and prevent leakage and loss of flow volumes. Image 4.21 in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR includes an example graphic of a typical flume pipe crossing; Where fluming cannot be achieved, and damming and pumping methods are to be used for open trenching, sandbags will be used with an impermeable barrier. Material excavated from the trench (and an upstream pump sump, if required) will be placed on terram on level ground as far back from the water body edge, as is practicable, and surrounded on its downslope side by a silt fence and / or impermeable berm to prevent material re-entering the water body. This material, if deemed suitable, can be used to partially backfill the trench. However, a significant amount of material will be in excess and will be removed from site by a suitably licensed handler to a suitably licensed facility. All pumps will be used to remove excess water from excavation will be treated on-site, and where necessary, pumps will be used if the first is not sufficient to remove enough solids. Pumped over water will be directed to a splash plate to prevent erosion of the riverbed / bank at the downstream outlet; The natural bed material removed which was set aside will be used to reinstate the stream bed after the ducts have been installed and the flume pipe has been removed, as well as all the damming materials. The stream bed will be reinstated at the same level and grade as it was prior to the works to ensure that there are no changes in channel bed gradient; and All bank surfaces will be reinstated at th	Pre-Construction / Construction
Chapter 13 (Archaeology, Architectural	AACH1	13.5	Throughout (as required)	Mitigation for archaeology, architectural heritage and cultural heritage will be undertaken within the framework provided by with the Code of Practice between the Department of the Environment, Heritage and Local Government and EirGrid (Department of the Environment, Heritage and Local Government and EirGrid 2009)	Construction Phase
Heritage and Cultural	AACH2	13.5	Throughout (as required)	Where preservation in situ is feasible, a methodology for this will be agreed with National Monuments Service (NMS).	Construction Phase
Heritage)	AACH3	13.5	Throughout (as required)	All mitigation will be carried out under the supervision of a suitably qualified archaeologist under Licence (where required) granted by the Minister for Housing, Local Government and Heritage, and in accordance with the provisions	Construction Phase

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				of the National Monuments Acts 1930–2004 (as amended). Written reports on the results of all mitigation undertaken will be prepared in accordance with the requirements of the Licence(s) granted by the NMS	
	AACH4	13.5	Throughout (as required)	The appointed contractor will allow sufficient time in their programme to allow the mitigation to be completed in the areas in which such mitigation is required.	Pre-Construction
	AACH5	13.5.1	In the location of the various archaeological, architectural heritage and cultural heritage assets receptors identified	 areas in which such mitigation is required. Mitigation measures for known archaeological, architectural heritage and cultural heritage assets, that will be undertaken post-consent but in advance of the Construction Phase, will comprise the following: Topographical survey of the upstanding remains of LI_08; A photographic and written record of the elements of GDLs DL_04, DL_05, DL_15 and DL_16 impacted by the Proposed Development; Townland boundary surveys comprising a detailed written and photographic survey, and test trenching of TB_01, TB_04, TB_38, TB_39, TB_44, TB_51, TB_52, TB_54, TB_57, TB_67, TB_76, TB_78, TB_82, TB_85, TB_86, TB_87, TB_96 and TB_97; Palaeoenvironmental assessment and analysis of LI_24, LI_36 and LI_58; Archaeological excavation of AY_47, CH_32, CH_59, CH_62, CH_67, CH_75, CH_78, LI_05, LI_08, LI_09, LI_11, LI_24, LI_36, LI_40 and LI_58, informed by archaeological geophysical survey and archaeological test excavation, where preservation in-situ is not feasible; Underwater assessment comprising wade and metal detecting survey of:	Pre-Construction
	AACH6	13.5.1	Throughout (as required)	Archaeological geophysical survey and archaeological test excavation will be undertaken post consent but pre- construction in all off-road sections required for construction, including land required for the proposed access tracks, Passing Bays and Joint Bays, and HDD Compounds and TCCs. Where preservation in situ is not feasible, the results of the archaeological geophysical survey and archaeological test excavation will inform the design of archaeological excavation required to mitigate the impact on any unknown archaeological remains identified.	Pre-Construction
	AACH7	13.5.2	In the location of the various archaeological, architectural heritage and cultural heritage assets receptors identified	 During construction, the following mitigation will be undertaken: Archaeological monitoring of on-road construction works within the Zones of Notification of Recorded Monuments (AY_18, AY_23, AY_24, AY_25, AY_29, AY_41 and AY_43) and for assets CH_34, CH_53, CH_68, CH_80, CH_81, CH_82, CH_83, LI_37, LI_57 and LI_60 will be undertaken; and AY_24, CH_15 and CH_63 will be clearly demarcated with temporary fencing within the Planning Application Boundary to avoid accidental damage. 	Construction
	AACH8	13.5.2	Throughout (as required)	If archaeological remains are identified during the archaeological monitoring, and preservation in-situ is not feasible, archaeological excavation will be undertaken under an excavation licence granted by the Minister for Housing, Local	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				Government and Heritage and in accordance with the provisions of the National Monuments Acts 1930–2004 (as amended).	
EIAR Chapter Chapter 14 (Traffic and Transport)	TT1	14.5.1.1	Throughout (as required)	The temporary impacts that construction will have on traffic and movement through the study area will be mitigated through the adoption of a regulated and approved CTMP. The CTMP is included as Appendix B of the CEMP (which is a standalone document in the planning application pack). It should be noted that in this regard both the CTMP and CEMP are included herewith for the purposes of this application and assessment. However, they will comprise 'live' documents insofar as they are subject to ongoing future refinement by the appointed contractor in collaboration and agreement with the Roads Authorities. However, all such refinement will occur in the context of the CTMP (and CEMP) included in this planning application pack for approval, and therefore, the subject of the assessment of the consenting authority. The CTMP will document measures to promote the efficient transportation of components and materials to site, whilst reducing congestion and disruption which might impact negatively on local communities or general traffic and in particular emergency services.	Pre-Construction / Construction
	TT2	14.5.1.1	Throughout (as required)	The appointed contractor will agree temporary traffic measures, and will then adopt and monitor an appropriate way of working, in consultation with Meath County Council, Fingal County Council, daa, Transport Infrastructure Ireland (TII) and / or their agents, and An Garda Síochána, as appropriate.	Pre-Construction / Construction
	TT3	14.5.1.1	Throughout (as required)	Construction activity generated vehicles will travel on predefined construction access routes to and from the relevant working areas to reduce the effects on local traffic.	Construction
	TT4	14.5.1.1	Throughout (as required)	Signed diversion routes will be provided to mitigate journey disruption and to minimise potential driver delay. These are outlined in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR but will be subject to final agreement with the Roads Authorities. Where practically achievable, diversion routes will not apply outside of the working area hours of operation.	Construction
	TT5	14.5.1.1	Throughout (as required)	Signage will be installed to warn road and recreational route users to the presence of the works access and the associated likely presence of large or slow-moving construction traffic.	Construction
	TT6	14.5.1.1	TCCs	To minimise inconvenience to the local community in terms of obstructive parking, adequate car parking for permanent site personnel, visitors and deliveries will be provided within the TCCs. Adequate vehicle parking is available on-site at either substation, and car parking will not be permitted on any of the public road network that bounds the respective TCC or work site, so that sight lines will be maintained and to minimise the potential for obstruction and delay for other road users.	Construction
	TT7	14.5.1.1	Throughout (as required)	Only vehicles essentially required to facilitate construction will be permitted to attend proposed cable route worksites. Car sharing will be promoted to construction personnel by the appointed contractor during the induction process.	Construction
	ТТ8	14.5.1.1	Throughout (as required)	The appointed contractor will nominate a person to be responsible for the co-ordination of all elements of traffic and transport during the construction process (liaison officer). This person will liaise with the local community so that the community has a direct point of contact within the contractor organisation who they can contact for information purposes or to discuss matters pertaining to the traffic management.	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	TT9	14.5.1.2	M3 Parkway railway line HDD works	 Railway Monitoring The following monitoring measures will be implemented for the HDD works at the M3 Parkway: The appointed contractor that will undertake the HDD at the M3 Parkway railway will use track monitoring equipment; and A detailed methodology will be determined by the appointed contractor in consultation with Irish Rail. However, it is anticipated that rail track monitoring will involve the use of survey equipment and target sights before, during and immediately following HDD operations to monitor any movements accurately. 	Construction
	TT10	14.5.1.3	Throughout (as required)	 Construction Access Arrangements The following mitigation measures will be implemented during the Construction Phase: Transportation, including deliveries to and from the Construction Phase working areas, will be on the existing public road network with access to off-road locations gained through both existing and constructed accesses and haul roads; The proposed programme of working area locations will be confirmed by the appointed contractor as an integral part of their adopted CTMP; All construction vehicle drivers will be instructed to access their destination worksite via an approved construction access route; and A wheel wash facility and road sweeper will be provided to minimise any mud and debris on the surrounding public road network and to prevent the introduction and spread of non-native or invasive plant material onto the site. 	Construction
Chapter 15 (Agronomy and Equine)	AE1	15.5.1	Off-Road Sections (as required)	The appointed contractor will be required to maintain close liaison with local community representatives and landowners and farmers to provide them with adequate progress information and advance notice of works. This will ensure that construction activities are planned around the reasonable access needs of the landowner, so that access is maintained when required by the landowner for farming activities, such as for example, forage and crop harvesting, fertiliser spreading, slurry spreading, and herding of livestock etc. Scheduling of works will be agreed with each landowner to facilitate the operation of the farm and minimise disturbance. Where it is necessary to move livestock along public roads or across the working area, this will be facilitated by the appointed contractor.	Construction
	AE2	15.5.1	Off-Road Sections (as required)	Landowners with lands adjoining sites, if rock breaking is required to take place, will be notified in advance of these activities.	Construction
	AE3 (see TT1 to TT10 (as applicable))	15.5.1	Off-Road Sections (as required)	Traffic mitigation measures outlined in Chapter 14 (Traffic and Transport) in Volume 2 of this EIAR and in Mitigation Item TT1 to TT10 (as applicable) in this Table, and any associated traffic management plans will be implemented to ensure that farmers and agri-business owners have adequate access to farmyards and land so that the transport of farm inputs and produce is not significantly affected.	Construction
	AE4 (see AQ1 to AQ9)	15.5.1	Off-Road Sections (as required)	Mitigation measures for the control of dust, as set out in Chapter 7 (Air Quality) in Volume 2 of this EIAR and in Mitigation Item AQ1 to AQ9 in this Table will be implemented by the appointed contractor.	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	AE5 (see NV1 to NV22)	15.5.1	Off-Road Sections (as required)	Mitigation measures for the control and monitoring of noise and vibration as set out in Chapter 9 (Noise and Vibration) in Volume 2 of this EIAR and in Mitigation Item NV1 to NV22 in this Table will be implemented by the appointed contractor.	Construction
	AE6 (see HY1 to HY8)	15.5.1	Off-Road Sections (as required)	Mitigation measures for the control and monitoring of water quality, as set out in Chapter 12 (Hydrology) in Volume 2 of this EIAR and in Mitigation Item HY1 to HY8 in this Table will be implemented by the appointed contractor.	Construction
	AE7	15.5.1	Off-Road Sections (as required)	The appointed contractor will comply with any regulations pertaining to the control of farm diseases as specified by the Department of Agriculture, Food and the Marine and will employ reasonable precautions against spreading any such farm disease. The appointed contractor will operate a biosecurity plan where machinery and personnel that are moving between farms will have adequate available disinfection facilities and equipment to ensure that disinfection can take place as required. The ESB and / or its appointed contractor will also take due notice and consideration of reasonable concerns expressed by landowners or occupiers prior to entry.	Construction
	AE8	15.5.1	Off-Road Sections (as required)	Where field boundaries are to be affected, replanting and fencing will be used to ensure that the boundaries are maintained between landowners and within existing field systems. Therefore, no permanent restructuring will occur. Hedgerows will be replanted with species-rich varieties and with suitable fit for purpose fencing in-line with Teagasc and the Department of Agriculture, Food and the Marine guidelines. However, technical considerations may limit planting above the proposed underground cable circuit. Where replanting is not feasible, suitable fit for purpose stockproof fencing will be provided with standard agricultural gates provided where required. Access between landowners will not be provided except where required on the joint bay access tracks (e.g. between Chainage 700 and 3,400 for the permanent access track to Joint Bay 1 to 4). Double gates will be provided at field boundaries between landowners on these permanent access tracks. The gates will be locked and maintained by ESB with no access provided to the landowner. Double fencing will be provided between separate landowners to maintain biosecurity between adjoining farms.	Construction
	AE9	15.5.1	Off-Road Sections (as required)	Where the working area severs land access or access to farmyards, the appointed contractor will ensure that there is adequate access provided to facilitate the farmer to effectively farm severed land.	Construction
	AE10	15.5.1	Throughout (as required)	The appointed contractor will adhere to the mitigation specified in this Chapter of the EIAR, and the CEMP which is included as a standalone document in this planning application pack	Construction
	AE11	15.5.1	Off-Road Sections (as required)	 The appointed contractor will: Maintain pre-entry records; Erect fit for purpose livestock proof fencing to prevent straying livestock; Maintain and repair existing field drainage systems to restore the drainage of land to the condition that prevailed before the proposed works; Store soil separate from the works traffic ensuring minimum amount of damage and disturbance to excavated soil material; Reinstate the land so that it is level and surface is free of stones and weeds; and Treat soil compaction by breaking up the soil to the required depth to address such compaction. 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	AE12	15.5.1	Off-Road Sections (as required)	The drainage reinstatement will not impede the drainage of surrounding agricultural lands, and where land drains have been intersected or blocked during construction, these will be reconnected or diverted to a suitable outflow.	Construction
	AE13	15.5.1	Off-Road Sections (as required)	Field boundaries (hedgerows and fencing) removed during the Construction Phase will be replaced with fit for purpose stock proof fencing and hedgerows. However, hedgerows will not be replaced directly along the easement where they are permanently removed.	Construction
Chapter 16 (Waste)	W1	16.5.1.1	Throughout (as required)	A CRWMP has been prepared (included as Appendix C to the CEMP included as a standalone document in this planning application). The appointed contractor will implement and update this document (as necessary) in accordance with best practice as described in Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (EPA 2021). The appointed contractor(s) will be responsible for reviewing and updating the CRWMP prior to the commencement of construction and will undertake periodic reviews, updating as necessary throughout the Construction Phase in agreement with the planning authorities. The CRWMP outlines how waste arising during the C&D Phases of the Proposed Development will be managed in a way that ensures compliance with the provisions of the Waste Management Act 1996 (as amended).	Construction
	W2	16.5.1.1	Throughout (as required)	All operations will be managed and programmed in such a manner as to prevent / minimise waste production. All waste material will be managed in accordance with the waste hierarchy outlined in Image 6.2 in Chapter 16 (Waste) in Volume 2 of this EIAR, with an emphasis on reuse, recycling and recovery of material over disposal where feasible.	Construction
	W3	16.5.1.1	Throughout (as required)	In order to minimise the creation of waste, opportunities for reuse of excavated material within the Proposed Development (e.g. as fill) will be sought. Where possible, excavated materials will be re-used for backfill subject to the results of testing, whereby representative samples will be retrieved from each material type (allow one per 100m ³ (cubic metres)) submitted for laboratory analysis and the results of analysis assessed to assess whether it is inert. If material is not inert, it will be disposed of at a suitable facility in line with waste management legislation and guidance.	Construction
	W4	16.5.1.1	Throughout (as required)	Where there is no reuse potential within the Proposed Development of such material, either due to the material being unsuitable or due to the quantity being in excess of requirements, the potential for reuse as a by-product in accordance with Article 27 will be investigated by the appointed contractor(s). Where this option is technically / economically feasible, the appointed contractor(s) will be responsible for the EPA Article 27 notification and the associated requirements. Any material which is to be managed as a by-product will be appropriately stored on-site and will be kept separate from any waste storage to avoid cross contamination.	Construction
	W5	16.5.1.1	Throughout (as required)	 Where waste is created it will be managed on-site in accordance with good practice and applicable waste legislation as follows: Waste excavated material will be appropriately stockpiled; Waste will be segregated at source to prevent cross contamination; Where relevant (e.g. excavated fill material), wastes will be sampled and tested to allow classification prior to disposal; Waste receptacles will be appropriate to the waste streams using them, and covered or netted where practicable to prevent wind-blown debris emanating from them; Any hazardous wastes will be stored in segregated waste containers which are appropriately labelled; 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 All waste will be collected by a suitable contractor in possession of a valid and appropriate Waste Collection Permit, and will only be transported to suitably licensed or permitted waste facilities (i.e. facilities in possession of a valid EPA Licence, Waste Facility Permit or Certificate of Registration); Regular site inspections and cleaning will be done in order to minimise the potential for litter in the surrounding area; Waste records will be maintained throughout the Construction Phase of the Proposed Development; and Waste auditing against the CRWMP will be carried out. 	
	W6	16.5.1.1	Throughout (as required)	The quantity and type of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations which waste and materials will be delivered to will be recorded along with the quantity for each facility. Records will show which material is recovered, which is recycled and which is disposed of.	Construction
	W7	16.5.1.1	Throughout (as required)	Any off site interim storage or waste management facilities for excavated material will have the appropriate EPA Licence, Waste Facility Permit or Certificate of Registration, as appropriate, in place.	Construction
	W8	16.5.1.1	Throughout (as required)	 Excavated materials from within roadways (e.g. capping, subbase and bituminous materials) will be reused or recycled in line with TII specifications where reasonably practicable: Capping, subbase, bituminous and concrete materials could be reused or recycled in fill and capping materials providing they comply with the Specification for Road Works Series 600 – Earthworks (CC-SPW-00600) (TII 2013a); Subbase, bituminous and concrete materials could be reused or recycled in subbase or base materials providing they comply with the Specification for Road Works Series 800 – Unbound and Cement Bound Mixtures (CC-SPW-00800) (TII 2013b); and Subbase and bituminous materials could be recycled in base or binder materials providing they comply with Road Pavements – Bituminous Materials (CC-SPW-00900) (TII 2015). 	Construction
	W9	16.5.1.1	Throughout (as required)	With respect to the potential to encounter coal tar within road planings, this will be managed in alignment with TII's The Use of Road Tar in Ireland and Research Treatment Protocols (TII 2023). The contractor will test all road planings for the presence of coal tar to ensure accurate classification of all arisings prior to disposal, thus minimising the quantity being disposed of as hazardous waste. Furthermore, the contractor will seek recycling options for any coal tar to divert it from landfill.	Construction
	W10	16.5.1.2	Throughout (as required)	 Imported Materials The following mitigation measures in relation to imported materials will be implemented during the Construction Phase of the Proposed Development: Excavated materials will be re-used for backfill subject to the results of testing (as outlined in Section 16.5.1.1 of Chapter 16 (Waste) in Volume 2 of the EIAR); Consideration will be given by the appointed contractor to the sustainability of material being sourced for the construction of the Proposed Development. As far as is reasonably practicable, materials required for the construction of the Proposed Development will be sourced locally to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and 	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
				 the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material; and Construction materials will be managed on-site by the appointed contractor in such a way to prevent overordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just-In-Time' ordering principles will be implemented by the appointed contractor, where practicable, to reduce the potential for over-ordering. 	
Chapter 17 (Material Assets)	MA1	17.5.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, protection in place or diversion as necessary is proposed to prevent long-term interruption to the provision of the affected services, which will be based on applicable minimum safety clearances and design standards.	Construction
	MA2	17.5.1	Throughout (as required)	Prior to excavation works commencing, localised confirmatory surveys will be undertaken by the appointed contractor to verify the results of the pre-construction assessments undertaken and reported in this EIAR and to ensure any unknown utilities are identified. Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage. 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.	Pre-Construction
	MA3	17.5.1	Throughout (as required)	All utility companies for which diversions are potentially required will continue to be consulted when designing any diversions to ensure that the proposed diversions conform to the utility provider's requirements and to ensure that service interruptions are kept to a minimum.	Pre-Construction / Construction
	MA4	17.5.1	Throughout (as required)	Where diversion, 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 only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and generally will not be continuous for a full day at a time. Prior notification of disruptions will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruptions. Any required works will be carefully planned by the appointed contractor to ensure that the duration of the interruptions is minimised, in as far as possible. Consultation with relevant neighbouring parties will be undertaken prior to any proposed disruptions.	Construction
Chapter 18 (Landscape and Visual)	LV3	18.5.1	Throughout (as required)	The site-specific AMS and Tree Protection Plan produced during the detailed design stage will be implemented as soon as works begin on-site.	Construction
	LV4	18.5.1	Throughout (as required)	As far is reasonably practicable, all cable installation works, particularly in the existing road surfaces will adhere to Volume 4 of the Guidance for The Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees is a widely adopted document within the utilities sector (National Joint Utilities Group (NJUG) 2007).	Construction
	LV5	18.5.1	Throughout (as required)	The Project Arboriculturalist will be retained to advise and resolve any unforeseen tree related issue which might occur during the Construction Phase and to provide general tree related advice.	Construction

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure	Implementation Phase
	LV6	18.5.1	Throughout (as required)	On-site monitoring will be undertaken at agreed intervals before and during the Construction Phase (this will be achieved through a combined effort between the ESB and the appointed contractor) to ensure protection measures and the site-specific AMS produced during the detailed design stage are being implemented correctly.	Pre-Construction / Construction
	LV7	18.5.1	Throughout (as required)	Once construction is complete, the road surface / agricultural grassland will be reinstated along the proposed underground cable route for all temporary works areas.	Construction
	LV8	18.5.1	Throughout (as required)	Hedgerows removed for temporary works within the Planning Application Boundary will be replanted with a new species-rich hedgerow which is estimated to reach similar maturity in 30 years and is likely to be more ecologically diverse than what was removed.	Construction
	LV9	18.5.1	Throughout (as required)	Where applicable, vegetation removed during the Construction Phase at temporary Passing Bays will be reinstated along the original alignment and will also be replanted with species-rich hedgerows, albeit immediately above the proposed underground cable route will remain absent of woody species to aid periodic maintenance.	Construction
	LV10	18.5.1	Throughout (as required)	The avoidance measures outlined in the Generic Arboricultural Method Statement (refer to Appendix C of Appendix A18.2 in Volume 3 of this EIAR) will be adopted in full and will help limit the impacts on the landscape and for visual receptors.	Construction
Chapter 20 (Cumulative Impacts and Environmental Interactions)	CIEI 1	20.4	Overlaps with the CP0966 Development in the vicinity of Woodland Substation / Woodland Corridor	 The following mitigation measures will be implemented in the event that Construction Phases for the Proposed Development and the CP0966 Kildare Meath Grid Upgrade (Planning Ref No. 316372) occur at the same time, due to the spatial overlap between the two developments in the 'Woodland Corridor' (refer to Figure 20.2 in Volume 4 of the EIAR), which extends from Woodland Substation southwards to the R156 Regional Road: Air Quality: Liaison meetings with the CP0966 construction management team / appointed contractor will be held to ensure plans in the Woodland Corridor are coordinated, in order to reduce cumulative dust and particulate matter emissions. As part of this liaison process, the appointed contractors will be required to determine the interactions of the offsite transport / deliveries which might be using the same strategic road network routes; Hydrology: Given the proximity of the two development crossings of the Dunboyne Stream_010 water body, coordination of the construction programmes for the two developments will be required between the respective appointed contractors to ensure that, where possible, works to cross the water body are undertaken at the same time, and as such, minimising disruption; Traffic: Coordination of the construction programmes for the two developments will be required to ensure that there are no conflicting road closures from either development at the same time; Traffic: Cumulative construction traffic will also be timed to avoid peaks in construction programmes, where possible; and Material Assets: Coordination / consultation between the appointed contractors for the two developments will be required as being required during the Construction Phase will be undertaken in consultation with the relevant utility companies. 	Pre-Construction / Construction

4. Compliance and Review of the CEMP

Compliance and review are crucial components of the CEMP. The purpose of compliance and review is to ensure that the CEMP is being followed and that any necessary adjustments are made to mitigate any potential environmental impacts. To achieve compliance and review, the CEMP has the following steps that will be implemented in full (these are described in more detail in the following sections):

- Environmental Induction and Awareness Training: All site personnel will receive environmental induction and awareness training in conjunction with site safety training;
- Monitoring: Regular monitoring of the construction site and surrounding areas is essential to identify any potential environmental impacts. This will include monitoring air quality, water quality, noise levels, etc., in-line with the mitigation measures set out in the CEMP, EIAR and NIS;
- Reporting: All environmental incidents or near misses will be reported as soon as possible to the relevant authorities and stakeholders. This will allow for prompt action to be taken to mitigate any potential impacts;
- Review: The CEMP will be reviewed regularly to ensure that it is up to date and that any new environmental risks are identified and addressed. The review will take into account any feedback from stakeholders, monitoring data, and any changes to relevant legislation or regulations;
- Auditing: An independent audit of the construction site and the CEMP will provide valuable insights into its effectiveness. Auditing will be conducted by a qualified environmental consultant, and the findings will be used to improve the CEMP; and
- Environmental Complaints any feedback from the public or stakeholders will be logged and addressed.

4.1 Environmental Induction and Awareness Training

The environmental induction and awareness training will ensure that staff are familiar with the principles of the CEMP, the environmental aspects and potential impacts associated with their activities, and the controls in place to mitigate those impacts. Prior to working in areas of particular sensitivity (as determined in the EIAR contained in this planning application pack or identified from other confirmatory surveys or studies that are undertaken prior to construction commencing), the appointed contractor's EnCoW will give a toolbox talk to site personnel. All site personnel will be trained in relation to incident response procedures and drills will be undertaken to ensure timely and effective responses to incidences.

All signed training record will be held on site for future inspection.

4.2 Monitoring

The appointed contractor will undertake regular inspections, which will include monitoring conformance with the CEMP. The EnCoW will be responsible for carrying out regular monitoring of the appointed contractor CEMP and will report monitoring findings in writing to the ESB on a regular basis (at least weekly, but immediately in the case of incidents or accidents). Assessment forms will be completed during the daily checks. Checks on equipment will be undertaken to reduce the risk of incidents occurring. As a minimum, the following equipment will be inspected:

- Waste storage facilities;
- Chemical storage facilities;
- Bund integrity;
- Foul water storage facilities;
- Storage vessels (including pumps, gauges, pipework and hoses);

- Secondary containment;
- Spill response materials; and
- Equipment with potential to leak oils and other liquids.

Regular inspections will be undertaken to ensure that the daily checks are being undertaken correctly. The inspections will also include:

- Reviewing the daily risk assessment forms;
- Ensuring that faults and defects are identified and rectified; and
- Providing data for performance monitoring.

Immediate action including, if necessary 'stopping a job', will be taken should any incidents or nonconformance with the CEMP be found during inspection.

4.3 Reporting and Review

Following the required updates to the CEMP by the appointed contractor, the Senior Project Manager, Project Supervisor, SHESQ Manager, EnCoW, Waste Manager, and other members of the Emergency Response Team will meet to discuss and agree any actions required during the Construction Phase. Any actions will be updated in the CEMP as appropriate and communicated to site members and other stakeholders as needed.

4.4 Auditing

Environmental audit reports will be carried out during the Construction Phase of the Proposed Development. Audits are additional activities to monitoring and inspections, as audits will be undertaken by a person separate to the day-to-day operation of the Proposed Development construction works and the auditor will assess regular activities to determine if there are reasons for non-compliance. Audits will also identify opportunities for improving the systems that are in place.

Environmental audits will be carried out by a suitably qualified and experienced person that is not involved to the day-to-day operation of the Proposed Development construction works. Environmental audits will be conducted at planned intervals to determine whether the CEMP is being properly implemented and maintained. Audit reports will be produced identifying examples of good practice, opportunities for improvement, non-conformances, and corrective actions taken, as appropriate.

Recommendations for follow-up audits will also be provided and implemented. The findings of the audits will be reported to the Site Manager, the appointed contractor and the independent EnCoW within the Employer's Representative Team and further relevant project management personnel.

4.5 Environmental Complaints

A formal complaints procedure will be developed and implemented by the appointed contractor. Signage will be provided at site entrances or on perimeter hoarding locations showing appropriate site contact details. The appointed contractor will:

- Record the complaint in a designated complaints register;
- Assess what corrective and preventive action is required;
- Carry out further investigation if necessary;
- Provide a response within a reasonable timescale;
- Notify the relevant stakeholder of the proposed corrective and preventive actions to be adopted; and

• On completion of the corrective action and following agreement that the complaint has been adequately addressed; the Site Manager will close the case and record the date of closure. The complaints register will include details of the preventative measures undertaken to avoid a reoccurrence and will be agreed with the appointed contractor's EnCoW.

The appointed contractor will communicate the specifics of any environmental complaint to the ESB and keep the ESB informed throughout each of the above steps.

5. References

BSI (2009). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – noise

BSI (2014a). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise

BSI (2014b). BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration

BSI (2015). BS EN 14388:2015 - Road traffic noise reducing devices. Specifications

Charles and Edwards (2015). CIRIA C741 Environmental Good Practice on Site

CIRIA (2006). Control of water pollution from linear construction projects. Site guide (C649)

CL:AIRE (2012). Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance

Collins (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition

Department of the Environment, Heritage and Local Government and EirGrid (2009). Code of Practice between the Department of the Environment, Heritage and Local Government and EirGrid

Department of Transport, Tourism and Sport (2017). The Guidelines for Managing Openings in Public Roads (The Purple Book)

EPA (2006). Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects

EPA (2019). Protocol for the Measurement of Radon in Homes & Workplaces

EPA (2021). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects

ESB (2023). ESB Register for Dial Before You Dig' programme.

HSA (2013). Asbestos-containing Materials (ACMs) in Workplaces – Practical Guidelines on ACM Management and Abatement

IAQM (2023). Guidance on the Assessment of Dust from Demolition and Construction (Version 2.1)

IFI (2016). Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters

Marnell, F., Kelleher, C., and Mullen, E (2022). Bat Mitigation Guidelines for Ireland – version 2. Irish Wildlife Manuals, Number 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Masters-Williams et al. (2001). CIRIA C532 Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors

Met Éireann (2024). Met Éireann website. [Online] Available from https://www.met.ie/

Murnane et al. (2006a). CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide

Murnane et al. (2006b). CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide

NBDC (2021). All-Ireland Pollinator Plan 2021-2025

NJUG (2007). Guidance for The Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees is a widely adopted document within the utilities sector

NRA (2004). Guidelines for the Treatment of Noise and Vibration in National Road Schemes

NRA (2005). Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes

NRA (2006a). Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes

NRA (2006b). Guidelines for the Treatment of Badgers during the Construction of National Road Schemes

NRA (2008b). Guidelines for the Treatment of Otters

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes

NRA (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads

Teagasc (2020). How to plant a hedge. Available online at https://www.teagasc.ie/news--events/daily/environment/how-to-plant-a-hedge.php

TII (2013a). Specification for Road Works Series 600 – Earthworks (CC-SPW-00600)

TII (2013b). Works Series 800 – Unbound and Cement Bound Mixtures (CC-SPW-00800)

TII (2015). Road Pavements – Bituminous Materials (CC-SPW-00900)

TII (2023). The Use of Road Tar in Ireland and Research Treatment Protocols

Directives and Legislation

Arterial Drainage Act 1945 and 1995 (as amended)

National Monuments Acts 1930–2004 (as amended)

Number 39 of 1976 - Wildlife Act, 1976 (as amended)

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

Number 1 of 1977 - Local Government (Water Pollution) Act, 1977 (Revised) (Updated to 14 October 2021);Number 10 of 2005 - Safety, Health, and Welfare at Work Act 2005 (as amended)

S.I. No. 218/2001 - Safety, Health, and Welfare at Work (Confined Spaces) Regulations, 2001

S.I. No. 299 of 2007 - Safety, Health, and Welfare at Work (General Application) Regulations 2007 (Revised) (Updated to 24 May 2023)

S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended)

S.I. No. 9/ 2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended)

S.I. No. 125/2011 - European Communities (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations 2011

S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011

S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021

S.I. No. 31/2014 - European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014

S.I. No. 122 of 2014 - European Union (Drinking Water) Regulations 2014

S.I. No. 113/2022 - European Union (Good Agricultural Practice for Protection of Waters) Regulations 2022

S.I. No. 99/2023 - European Union (Drinking Water) Regulations 2023

S.I. No. 255/2023 - Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2023

Water Pollution Acts 1977 and 1990 (as amended)



Environmental Incident Response Plan

EirGrid

March 2024


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Appendix A – Environmental Incident Response Plan

1. Environmental Incident Response Plan

1.1 Introduction

This Environmental Incident Response Plan (EIRP) has been prepared to ensure that in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP details the procedures to be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g. concrete), non-compliance incident with any permit or license, or other such risks that could lead to a pollution incident, including flood risks. The EIRP will identify the on-site risks and appropriate responses. The focus of including the measures in this EIRP is on prevention of the incident arising in the first place.

The EIRP will be further developed by the appointed contractor, in line with the mitigation measures detailed in the CEMP, EIAR and NIS for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development), to describe the procedures, lines of authority and processes that will be followed to ensure that all incident response efforts are prompt, efficient and appropriate to the particular incident.

1.2 Plan Objectives

The objectives of this EIRP are to:

- Ensure the health and safety of all workers on-site and visitors to the sites along the Proposed Development;
- Minimise environmental impacts;
- Minimise any impacts on properties, services etc.; and
- Establish procedures that will enable personnel to respond to incidents with an integrated multi-departmental effort in a manner that minimises the possibility of loss and reduces the potential for affecting health, property and the environment.

1.3 Relevant Guidelines

This EIRP will be prepared with regard to the following guidance documents, where relevant:

- Control of Water Pollution from Linear Construction Projects. Technical Guidance (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);
- Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (CIRIA 2001);
- Department of Housing, Local Government and Heritage (DHLGH) A Framework for Major Emergency Management (DHLGH 2021); and • A Framework for Major Emergency Management. Guidance Document 1. A Guide to Risk Assessment in Major Emergency Management (DEHLG 2010);
- Major Emergency Plan of Fingal County Council (FCC) (FCC 2023); and
- Meath County Council (MCC) Meath County Council (MCC) Major Emergency Plan (MCC 2019).

1.4 Implementation of the Plan

The EIRP will be reviewed and updated regularly so that it continues to apply to construction activities and is amended when applicable regulations are revised or when amendments are required by a regulatory authority. It will identify the risks associated with health and safety and the environment and will evolve throughout the Proposed Development lifecycle, with inputs from the appointed contractor/ Project

Supervisor for the Construction Phase (PSCP) and any subcontractors. It will be the responsibility of the Environmental Clerk of Works (EnCoW) or equivalent as stipulated by the appointed contractor to maintain and change the EIRP as required. The EIRP may also require amendments from the various stakeholders or suppliers as the Proposed Development progresses.

The mitigation measures specified in the CEMP, EIAR and NIS will minimise / avoid the potential for environmental pollution. However, procedures must be in place in the unlikely event of an incident. The appointed contractor will provide a full list, including the exact locations, of all pollution control plant and equipment. All such plant and equipment will be maintained in place and in working order for the duration of the works.

As part of the Proposed Development and management of the EIRP, the appointed contractor will:

- Assess the pollution risks and develop emergency and spill response procedures for specific construction activities;
- Obtain details of key people that may need to be contacted for help in the event of an incident;
- Conduct a risk assessment for each activity and all possible emergency scenarios, including but not limited to:
 - Injury or health emergency to site staff or members of the public; bridge strikes, fire, criminal damage, fuel spills, earthworks incidents, siltation incident and other water pollution events, Horizontal Directional Drilling (HDD) incidents, utility strikes and traffic collision and incidents.
- Identify emergency access routes along the Proposed Development;
- Identify emergency response equipment and resources that will be needed in the event of an environmental emergency, such as spill kits, containment kits and pumps, and identify their locations at regular intervals for ease of access;
- Develop an Emergency Response Team / Lead that includes designated individuals (including the EnCoW) who will be responsible for coordinating and implementing the EIRP. This team will be trained in emergency response procedures and will be familiar with the specific environmental risks and hazards associated with the construction of the Proposed Development;
- Establish communication protocols with local authorities and emergency services, including phone numbers and contact details for the responsible parties;
- Conduct drills and exercises to test the effectiveness of the EIRP and ensure that all team members are familiar with their roles and responsibilities;
- Train personnel to follow procedures and use equipment correctly;
- Take action following an incident to ensure it does not occur again; and
- Review and update the Plan regularly to ensure it remains relevant and effective.

1.5 Environmental Response Procedures

The following are the procedures for the EIRP. The actual response will be tailored to the nature and scale of the incident. Professional judgement will be applied to ensure the response is appropriate without undermining anyone's safety or protection of the environment, and property. The following procedures will be carried out in an event of an emergency:

• Notification and Communication: In the event of an environmental emergency, the first priority is to notify the appropriate authorities and emergency services. The contact numbers will be readily available and will be displayed at prominent and suitable locations at construction sites during the proposed works. Additionally, all numbers will be pre-programed into site members' mobile phones so that they can be easily contacted. A table of Emergency Contacts will be developed to include contact details for key personnel with environmental responsibilities;

- Evacuate all personnel from the immediate area of the incident to a safe location;
- If possible, contain the spill or release using appropriate equipment such as spill kits or containment booms;
- Notify the designated Emergency Response Team members and ensure that they have access to the necessary resources and equipment to respond to the emergency;
- Implement emergency response measures, as outlined in the final EIRP, to mitigate the environmental impact of the incident;
- Cooperate fully with the relevant authorities and emergency services to ensure a coordinated and effective response;
- All works in the vicinity of the incident must be ceased until such a time as the Site Manager notifies personnel that it is safe to proceed with the works. The appointed contractor's EnCoW will be responsible for formulating any corrective actions that are required (e.g., repair silt fencing in the event of damage from extreme weather) in consultation with the appointed contractor and relevant stakeholders;
- Conduct an assessment of the environmental impact of the incident, including any damage to the surrounding area or waterways;
- Where appropriate, monitor air, soil and water quality to ensure that the environment is returning to normal levels; and
- Report the findings of the assessment to the relevant authorities, including details of any remedial action taken to mitigate the environmental impact of the incident.

An emergency contact list will be displayed at prominent and suitable locations at construction sites during the proposed construction works. An example is provided in Table 1, and this will be further developed by the appointed contractor to include contact details for key personnel with environmental responsibilities, as detailed in Section 1.5 of the CEMP.

Table 1: Emergency Contacts

Point of Contact	Telephone Number
Emergency services (fire, police, ambulance)	999/112
Local Authority	<relevant and="" be="" confirmed="" contact="" councils="" county="" fingal="" meath="" of="" point="" pre-construction="" will="" within=""></relevant>
Lead member of the Emergency Response Team (Likely Project Supervisor)	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
Senior Project Manager	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
Project Supervisor	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
Safety, Health, Environment, Security and Quality (SHESQ) Manager	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
EnCoW or equivalent	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
ESB (Client)	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
Irish Rail Emergency	018555454
ESB Emergency Services	1850372999
Waterways Ireland Emergency	< Relevant details will be confirmed pre-construction>
Uisce Éireann Emergency	1800278278
Bord Gáis Emergency	1850205050
Transport Infrastructure Ireland (TII) – Motorway Control Centre	0818715100
Health and Safety Authority	1890289389
Inland Fisheries Ireland (IFI)	1890347424
Project Supervisor Construction Stage (PSCS): TBC	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
Project Supervisor Design Process Lead (PSDP): TBC	<relevant be="" confirmed="" details="" pre-construction="" will=""></relevant>
Environmental Protection Agency	1890 33 55 99 / 053 91660600

For each incident, the following information will be communicated to the relevant authorities:

- The nature and location of the emergency;
- The time and date;
- Nature of the incident and source-pathway and receptor;
- The estimated size and severity of the incident;
- The type of hazardous materials or substances involved, if applicable;
- The number of individuals involved or affected by the incident, if applicable;
- Remediation measures undertaken;
- Name of the personnel who reported the incident; and
- Any other relevant details.

The Site Manager will keep a log of all environmental incidents on file and these will be made available to the Local Authority, the independent EnCoW within the Employer's Representative Team and other agencies, as required, such as the Inland Fisheries Ireland or the Environmental Protection Agency.

The communication chain shown in Image 1 will be followed in the event of an emergency.



Image 1: Emergency Communication Chain

1.6 References

CIRIA (2001). Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532)

CIRIA (2006a). Control of Water Pollution from Linear Construction Projects. Technical Guidance (C648)

CIRIA (2006b). Control of Water Pollution from Linear Construction Projects. Site Guide (C649)

DEHLG (2010). A Framework for Major Emergency Management. Guidance Document 1. A Guide to Risk Assessment in Major Emergency Management

DHLGH (2021). A Framework for Emergency Management

FCC (2023). Major Emergency Plan of Fingal County Council

MCC (2019). Meath County Council Major Emergency Plan



East Meath - North Dublin Grid Upgrade Construction Environmental Management Plan – Appendix B

Construction Traffic Management Plan

EirGrid

March 2024



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Appendix B – Construction Traffic Management Plan

1. Introduction

1.1 Purpose

This Construction Traffic Management Plan (hereafter referred to as the CTMP) has been prepared to demonstrate that the residual impacts to the public road and active travel network during the Construction Phase of the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) which have been identified can be minimised, and that transport related activities are carried out as safely as possible and with the minimum disruption to other road users. The CTMP has also been prepared for the purpose of identifying feasible, appropriate, and safe methods of access for construction traffic to the Proposed Development.

1.2 Objectives

The objectives of the CTMP are to:

- Outline minimum road safety measures to be undertaken, including site access / egress locations, during the works;
- Provide measures that respond to all road user needs including public transport, pedestrians, cyclists and vehicular traffic;
- Ensure disruption is minimised, with access to homes, education sites, health / medical care facilities, public transport stops / hubs, active travel routes, local services, retail centres, local amenities schools, places of worship, and businesses maintained, as is reasonably practicable in delivering the Proposed Development;
- Demonstrate to stakeholders, the appointed contractor and suppliers, the need to adhere to the relevant guidance documentation for such works; and
- Identify objectives and measures for inclusion in the management, design, and construction of the Proposed Development to control the traffic impacts of construction insofar as it may affect the environment, local residents and the public in the vicinity of the construction works.

1.3 Scope

This CTMP which is appended to the Construction Environmental Management Plan (CEMP), illustrates a preliminary traffic management design for the transportation of construction materials, equipment, and personnel along the public road network to facilitate the construction of the Proposed Development. Light vehicles, such as cars and vans, are used by operatives travelling to and from the works areas. Heavy Goods Vehicles (HGVs), for the most part, will deliver general construction materials, such as concrete, to, from and around the working areas.

EirGrid will put in place robust procedures to inform and supervise all those working on the Proposed Development, including its supply chain of contractors, to make sure that the control measures set out in the CTMP are fully applied during the Construction Phase. The main responsibility for implementing these control measures will fall to the principal contractor appointed for the Proposed Development.

The appointed contractor will develop the CTMP in the event that An Bord Pleanála grants approval for the Proposed Development. The CTMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by An Bord Pleanála.

The CTMP should be read in conjunction with the Temporary Traffic Management Plan included in Appendix A of this CTMP (hereafter referred to as the TTMP).

2. **Proposed Construction Activities**

2.1 Overview

Activities to be carried out during the Construction Phase as part of the Proposed Development are outlined in the TTMP (Appendix A). Passing Bay construction, Joint Bay construction, and cable installation operations are expected to be the key activities for the Proposed Development, and will include, excavation, installing, disposal, import and haulage. The Construction Phase of the Proposed Development will require movements of materials to, from and around the works areas. Most of the materials leaving the working areas will consist of subsoil export.

To facilitate construction, the Proposed Development has been divided into 30 Temporary Traffic Management (TTM) Sections, as described in the TTMP and Section 4.5.4 in Chapter 4 (Proposed Development Description) in Volume 2 of the Environmental Impact Assessment Report (EIAR) (included in this planning application pack). The location of each section along the Proposed Development is presented in Table 2.1 and shown in Figure 14.1 in Volume 4 of the EIAR.

Section	Section Name	Length (m)	Start Chainage	End Chainage	Roads
Number					
1.01	Woodland	3,635	0	3,635	N/A
1.02	R156	7,185	3,635	10,820	R156
1.03	R157	1,530	10,820	12,350	R157
1.04	М3	873	12,350	13,223	N/A
1.05	R147	327	13,223	13,550	R147
1.06	L5026	1,610	13,550	15,160	L5026
1.07	L1010 West	695	15,160	15,855	L1010
1.08	Pinkeen River	605	15,855	16,460	N/A
1.09	L1010 East	340	16,460	16,800	L1010
1.10	Nuttstown Road	1,410	16,800	18,210	Nuttstown Road
1.11	Ward River	70	18,210	18,280	N/A
1.12	Priestown Road	915	18,280	19,195	Priestown Road
1.13	Priest Town	195	19,195	19,390	N/A
1.14	Kilbride Road North	1,115	19,390	20,505	Kilbride Road
1.15	Kilbride Off-road	80	20,505	20,585	N/A
1.16	Kilbride Road South	695	20,585	21,280	Kilbride Road
1.17	Hollywood	1,346	21,280	22,626	N/A
1.18	M2 HDD South	684	22,626	23,310	R121
1.19	M2 HDD	360	23,310	23,670	N/A
1.20	M2 HDD North	950	23,670	24,620	R121
1.21	The Ward Cross / R121	1,575	24,620	26,195	R121
1.22	Ward River	70	26,195	26,265	N/A
1.23	R121	805	26,265	27,070	R121
1.24	R122	1,250	27,070	28,320	R122
1.25	Kilreesk Lane	50	28,320	28,370	Kilreesk Lane
1.26	Kingstown	790	28,370	29,160	N/A
1.27	R108	1,640	29,160	30,800	R108
1.28	Naul Road	2,450	30,800	33,250	Naul Road
1.29	Stockhole Lane West	810	33,250	34,060	Stockhole Lane
1.30	M1 East	3,706	34,060	37,766	N/A

Table 2.1: TTM Sections

2.2 Construction Programme

A programme for construction of the Proposed Development is provided in Section 2.4 of the CEMP. The total Construction Phase duration for the overall Proposed Development is estimated at approximately 42 months. However, construction activities in individual sections will have shorter durations. The programme identifies the approximate duration of works at each TTM Section. The appointed contractor will be responsible for determining the final programme.

To achieve the overall programme duration, it will be necessary to work on more than one section at any one time.

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

2.3 Temporary Traffic Management

If An Bord Pleanála grants approval for the Proposed Development, TTM designs (drawings and method statements) will be prepared by the appointed contractor in compliance with the following requirements to facilitate the safe and efficient construction of the Proposed Development:

- Traffic Signs Manual Chapter 8 Temporary Traffic Measures and Signs for Roadworks, Department of Transport (DoT 2019);
- Guidance for the Control and Management of Traffic at Road Works, Department of Transport (DoT), Health and Safety Authority, National Roads Authority and Local Government Management Services Board(DoT et al. 2010);
- Guidelines for Managing Openings in Public Roads (Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads (DoT 2017); and
- Guidelines for Working on Roads, Health and Safety Authority (Health and Safety Authority (HSA) 2009).

These guideline documents should typically be read in conjunction with primary Number 10 of 2005 - Safety, Health, and Welfare at Work Act 2005 (as amended) and S.I. No. 291 of 2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013, as amended by S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021.

TTM is outlined in Section 4 in the TTMP (See Appendix A). These provisions have been developed using works areas for the purpose of safety, to minimise disruption and to facilitate the smooth operation of construction activities. The roads and streets along the Proposed Development will remain open to general traffic, wherever practicable, during the Construction Phase. However, lane closures, road closures and diversions will be necessary to facilitate construction. Traffic management provisions for each TTM Section are included in Table 2.2.

TTM Length Sections (km)		Road	Joint Position Bay		n Road Width (m)	Phase 1 (Joint Bay and Passing Bay Installation) and Phase 3 (Cable Installation and Jointing)		Phase 2 (Excavation and Duct Installation)		Diversion Route Length (km)
					(111)	Traffic Measures	Approximate Duration – Phase 1 / Phase 3 (days)	Traffic Measure	Approximate Duration (days)	
1.02	7.2	R156 Regional Road (west of R157 Regional Road)	JB5	In-road	6.5	Passing Bay – two lane closures	23 / 47	Full road closure	134	24.1
			JB6	In-verge	6.5	Single lane closure	10 / 45			
			JB7	In-verge	7.0	n/a	12 / 47			
			JB8	In-verge	6.7	Single lane closure	22 / 46			
			JB9	In-road	6.5	Full Road closure	5 / 51			
			JB10	In-road	7.0	Passing Bay – two lane closures	13 / 42			
			JB11	In-road	6.3	Full Road Closure	7 / 42			
			JB12	In-verge	6.9	Single lane closure	12 / 48			
			JB13	In-verge	6.5	Single lane closure	14 / 46			
			JB14	In-verge	8.0	n/a	15 / 47			
1.03	1.5	R157 Regional Road (south-west of M3 Motorway Junction 5 (J5))	JB15	In-verge	15.0	Hard shoulder closure	15 / 48	Hard Shoulder Closure	44	n/a
1.05	0.3	R147 Regional Road (north-west of M3 Motorway J5)	n/a	n/a	14.5	n/a	n/a	Two lane closures	9	n/a
1.06	1.6	L5026 Pace (east of R147 Regional	JB18	In-road	12.0	Two lane closure	7 / 48	Full road closure	50	3.3
		Road)	JB19	In-road	3.6	Full road closure	5 / 48			
1.07	0.7	L1010 (south of Newbridge)	JB20	In-road	5.0	Full road closure	9 / 46	Full road closure	19	20.9
1.09	0.3	L1010 (west of Nuttstown Crossroads)	JB22	In-road	5.3	Full road closure	5 / 50	Full road closure	11	21.3
1.10	1.4	Nuttstown Road (west of Belgree Court)	JB23	In-road	5.3	Full road closure	7 / 48	Full road closure	42	20.2
1.12	0.9	Priestown Road (west of Kilbride Road)	JB24	In-road	5.5	Passing Bay – two lane closures	15 / 49	Full road closure	26	20.7

Table 2.2: Summary of Lane and Road Closures due to Proposed Temporary Traffic Management

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TTM Sections	Length (km)	Road	Joint Bay	Position	Road Width	Phase 1 (Joint Bay and Passin Phase 3 (Cable Installation an	Phase 1 (Joint Bay and Passing Bay Installation) and Phase 3 (Cable Installation and Jointing)		Phase 2 (Excavation and Duct Installation)	
					(m)	Traffic Measures	Approximate Duration – Phase 1 / Phase 3 (days)	Traffic Measure	Approximate Duration (days)	
			JB25	In-road	5.3	Passing Bay – two lane closures	15 / 46			
1.14	1.1	L1007 Kilbride Road (south of Priestown Road)	JB26	In-verge	5.8	Single Lane Closure	14 / 56	Full road closure	34	13.8
1.16	0.7	L1007 Kilbride Road (north of Kilmartin Lane)	JB27	In-road	5.7	Passing Bay – two lane closures	17 / 56	Full road closure	20	14.2
1.18	0.7	R121 Regional Road (north-east of Kilnamonagh)	n/a	n/a	5.8	n/a	n/a	Full road closure	20	6.5
1.20	0.9	R121 Regional Road (west of R135 Regional Road)	JB32	In-road	6.5	Full road closure	7 / 47	Full road closure	36	6.3
1.21	1.6	R121 Regional Road (east of R135 Regional Road)	JB33	In-road	5.9	Passing Bay – two lane closures	15 / 45	Full road closure	50	8.5
			JB34	In-road	4.8	Passing Bay – two lane closures	18 / 48			
1.23	0.8	R121 Regional Road (west of R122 Regional Road)	JB35	In-road	5.3	Passing Bay – two lane closures	15 / 45	Full road closure	24	9.2
1.24	1.2	R122 Regional Road (south of	JB36	In-verge	6.5	n/a	12 / 49	Full road closure	37	8.7
		R121 Regional Road)	JB37	In-verge	5.8	Single Lane Closure	15 / 42			
1.25	0.05	L3030 Kilreesk Lane	n/a	n/a	6.5	n/a	n/a	Full road closure	2	2.5
1.27	1.6	R108 Regional Road (west of Naul Road)	JB39	In-road	7.4	Passing Bay – two lane closures	15 / 46	Single lane closure	55	11.7
			JB40	In-road	7.4	Passing Bay – two lane closures	15 / 44			
1.28	2.5	L2020 / L72746 Naul Road (east of R108 Regional Road)	JB41	In-road	7.4	Passing Bay – two lane closures	15 / 45	Single lane closure	56	10.9
			JB42	In-road	8.0	Passing Bay – two lane closures	14 / 46			
			JB43	In-road	7.5	Passing Bay – two lane closures	13 / 45			

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TTM Sections	Length (km)	Road	Joint Bay	Position	Road Width	Phase 1 (Joint Bay and Passing Bay Installation) and Phase 3 (Cable Installation and Jointing)		ation) and Phase 2 (Excavation and Duct Installation)		
					(111)	Traffic Measures	Approximate Duration – Phase 1 / Phase 3 (days)	Traffic Measure	Approximate Duration (days)	
			JB44	In-verge	7.5	n/a	14 / 45			
1.29	0.8	L2753 Stockhole Lane (east of R132 Regional Road)	JB45	In-road	7.6	Passing Bay – two lane closures	15 / 48	Single lane closure	28	11.7

2.4 Anticipated Construction Traffic

2.4.1 Construction Activities

Traffic will be generated during the Construction Phase of the Proposed Development. Construction traffic is expected to comprise of trips for the following purposes:

- Journeys by construction personnel to and from the Temporary Construction Compounds (TCCs), Horizontal Directional Drilling (HDD) Compounds, and TTM Sections of the Proposed Development; and
- Delivery and removal of materials to and from the Proposed Development:
 - Clearance of existing material and waste;
 - Deliveries of construction material; and
 - Removal of construction waste material.

Construction activities associated with the Proposed Development typically follow a work sequence that is repeated in smaller works areas. The movement of construction vehicles to and from the Proposed Development is determined by this work sequence; materials either being 'removed from' or 'delivered to' site. There is also stationary dwell time, as material is being unloaded or loaded at either end of a journey. The construction vehicles expected for each construction activity are shown in Table 2.3.

Activity	Item of Plant (BS 5228-1) (BSI 2014) NOTE			
Phase 0 – Site Establishment and	Tracked Excavator (C.2.14)			
Advanced Works	Circular Bench Saw (C.4.71)			
Phase 1 – Passing Bays	Tracked Excavator (C.2.14)			
	Dumper (C.4.3)			
	Asphalt Paver (& tipper lorry) (C.5.31)			
	Hydraulic vibratory compacter (C.2.42)			
	Vibratory Roller (C.5.25)			
Phase 1 – Joint Bays	Tracked Excavator (C.2.14)			
	Dumper (C.4.3)			
	Asphalt Paver (& tipper lorry) (C.5.31)			
Phase 2 – Trenching and Ducting	Road Planer (C.5.7)			
	Tracked Excavator (C.2.14)			
	Dumper (C.4.3)			
	Asphalt Paver (& tipper lorry) (C.5.31)			
	Lorry (C.2.34)			
	Hydraulic vibratory compacter (C.2.42)			
	Vibratory Roller (C.5.25)			
Phase 3 – Installation and	Wheeled Loader (C.4.13)			
jointing of cables	Lorry (C.2.34)			
	Telescopic Handler (C.4.54)			
HDD	Tracked Drilling Rig (C.3.15)			
	Directional Drill (Generator) (C.2.44)			
	Wheeled Backhoe Loader (C.4.66)			
	Tracked Excavator (C.2.14)			
	Vibratory Roller (C.5.25)			
Construction Access Route	Lorry (C.2.34)			
	Dozer (C.2.11)			

Table 2.3: Anticipated Construction Machinery

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Activity	Item of Plant (BS 5228-1) (BSI 2014) NOTE			
TCCs	Tracked Excavator (C.2.14)			
	Diesel Generator (C.4.76)			
	Telescopic Handler (C.4.54)			
	Dozer (C.2.11)			
	Vibratory Roller (C.5.25)			
Substation Works	Tracked Excavator (C.2.14)			
	Diesel Generator (C.4.76)			
	Vibratory Roller (C.5.25)			
	Telescopic Handler (C.4.54)			
NOTE: Source - British Standards Institution (BSI), British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise (hereafter referred to as BS 5228-1) (BSI 2014)				

Likely traffic generation associated with construction site activities is described further in Section 2.4.2 and Section 2.4.3.

2.4.2 Estimated Construction Vehicle Movements

An estimate of construction plant and equipment that will be necessary to construct the Proposed Development has been calculated across the construction programme. Of the plant and equipment in operation during construction, HGVs will use the public road network for delivery and removal of materials to and from the Proposed Development. The estimated peak construction traffic to be in operation at each TTM Section across the Proposed Development is shown in Table 2.4.

TTM Section	HGV Movements	LGV Movements	Total Movements	Number of Peak Days
1.01	75	134	209	2
1.02	107	117	224	2
1.03	55	7	62	2
1.04	77	5	82	2
1.05	14	1	15	13
1.06	64	9	73	6
1.07	22	5	27	3
1.08	64	7	71	2
1.09	24	2	26	16
1.10	37	6	43	3
1.11	20	3	23	4
1.12	71	7	78	6
1.13	13	3	16	3
1.14	31	4	35	2
1.15	40	0	40	40
1.16	62	6	68	3
1.17	52	153	205	2
1.18	14	1	15	16
1.19	94	9	103	5
1.20	23	2	25	18
1.21	86	8	94	6
1.22	14	1	15	13
1.23	49	10	59	1

Table 2.4: Estimated Peak Daily Movements Across the Proposed Development

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TTM Section	HGV Movements	LGV Movements	Total Movements	Number of Peak Days
1.24	74	8	82	4
1.25	12	1	13	17
1.26	41	4	45	2
1.27	89	9	98	6
1.28	117	11	128	6
1.29	56	7	63	3
1.30	155	177	332	3

The construction period of the programme (as set out in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR, included in this planning application pack), where the highest number of HGVs are expected to be in operation is Year 1: Q3 (September 2026). Works will be ongoing at TTM Sections 1.01, 1.11, 1.12, 1.13, 1.14, 1.19, and 1.30 during this period. The maximum number of HGV movements is expected to be 273, as shown in Table 2.5. This represents the peak period for haulage activities on the public road network.

TTM Section	HGV Movements
1.01	65
1.11	17
1.12	11
1.13	11
1.14	11
1.19	58
1.30	99

Table 2.5: Estimated Daily HGV Movements During the Period of Peak Haulage Activity

A total of approximately 27 two-way HGV movements are therefore expected in a typical hour during peak haulage activity of the Proposed Development (assuming a 10-hour working day). HGV movements will be managed during the periods of 07:00hrs to 09:00hrs and 17:00hrs to 19:00hrs to minimise the impact of construction related traffic on peak-hour general traffic. Construction vehicles will be directed to access work sections via the Proposed Development and dedicated routes on the National and Regional Road Network where practicable, to minimise use of the Local Road Network. The routes are outlined in Section 2.4.4.3 of this CTMP.

2.4.3 Staff Journeys to and from the Proposed Development

Typical work hours (not including localised instances where night-time working is required) are envisaged between Monday to Friday 07:00 to 19:00 and Saturday from 08:00 to 14:00). Personnel numbers for the Proposed Development are outlined in Chapter 4 (Proposed Development Description) and in Chapter 14 (Traffic and Transport) in Volume 2 of the EIAR included in this planning application pack. Throughout the Construction Phase there will be some variation in the numbers of personnel working on-site. It is anticipated that there will be approximately 118 personnel, on average, directly employed across the Proposed Development, rising to 215 personnel at the peak.

The appointed contractor will prepare a Construction Stage Mobility Management Plan (CSMMP) to actively discourage personnel from using private vehicles to travel to the Proposed Development. The CSMMP will promote the use of public transport, cycling and walking by personnel. Private parking at the TCCs and HDD Compounds will be limited. Vehicle-sharing will be encouraged, where travel by private vehicle is a necessity (e.g., for transporting heavy equipment).

Transportation of construction personnel between TCCs, HDD Compounds and working areas along the public highway will primarily be in site / minibus vehicles.

With the M3 Parkway rail station located towards the western extent of the Proposed Development, providing services to / from Dublin, it could serve as a means of travel to the Proposed Development if a shuttle bus service was also provided between the here and TCCs, HHD Compounds and work fronts.

2.4.4 Construction Traffic Management Plan Contents

The appointed contractor will be responsible for developing a CTMP to effectively manage traffic and transport during the Construction Phase of the Proposed Development. The appointed contractor will address the following aspects, in addition to any other aspects identified by the appointed contractor during the preparation of the CTMP:

- Access and egress;
- TCCs and HDD Compounds;
- Routing of construction vehicles;
- Pedestrian (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users etc.) and cyclist provisions;
- Public transport provisions;
- Parking and access;
- Lighting;
- CSMMP;
- Traffic management signage;
- Timings of material deliveries;
- Traffic management speed limits;
- Vehicle cleaning;
- Road cleaning;
- Road condition;
- Road closures and diversions;
- Enforcement of CTMP;
- Interface with other projects;
- Emergency procedures during construction; and
- Communication.

Further details on issues to be addressed are provided in Section 2.4.4.1 to Section 2.4.4.19.

2.4.4.1 Access and Egress

Access to TCCs, HDD Compounds, and working areas will be designed to safely accommodate the existing road and active travel users, and the type of construction traffic that will use these accesses during the Construction Phase.

The appointed contractor will provide advanced warning signs, in accordance with the Traffic Signs Manual (DoT 2019), on approach to the proposed access locations, and entry and exit points throughout the live working area.

During the Construction Phase, there will be some temporary disruption / alterations to access to premises in certain locations along the proposed cable route. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with homes and businesses prior to construction starting in the area.

2.4.4.2 Temporary Construction Compounds

TCC and HDD Compound requirements to facilitate the Construction Phase of the Proposed Development are detailed in Section 4.5.6 of Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR included in this planning application pack. The TCCs and HDD Compound locations have been selected due to the amount of available space, their relative locations near to the Proposed Development and access to the National and Regional Road network. The location of the TCCs in relation to the Proposed Development are shown in Section 4.5.6 of Chapter 4 (Proposed Development Description), in addition to Figure 4.1 in Volume 4 of the EIAR. The TCCs will be located within the Planning Application Boundary at the following sites:

- TCCO: Chainage 0, located off Redbog Road adjacent to Woodland Substation;
- TCC1: Chainage 3,550, located off the R156 Regional Road;
- TCC2: Chainage 10,600, located off the R156 Regional Road;
- TCC3: Chainage 21,600, located off the Ballymacarney Road;
- TCC4: Chainage 26,850, located off the R121 Regional Road;
- TCC5: Chainage 34,800, located off Stockhole Lane; and
- TCC6: Chainage 37,700, located off the Stockhole Lane adjacent to Belcamp Substation.

The TCCs will contain a site office, and welfare facilities for appointed contractor personnel. Limited car parking will be allowed at the TCCs, in line with the principles of the CSMMP. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the TCCs for reuse, as necessary. Items of plant and equipment will also be stored within the TCCs.

The temporary HDD Compounds will be sited at both the reception and launch locations at each HDD crossing. These HHD Compounds will not be used for the storage of materials for the wider route or for site offices but will be used to facilitate the works required adjacent to and under the motorways and railway. A laydown area is also required for each HDD crossing. The location of the temporary HDD Compounds in relation to the Proposed Development are shown in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR, and in Figure 4.1 in Volume 3 of the EIAR. The temporary HDD Compounds will be located within the Planning Application Boundary at the following locations:

- M3 HDD Compound West (HDD 1a): Chainage 12,850, located off Woodpark Road;
- M3 HDD Compound East and Laydown Area (HDD 1b): Chainage 13,050, located off the R147;
- M2 HDD Compound South (HDD 2a): Chainage 23,400, located off the R121;
- M2 HDD Compound North and Laydown Area (HDD 2b): Chainage 23,600, located off the R121;
- M1 HDD Compound West (HDD 3a): Chainage 34,250, located off Stockhole Lane; and
- M1 HDD Compound East and Laydown Area (HDD 3b): Chainage 34,450, located off Stockhole Lane.

The appointed contractor's CTMP will include measures for managing traffic accessing and egressing the TCCs and HDD Compounds.

2.4.4.3 Routing of Construction Vehicles

Access to and egress from the TCCs, HDD Compounds and TTM Sections is envisaged to be along dedicated construction access routes. Abnormal loads are anticipated for the delivery of some large components (e.g., cable drums) for which a separate Abnormal Load Route Assessment (ALRA) has been completed (refer to Appendix B of this CTMP).

It is assumed that all national roads and regional roads in the immediate vicinity of the Proposed Development would be used by construction vehicles. The following national roads are expected to be used as construction access routes during the Construction Phase of the Proposed Development:

• M1 Motorway;

- M2 Motorway;
- M3 Motorway; and
- M50 Motorway.

The following regional roads are expected to be used as construction access routes during the Construction Phase of the Proposed Development:

- R108;
- R121;
- R122;
- R125;
- R132;
- R135;
- R139:
- R147;
- R154;
- R156; and
- R157.

The following local roads are expected to be used as construction access routes during the Construction Phase of the Proposed Development:

- L1007 Kilbride Road;
- L1009 Kilbride Lane;
- L1010;
- L2020 Naul Road;
- L2051 Clonshaugh Road;
- L2055 Baskin Lane;
- L2753 Stockhole Lane;
- L3030 Kilreesk Lane;
- L3132 Saint Margaret's Bypass;
- L3080 Ratoath Road;
- L3125 Kilshane Road;
- L5026 Pace;
- L6207 The Red Road;
- L72746 Naul Road;
- Ballymacarney Road;
- Cherryhound Tyrrelstown Link Road;
- Nuttstown Road;
- Priestown Road; and
- Toberburr Road.

The assumed construction access routes for the Proposed Development are shown in Figure 14.2 in Volume 4 of the EIAR included in this planning application pack.

2.4.4.4 Pedestrian and Cyclist Provisions

The measures set out in Section 8.2.8 of the Traffic Signs Manual (DoT 2019) will be implemented, wherever practicable, to ensure the safety of all road users, in particular pedestrians (including able-bodied

pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users) and cyclists. Therefore, where footpaths or cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for pedestrians and cyclists will be made.

2.4.4.5 Public Transport Provisions

Existing public transport routes will be maintained throughout the duration of the Construction Phase of the Proposed Development (notwithstanding the need for road closures / diversions as discussed in Section 2.4.4.15). Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes will be required to facilitate the establishment of a suitable working area on the R147 Regional Road as part of the Proposed Development. Some existing bus stop locations will need to be temporarily relocated to accommodate the works. In such cases, bus stops will be safely accessible to all users and all temporary impacts on bus services will be determined in consultation with the relevant stakeholders.

To the north of the M3 Parkway railway station, between the M3 Motorway and R157 Regional Road, off-road TTM Section 1.04 will involve the use of HDD to route the proposed cables underneath the track. This section of track is railway siding beyond the current line terminus at M3 Parkway and combined with the use of trenchless techniques, and the scheduling of these works to occur when trains are not in service, will ensure that there will be no disruption to operational services.

Traffic required in and around this trenchless crossing will be managed in accordance with the CTMP.

2.4.4.6 Parking and Access

During the Construction Phase, there is likely to be some disruption to existing areas of on-road or off-road parking provision, whether formal or informal. When roads have lane or full closures, alternative access to premises in certain locations along the proposed cable route may be required. Local arrangements will be made on a case-by-case basis to maintain continued access to homes, education sites, health / medical care facilities, public transport stops / hubs, active travel routes, local services, retail centres, local amenities, schools, places of worship, and businesses affected by the works, where practicable. Details regarding temporary access provisions will be discussed with stakeholders prior to construction starting in the area. The duration of the works will vary from property to property, but access and egress will be maintained at all times.

2.4.4.7 Lighting

Temporary lighting may be required at times along the proposed cable route at certain locations during the Construction Phase, where necessary. Where it is necessary to disconnect public lighting during the construction works or to undertake works outside of daylight hours where the existing lighting is low, appropriate temporary lighting will be provided. Temporary lighting will also be installed at the TCCs and HDD Compounds for the duration of the Construction Phase.

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

2.4.4.8 Construction Stage Mobility Management Plan (CSMMP)

The appointed contractor will prepare a CSMMP. The CSMMP will be used to encourage personnel to commute by means other than private car. The CSMMP may comprise the following topics, as well as other relevant topics identified by the appointed contractor:

• Introduction;

- Objectives and targets;
- Strategy of travel;
- Construction phase specific measures;
- Access and surrounding road network;
- Opportunities for car sharing;
- Implementation and coordination;
- Monitoring; and
- Adherence to public health guidelines.

2.4.4.9 Traffic Management Signage

TTM signage will be put in place in accordance with the requirements of the Traffic Signs Manual, Chapter 8, Temporary Traffic Measures and Signs for Roadworks (DoT 2019) to warn road users of the works ahead and to advise of any changes to the carriageway layout. In addition to TTM signage, requirements may include:

- Provision of temporary signage indicating construction access routes and locations for the appointed contractor and associated suppliers; and
- Provision of general information signage to inform road users and local communities of the nature and locations of the works, including contact details.

2.4.4.10 Timings of Material Deliveries

The appointed contractor will seek to reduce the impact of material deliveries on local communities and residents adjacent to the Proposed Development during the Construction Phase, where practicable.

2.4.4.11 Traffic Management Speed Limits

Adherence to posted / legal speed limits will be emphasised to all personnel / suppliers by the appointed contractor during induction training. The use of special speed limits for construction traffic in sensitive areas will be considered, such as 30km/hr (kilometres per hour) at school locations. Recommended speed limits will only apply to construction traffic and not to general traffic. The sign posting of such speed limits is not expected in the interest of clarity for local road users.

2.4.4.12 Vehicles and Vehicle Cleaning

An Environmental Incident Response Plan (EIRP) has been prepared for the Proposed Development (see Appendix A of this CEMP). The EIRP will ensure that, in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP includes measures to address surface water related incidents such as accidental spillages of noxious substances (e.g., oil and significant releases of sediment or concrete washings). A Surface Water Management Plan (see Appendix D of this CEMP) details the control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase.

Vehicles and plant provided for use on the Proposed Development will be in good working order to ensure optimum fuel efficiency and will be regularly inspected to ensure that they are free from leaks and are promptly repaired when not in good working order. To minimise risks to workers, locals, and the environment the following methods / procedures will be followed:

- Spill kits will be carried on all vehicles;
- Vehicles and plant will not park near or over surface water drains or watercourses;
- Refuelling of vehicles and plant will be carried out on hardstanding surfaces, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas;
- For deliveries and dispensing activities, the appointed contractor will ensure that:

- Site-specific procedures are in place for bulk deliveries;
- o Delivery points and vehicle routes are clearly marked; and
- Emergency procedures are displayed, and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.
- The appointed contractor will provide wheel washing facilities, and any other necessary measures to remove mud and organic material from vehicles, at the TCCs, HDD Compounds, and working areas, where necessary. These will be located at least 10m away from any surface water drains or watercourses;
- The cleaning of delivery trucks will be carried out at the TCCs and will not be undertaken at the works areas;
- The surface runoff from vehicle washing areas will be directed to an on-site treatment system where possible. This will also increase the potential for reusing the water. Such a treatment system would typically include:
 - A settlement lagoon to remove suspended solids such as mud and silt; and
 - Catchpits or silt traps on drains, ensuring that they are in place during cleaning and that they are emptied at regular intervals;
- The use of detergents in the cleaning process will be minimised, where required. Biodegradable and phosphate-free detergents will be used;
- Where detergents are used in the washing process, the wash water will be contained in a containment tank prior to disposal off site using a suitable licensed waste disposal operator, or if a foul or combined sewer is nearby, the surface runoff could be directed to it, with the permission of the sewerage undertaker; and
- To further minimise water used for washing vehicles, trigger-operated spray guns will be used, with an automatic water supply cut-off.

2.4.4.13 Road Cleaning

Roads being used for dedicated construction access routes will be regularly inspected for cleanliness. The appointed contractor will monitor for mud and debris on the roads as a result of the Construction Phase works and use a road sweeping vehicle for cleanliness, if needed. The use of road cleaning sweepers will be considered as a last resort with prevention being the main objective.

2.4.4.14 Road Condition

The extent of the lorry traffic movements and the nature of the payload may create problems of:

- Fugitive losses from wheels, trailers, or tailgates; and
- Localised areas of subgrade and wearing surface failure.

Activities which may reduce the impact on road conditions will be incorporated into the CTMP by the appointed contractor, where practicable:

- Loads of materials leaving each works area will be evaluated and covered if considered necessary to minimise potential dust impacts during transportation;
- All reasonable measures will be taken while transporting waste or any other materials likely to cause fugitive losses from a vehicle during transportation to and from the works areas, including but not limited to:
 - \circ $\,$ Covering of all waste or materials with suitably secured tarpaulin / covers to prevent loss; and
 - Utilisation of enclosed units to prevent loss.
- Pavement condition surveys will be undertaken along roads forming part of the construction access route during the Construction Phase, based on consultation with the relevant

stakeholders and professional judgement regarding the condition of the route, preconstruction. These surveys will record the baseline structural condition of the road being surveyed immediately prior to construction; and

• On-going visual inspections and monitoring will be undertaken of the construction access routes, throughout the course of construction of the Proposed Development to ensure any damage caused by construction traffic is recorded. Arrangements will then be made to repair any such damage to an appropriate standard in a timely manner such that any disruption is minimised.

Upon completion of construction of the Proposed Development, the surveys carried out pre-construction will be repeated, and a comparison of the pre-construction and post-construction surveys will be carried out.

2.4.4.15 Road Closures and Diversions

Road closures and diversions will need to be carried out during the Construction Phase of the Proposed Development. However, these measures will be minimised, wherever possible. Where necessary, road closures and diversions will take into consideration the impact on road users, residents, public services, businesses etc. Expected road closures and diversions have been outlined in the TTMP (see Appendix A) and will be carried out with regard to the Traffic Signs Manual (DoT 2019). All road closures and diversions will be determined in consultation with the local authorities, An Garda Síochána and other relevant stakeholders, as necessary. Access will be maintained for emergency vehicles along the Proposed Development, throughout the Construction Phase.

2.4.4.16 Enforcement of Construction Traffic Management Plan

The appointed contractor will develop the CTMP for use throughout the Construction Phase. All personnel and material suppliers will be required to adhere to the CTMP. The appointed contractor will agree and implement monitoring measures to confirm the effectiveness of the CTMP and compliance will be monitored by the relevant stakeholders. Regular inspections / spot checks will be carried out to ensure that all personnel and material suppliers follow the agreed measures adopted in the CTMP.

Should any unforeseen issues arise, they will be addressed by remedial actions and changes to the monitoring regime. Where required, any deviation to measures included within the finalised CTMP will be submitted to and agreed with the relevant authorities / stakeholders.

In the unlikely event that the construction traffic routing is not adhered to, or where other inappropriate driving by a driver associated with the Proposed Development is confirmed, this will be relayed to the relevant partner, subcontractor, or supplier to address the issue. This will help to reduce the risk of it happening again.

2.4.4.17 Interface with Other Projects

The likely timelines of the Proposed Development construction works have considered the potential for simultaneous construction of, and cumulative impacts with other infrastructure projects and developments which are proposed along, or in the vicinity of the Proposed Development. The likely significant cumulative impacts caused by the Proposed Development in combination with planned projects are identified and assessed in Chapter 20 (Cumulative Impacts and Environmental Interactions) in Volume 2 of the EIAR included in this planning application pack. 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 routes remain unobstructed by the Proposed Development works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

2.4.4.18 Emergency Procedures During Construction

The appointed contractor will ensure that unobstructed access is provided to all emergency vehicles along all routes and accesses. The Electricity Supply Board (ESB) will provide to the local authorities and emergency

services, contact details of the appointed contractor personnel responsible for construction traffic management.

In the case of a construction traffic related emergency, the following procedure will be followed:

- Emergency Services will be contacted immediately by dialling 112;
- Exact details of the emergency / incident will be given by the caller to the emergency line operator to allow them to assess the situation and respond in an adequate manner;
- The emergency will then be reported to the appointed contractor;
- All construction traffic will be notified of the incident (where such occurs off site);
- Where required, appointed first aiders will attend the emergency immediately; and
- The appointed contractor will ensure that the emergency services are directed to and arrive at the emergency location.

2.4.4.19 Communication

The appointed contractor will develop a communications management plan that will set out engagement methods for road users, local communities and affected landowners. The appointed contractor will, through the ESB, ensure that close communication with the relevant local authorities and the emergency services will be maintained throughout the Construction Phase. The appointed contractor will also ensure that the local community, landowners, and strategic stakeholders are appropriately informed of proposed traffic management measures in advance of their implementation. Contact information for key points of contact will be provided for members of the public to obtain additional information and to provide additional knowledge such as local events, such as sports fixtures, for example, which may conflict with proposed traffic management measures. The appointed contractor will liaise with landowners through the agreed Communications Plan, where access to their property is temporarily affected by works.

3. References

BSI (2014). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise

Department of Transport, Health and Safety Authority, National Roads Authority and Local Government Management Services Board (2010). Guidance for the Control and Management of Traffic at Road Works.

DoT et al. (2010). Guidance for the Control and Management of Traffic at Road Works

DoT (2017). Guidelines for Managing Openings in Public Roads (Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads).

DoT (2019). Traffic Signs Manual

HSA (2009). Guidelines for Working on Roads, Health and Safety Authority

Directives and Legislation

Number 10 of 2005 - Safety, Health, and Welfare at Work Act 2005 (as amended)

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

S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021

Appendix A – Temporary Traffic Management Plan



East Meath-North Dublin Grid Upgrade

CP1021 - Temporary Traffic Management Plan

March 2024

EirGrid





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Executive Summary

This document reviews the required Temporary Traffic Management (TTM) during the implementation of proposed cable route as part of the East Meath-North Dublin Grid Upgrade Project (hereafter referred to as the "Project"). The Traffic Management Plan (TMP) identifies the relevant legislation and regulations and proposes the required control measures.

A TMP for the full route is provided, breaking the route down into 30 no. sections. The sections allow for refinement in the proposed TTM, with the aim to reduce impact to road users. The plan considers the spatial requirements for the construction and the application of relevant legislations and guidance.

The proposed construction sequence to support the Temporary Traffic measures for the in-carriageway sections of the cable route as follows:

- Phase 1 Installation of passing bay and joint bay structure: The passing bays (where required) will be constructed at the joint bay locations. Following the completion of the passing bay, the installation of the joint bay will take place under the same phase.
- Phase 2 Excavation and installation of cable ducts: A trench will be dug along the cable route, ducts will be installed, and the road surfacing will be restored.
- Phase 3 Installation and jointing of cables: The cables will be installed at joint bay locations within the ducts. The cables will then be jointed (connected) at each joint bay location to allow the installation of a continuous circuit.

The scale and nature of the Temporary Traffic measures will likely vary from Phase to Phase because of the different effects. Works during Phases 1 and 3 are discrete locations along the cable route, whereas Phase 2 would potentially be a rolling working area as the trench will run the entire length of the Proposed Development.

In Phases 1 and 3, the proposed traffic management solutions as follows:

- Lanes closure: Where the road width at the location of the joint bay is greater than 10.5m, a passing bay would not be required and only lanes closure required.
- Passing bay with lanes closure: Where the road width is less than 10.5m and where there is suitable space to construct a passing bay, a passing bay with lanes closure will be used to facilitate a single traffic signalled lane at the joint bay; and
- Full road closure (with local access arrangements): Where the road width is less than 10.5m and where there is insufficient space to construct a passing bay, a road closure with local access arrangements would be required for the affected area with signposted diversions to maintain safe flow of traffic.

In Phase 2, the following proposed measures will be applied:

• Full road closure (with local access arrangements): Where the residual open carriageway is less than 2.5m the road will be required to be closed, with local access arrangements where necessary. Allowing vehicles to pass on a carriageway less than this width would pose an increase in risk to road users and the construction delivery teams. Please note that the length of road that will be closed will be minimised and made
appropriate to the area of the works. The closed section will be based on the nearest diversion point and the works required in that area.

- Lane Closure with Heavy Goods Vehicles (HGV) Diversion: Where the residual open carriageway is between 2.5m and 3m the road will be required to be closed to HGVs but open to Light Goods Vehicles (LGVs e.g., Ford Transit vans) and cars. All HGVs would be required to utilise the diversion route, this would require signage to mitigate the risk of HGVs passing the works sites.
- Lane Closure: Where the residual open carriageway is greater than 3m, it is proposed to keep the road open to all road users utilising automated stop / go traffic signals. Automated signalling to account for the traffic flow and demand will reduce waiting times. The lane closures would remain during the entirety of the section of works (i.e., out of hours included) to ensure safety to all road users and delivery teams.

Section 4 details the proposed Temporary Traffic measures that will likely be required for the Project. The cable route has been divided into a number of sections because of the different sections being in-carriageway, in-verge or off-road, the nature of the proposed works in the area, difference in road widths, etc.

Diversions have been identified and calculated on a like-for-like basis e.g., where a regional road is affected by the Proposed Development, the proposed diversion only uses regional roads and does not include local roads in the area. In some areas, this approach could significantly increase the length of the diversion.

Further details on the proposed Temporary Traffic measures are included in the main body of this report. The assessment of the effects of these measures are included in the Planning and Environmental Considerations Report (PECR) for the Project.

The Contractor will update this TMP with details of the plans and procedures for their specific activities on site, including method statements, within the requirements set out in this TMP unless otherwise agreed with the relevant local authority. Such plans and procedures should, where applicable, adhere to the requirements as delineated in this TMP.

As such, this TMP should be understood as being an iterative document; while significant and adequate information is included herein to ensure a comprehensive understanding of Traffic Management measures that are proposed in respect of the development. It is further acknowledged that these might be refined in ongoing collaboration with the Roads Authorities in the post-consent detailed design process, or in response to any Condition(s) of Approval from the Consenting Authority. It is possible that the Contractor will provide additional innovations to the approach to traffic management that will further minimise traffic disruption.

1. Introduction

1.1 Purpose and objectives

This TMP has been prepared to present the approach and application of traffic management and mitigation measures for the construction of the Project. It aims to ensure that adverse effects from the construction phase of the Project, on the road network and the local communities, are avoided or minimised.

The purpose of this TMP is to document and describe the main activities that will likely be undertaken to facilitate the Project and to provide a framework of Traffic Management measures that could be implemented prior to commencement of, and throughout the duration of the construction of the Project.

The Project will be undertaken by a Contractor appointed by ESB. The Contractor will be responsible for updating the TMP for approval by ESB and agreement with the planning authority (in this case, Fingal County Council and Meath County Council), prior to the commencement of works. In the event that planning approval is given, any condition(s) relating to a TMP which may be attached to such an approval, will be implemented in accordance with the requirements of the condition. The Contractor will update this TMP with details of the plans and procedures for their specific activities on site, including method statements. Such plans and procedures should, where applicable, adhere to the requirements as delineated in this TMP.

As such, this TMP should be understood as being an iterative document; while significant and adequate information is included herein to ensure a comprehensive understanding of Traffic Management measures that are proposed in respect of the development. It is further acknowledged that these might be refined in ongoing collaboration with the Roads Authorities in the post-consent detailed design process, or in response to any Condition(s) of Approval from the Consenting Authority. However, it is considered that this document is robust and appropriate for inclusion in the consent application. The plan has identified the underground cable (UGC) route as a key component of the Project which requires Traffic Management.

The cable commences at the Woodland Substation and finishes at the Belcamp Substation, a route of approximately 37.5km in total length. The works require the laying of 400 kV cables in roadways, verges and across private lands with cable joint bays at defined locations. There will potentially be a requirement for significant temporary works along the route including site and storage area setups as well as the crossing of motorways, railways, and watercourses.

The Contractor's Method Statements will be prepared in acknowledgment of this TMP. The updated TMP will set out the detailed approach and methodology which the Contractor will follow in scheduling and undertaking the work. The Method Statements will also incorporate the control measures detailed in the TMP in addition to specified conditions that may be prescribed in any approval from An Bord Pleanála for the Project and measures provided in the PECR.

The subsequent sections provide the basis for the management of traffic expected during construction of the Project, on the basis of the designs shown in the planning documents. The TMP shall be developed by the appointed Contractor during detailed design into a more detailed Construction Traffic Management Plan based on their specific design proposals.

The role of Project Supervisor Design Process (PSDP) may be taken over by the Contractor and as such a TMP for their proposed design should be prepared in accordance with this TMP but can be revised as necessary in consultation with Transport Infrastructure Ireland (TII), Fingal County Council and Meath County Council. The Temporary Traffic Management Designer should prepare Detailed Temporary Traffic Management Design for all

locations where works are planned on, or impact on, any public road. The Temporary Traffic Management Design will have overall responsibility for the Temporary Traffic Management Plan, appointed by the Contractor.

Prior to commencing the works, the safe works plan should be developed into an Operational Traffic Management Plan by the Project Supervisor Construction Stage (PSCS). The appointed PSCS/Contractor of the Project is required to carry out the Safety Audit on Operational Traffic Management Plans prior to commencing the works. The PSCS shall co-ordinate the implementation of the developed Traffic Management Plan during construction of the works.

The developed TMP requirements should include the provision of facilities for the safe passage of pedestrian and vehicular traffic and measures to keep the impact of the works on the roads, local communities, and road users, to a minimum. All Traffic Management controls proposed by the Contractor should be in accordance with the documents referenced. It is possible that the Contractor will provide additional innovations to the approach to Traffic Management that will further minimise traffic disruption. Such measures could include restrictions on the timing of proposed works in sensitive areas, additional use of roadside verges within the planning application boundary for the Proposed Development, etc. Discussions with the Local Authorities have determined that roadworks is currently sometimes undertaken at night-time to reduce the impact to road users. It is not currently proposed that night-time working would be undertaken from the Proposed Development, but it is an innovation that could be discussed with the Local Authorities to reduce the impacts.

1.2 Details of Proposed Development

The Proposed Development includes approximately 37.5 kilometres (km) of new 400 kilovolt (kV) underground cable circuit between the existing Woodland Substation in the townland of Woodland, near Batterstown, County Meath and the existing Belcamp Substation in the townlands of Clonshagh and Belcamp in Fingal, north County Dublin.

The Proposed Development will consist of the following principal elements:

- A. Installation of an underground cable circuit, approximately 37.5km in length, connecting Woodland Substation (400kV) in the townland of Woodland in County Meath, and Belcamp Substation (220kV) in the townlands of Clonshagh and Belcamp in Fingal in North County Dublin. The development of the underground cable will include the following:
 - Construction of a trench of approximately 1.5m in width and approximately 1.3m in depth in the public road (approximately 26km) and approximately 1.8m in depth in private lands (approximately 11.5km) in which the underground cable is laid in flat formation, with associated route marker posts at field boundaries where the cable is laid in private land;
 - Construction of 49 Joint Bays (on average every 750m), each approximately 10m in length, 2.5m in width and 2.5m in depth, with adjacent communication chambers and link boxes, along the full alignment of the underground cable. Where the Joint Bays are located off-road, permanent hardstanding areas will be created around the Joint Bays;
 - The laying of communication links and fibre optic cables between both substations, running in the same trench as the underground cable;
 - The provision of seven Temporary Construction Compounds (approximately 1 hectare per compound);
 - The provision of a Temporary Horizontal Directional Drilling (HDD) Compound at both the reception and launch locations for three HDD motorway crossings (i.e., six temporary HDD Compounds in total), and associated laydown area for each HDD crossing (i.e., three laydown areas in total) sizes for each of the six HDD Compounds (plus laydown area where applicable) ranging from approximately 0.15ha to 0.45ha;
 - The provision of temporary Passing Bays during construction at 14 Joint Bay locations, each approximately 95m in length and 5.5m in width;

- The laying of unbound temporary access tracks, 6m wide in private lands (approximately 12km in total length);
- The laying of 12 unbound, permanent access tracks, 4m wide in private land, and maintained by the Electricity Supply Board (ESB) (approximately 4km in total length);
- All associated water, rail, road, and utility underground crossings using either trenchless drilling or open cut techniques as appropriate for the particular crossing; and
- All associated and ancillary above and below-ground site development works, including works comprising or relating to permanent and temporary construction, roadworks, utility diversions and site and vegetation clearance.
- B. Upgrades to the existing 400kV Woodland Substation in the townland of Woodland in County Meath. This will include:
 - Installation of a 400kV feeder bay and associated electrical shunt reactor (approximately 8m in height);
 - Installation of insulators, instrument transformers, overhead conductors, disconnectors, circuit breakers, surge arrestors (up to 12.6 m in height) in order to connect the bay to the busbar;
 - Installation of two gantries, 25m in height, with one 3m tall lightning rod on top of each gantry; and
 - All ancillary site development works including site preparation works, underground cabling, drainage and earthgrid, as required to facilitate the Proposed Development.
- C. Upgrades to the existing 220kV Belcamp Substation in the townlands of Clonshagh and Belcamp, Fingal. This will include:
 - Construction of a new GIS steel framed and clad building (73m long, 17.8m wide by 16m high) to house new 400kV GIS Hall, plus eight lightning rods on the roof of the GIS Hall (each 3m in height);
 - Installation of 400kV switchgear to facilitate the connection of the new cable to the existing substation;
 - Installation of associated electrical shunt reactor (approximately 8m in height) with insulators, instrument transformers, overhead conductors, disconnectors, circuit breakers, surge arrestors (up to 12.8m in height) in order to connect the reactor to the cable;
 - Installation of two lightning masts (each 15m in height);
 - Installation of a new 400/220kV transformer adjacent to the new GIS Hall and connections to the existing 220kV substation via cable; and
 - All ancillary site development works including site preparation works, site clearance and levelling, vegetation clearance, reinstatement, and access tracks.

1.3 Challenges and considerations

The major challenge on the project is maintaining the flow of all public traffic during the works. This will be especially prevalent during the construction of the cable trench in the road network where lane and road closures will be required to allow construction to proceed while also protecting the workforce. This is the main reason that this TMP has been produced.

Linked to this will be to maintain access to all properties and businesses along the route during the construction works and especially with regards to the lane and road closures.

Due to the proposed construction methodology and the long distance within the road network there is an additional challenge of how long the works will take and the subsequent duration requirements for traffic management to be in place. This disruption will be mainly felt by the residents, local businesses and commuters who would normally use these routes daily.

2. Traffic Management Assessment

2.1 Guidance documentation

The Contractor should typically comply with the requirements of:

- Traffic Signs Manual Chapter 8 Temporary Traffic Measures and Signs for Roadworks, Department of Transport, Tourism and Sport, August 2019 (Department of Transport, Tourism and Sport, 2019);
- Guidance for the Control and Management of Traffic at Road Works, Department of Transport, Health and Safety Authority, National Roads Authority and Local Government Management Services Board, second edition 2010 (Department of Transport, Tourism and Sport, 2010);
- Guidelines for Managing Openings in Public Roads (Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads), Department of Transport, Tourism and Sport, second edition April 2017 (Department of Transport, Tourism and Sport, April 2017); and
- Guidelines for Working on Roads, Health and Safety Authority, 2009 (Health and Safety Authority, 2009)

These Guideline documents should typically be read in conjunction with primary Safety, Health and Welfare at Work legislation, including the Act 2005, the Construction Regulations 2013, and any amendment to them.

2.2 Design reference documentation

The assessment of the TTM is based on the following issued design reference documentation:

- Cable joint bay design as per ESB 400kV Joint Bay PE422-D7001-013-002 Rev 00 (Issued 10/03/10)
- Cable drum description/properties: 4.3m external diameter, 4.0m barrel length and 35.4t (As detailed by Jacobs Cable Designer)
- Passing bay proposed details 321084AJ-JAC-ZZ-XX-DR-C-0001.

It is assumed that the 400kV cables is the most onerous construction case with regards to the largest spatial requirements.

2.3 Temporary Traffic Management Process

TII Chapter 8 are the base standards that are used as part of the design of the construction space proofing for the passing bays at the joint bay locations. By using existing typical layouts from the standards, combined with route specific parameters, the traffic management solution can be detailed to provide space proofing diagrams. Figure 2-1 shows the TTM design process used as part of the Traffic Management assessment.



Figure 2-1 Temporary Traffic Management design process

2.3.1 Road Classification

Table 2-1 identifies the road classification dividing them into two levels; main and sub. Identifying the road classification is of particular importance as this defines the TTM parameters (i.e., extent of space required for the TTM).

Level		Carriageway Type	Speed / Speed Limit	
Main	Sub	Gannageway Type	(km/h)	
	i	Single	≤ 30	
	ij	Single	40	
Level 1	iii	Single	50	
	iv	Single	60	
		Multi-Lane / Dual	≤ 60	
Lough D	i	Single	80	
Level 2	ii	Single	100	
Lough 2	i	Dual and Motorway	80	
Level 3	ii	Dual and Motorway	≥ 100	

Table 2-1 Road Classifications (Extract of TII Chapter 8 Table 8.2.1.1)

The main levels are defined as follows:

- a) Level 1 Urban and Low Speed Roads
- b) Level 2 Rural Single Carriageway Roads
- c) Level 3 Dual Carriageways and Motorways

The proposed cable alignment is predominantly along Regional, 'R' roads, with a speed limit of 80km/hr. Most roads on the route are classed as Level 2(i). It is permissible to justify a lower-level classification provided permission from the relevant local authority for a temporary construction speed limit.

Clause 8.2.3.10 states "The speed limit chosen typically should not be more than two speed limit steps below the permanent posted speed limit and should be appropriate to the speed at which a vehicle could drive through the roadworks with reasonable safety." Therefore, in compliance with Clause 8.2.3.10, it is assumed the local authority would approve a reduced speed limit and that the classification of the roads can be reduced to Level 1 (iii).

2.3.2 Roadworks Type

The roadworks types are defined in Figure 2-2. The main construction works as part of the Project are assumed to require the conditions of that of Static Type A. The defining parameter being the requirement for full time where works are expected to be greater duration than 12hours.

TTM Type	Description	Traffic Flow Conditions	Visibility Conditions	Planned Duration			
Static Type A	Works requiring full time Temporary Traffic Management (TTM)	All	All	Permitted for any duration but required for durations in excess of 12 hours			
Static Type B	Works that normally involve the use of one or two vehicles in the operation. This type of work is typically maintenance and repair type operations, including maintenance of utilities or street furniture.	Unrestricted by either traffic volume or weather conditions	All	Permitted for a duration of up to 12 hours			
Static Type C	Works at a discrete location that are of a short duration (excluding signage setup/removal).	Unrestricted by either traffic volume or weather conditions	Good	Permitted for a duration of up to 15 minutes			
Semi Static Operation (SSO)	Works where the operations are mobile or making short duration stops continuously along a road where static warning signs are used. SSO is only suitable on Level 1 and 2 roads.	Unrestricted by either traffic volume or weather conditions	Good	Permitted for stop durations of up to 15 minutes			
Mobile Lane Closure (MLC)	Works where the operations are mobile or making short duration stops continuously along a road where mobile warning signs and Impact Protection Vehicles (IPV) are used. MLC is only suitable on Level 3 roads.	Unrestricted by either traffic volume or weather conditions	Good	Permitted for stop durations of up to 15 minutes*			
Note: Particular works may have several phases of TTM which may fall under different TTM types. For example, footway works may require different phases. For MLC the permitted duration may be extended by agreement with the overseeing organisation.							

Figure 2-2 TTM Roadworks Types (Extract of TII Chapter 8 Table 8.2.1.2)

2.3.3 Traffic control method

The Traffic Management utilises temporary traffic controls, including but not limited to traffic lights, road signs and traffic cones, to allow shuttle working at any given time. The key design parameters are shown in Figure 2-3. These include and are defined as:

- Cumulative Distance
 - Distance from the first sign (Roadworks Ahead) to the start of the taper.
- Taper Length
 - The required length for the reduction in width of a single lane or hard shoulder.
- Longitudinal safety zone
 - Measured from the end of the taper to the start of the works area. It provides a clear area for an errant vehicle to come to a stop before reaching the works area.
- Lateral Safety Zone
 - Measured from the trafficked edge of the cone or barrier to the edge of the works area. This area must be kept free of all operations, stationary vehicles, materials, and personnel thus ensuring a clear safe distance back from the edge of the live traffic.
- Minimum lane width
 - The minimum width of traffic lane to be maintained at all times for use by the road user. This may vary depending on the characteristics of the traffic being catered for.
 - Clause 8.4.3.2 states "the unobstructed road width which forms the traffic lane for one-way traffic should be an optimum width of 3.3m and maximum lane width of 4.3m".



Figure 2-3 Temporary Traffic Signals Control for Shuttle Working (Extract of Figure 8.4.4.5 Chapter 8 TII)

Table 2-2 defines the key design parameters for each of the road levels. Please note that the majority of the roads are classified as Level 2 (i). With the introduction of a reduced speed limit and in compliance with Clause 8.2.3.10, the TTM is designed around the parameter of Level 1(iii).

Level		Carriageway	Speed / Speed	Speed / Min Lane Width (m)		Lane Taper Rate /	Safety Zones	
Main	Sub	Туре	Limit (km/h)	HGV	Light Vehicles	Length (m)	Longitudinal (m)	Lateral (m)
	i	Single	≤ 30	3	2.5	1 in 1	0.5	0.5
	ii	Single	40	3	2.5	1 in 1	0.5	0.5
	iii	Single	50	3	2.5	1 in 5*	5	0.5
Level		Single	60		2.5	1 in 10*	15	
	iv	Multi-Lane / Dual	≤ 60	3				0.5
Lavel 2	i	Single	80	3	2.5	1 in 40*	45	1.2
Level 2	ii	Single	100	3	2.5	1 in 60*	60	1.2
	i	Dual and Motorway	80	3.3. (Lane 3 (Subseq	1) uent Lanes)	180	45	1.2
Level 3 —	ii	Dual and Motorway	≥ 100	3.3. (Lane 1) 3 (Subsequent Lanes)		180	60	1.2

Table 2-2 Restrictions (Department of Transport, Tourism and Sport, 2019)

* 45° taper is required at shuttle traffic-controlled layouts with cones at 1m centres.

As per the Clause 8.4.3.1, "for two-way traffic the minimum road width should be 5.0m for Level 1 roads and 6.0m for Level 2 roads". In this case, the key design parameters remain the same as for the shuttle working arrangement. It is important that advance warning signage is given to road users using signs Road Narrows on Left, on Right or on Both Sides as appropriate (Figure 2-4). If vehicles are required to traverse the existing centreline, then centreline coning should be provided.



Figure 2-4 Temporary Traffic Signals Control for two-way Traffic (Extract of Figure 8.4.4.1 Chapter 8 TII)

2.3.4 TTM Design Parameters

Table 2-3 defines the minimum design parameters using the road classification and road works type. Table 2-3 demonstrates the refinement and reduction in required land take by introducing the construction speed restriction. The aim would be to introduce a temporary construction speed limit to allow the road to be classified as a Level 1(iii)

	Level 1(iii)	Level 2(i)
Cumulative Distance	40m	480m
Lane Taper Rate	1 in 5	1 in 40
Longitudinal Safety Zone	5m	45m
Lateral Safety Zone	0.5m	1.2m

Table 2-3 Minimum Design Parameters (Extract Chapter 8 TII of Table 8.2.2.4 and 8.2.2.6)

2.3.5 Construction Space

With regards to the allowance for the construction space, as per the Abnormal Load Assessment, it is assumed that an adapted low loader trailer will be used for the transportation and installation of the cable. It is assumed that a total vehicle length of 15m would be required.

Using the ESB Murphy's market engagement as the base case for the cable installation, shown in Figure 2-5, it is assumed that 7m distance from edge of drum barrel to edge of pit is required.

The required construction width of 6.5m assumed the joint bay is against the road kerb line. If the joint bay is unable to be positioned against the kerb line, the construction working room will increase and the size of the plan horizontal dimension of the passing bay will increase accordingly.

Therefore, the following key input parameters are used as part of the construction space parameters as follows:

- Length ~45m
 - Length of joint bay ~10m
 - Distance from drum to edge of joint bay ~7m
 - Length of delivery vehicle ~15m
 - Access space around the vehicle ~10m (Allowing for lubrication unit, vehicle parking, welfare etc.)
- Width ~min. 6.5m

With regards to the joint bays that are located in the verge or off-road, a temporary land-take as shown in Section 2.3.6.3 will be required. A suitable and stable platform designed to take the axle loadings is required to ensure the safety of the vehicles, site personnel and the public. It would not be recommended to negate the temporary land requirements and operate either on the existing ground or in the live carriageway.



Figure 2-5 Murphy Cable Installation Diagram

2.3.6 Proposed Traffic Management Design

2.3.6.1 In-carriageway Joint Bay (Option 1) – Dual direction cable installation

Figure 2-6 shows the required construction space and associated passing bay if the location is to support cable pulling from both directions. A total of 95m passing bay is required to support this solution. Note a 0.5m walking space has been provided around the delivery vehicles to maintain the TII requirements for the lateral and longitudinal safety zone.



Figure 2-6 'In-carriageway' Joint Bay (Option 1)

2.3.6.2 In-carriageway Joint Bay (Option 2) – Single direction cable installation

Figure 2-7 shows the required construction space and associated passing bay if the location is to support cable pulling from one direction. A total of 85m is required to support this solution. As per the ESB market engagement, provision has been provided for a lubrication and jointing unit on the opposite side of the delivery vehicle.



Figure 2-7 'In-carriageway' Joint Bay (Option 2)

2.3.6.3 Off-road / in-verge Joint Bay

Figure 2-8 shows the required construction space with passing bay for off-road or in-verge Joint Bays. To ensure the safety and stability of all construction vehicles, a temporary access platform will be installed. Without a suitably designed construction platform this could present difficulties installing the cable and further health and safety issues, including vehicles instability, lack of traction, over-turning or utility damage.



Figure 2-8 Off-road joint bay

2.3.7 Additional Considerations

2.3.7.1 Construction traffic

Construction traffic mainly consists of the movement of excavated materials and the delivery of equipment and materials. A summary of the proposed machinery – both LGV (less than 3.5t) and HGV (over 3.5t) – for this project is provided in Section 4.3. Where possible, HGV traffic should be directed away from residential communities in the vicinity of the works areas in order to minimise the impact on these communities.

The Contractor should commit to ensuring that the adverse effects of construction traffic are minimised, as far as reasonably practicable. It is the Contractor's responsibility to liaise with the relevant authorities prior to construction, including TII, DAA, Fingal County Council, Meath County Council, and the emergency services in order to prepare a comprehensive Construction Traffic Management Plan.

Regarding the timing of material deliveries, the Contractor may schedule the deliveries in such a way that construction activities requiring a greater number of HGVs do not overlap with concentrated delivery activities. In addition, where possible deliveries should be coordinated to avoid coinciding with major events that have potential to generate higher than usual traffic volumes. It is also the Contractor's responsibility to liaise with Fingal County Council, Meath County Council, and the management of other adjacent construction projects to coordinate deliveries appropriately if their construction periods coincide.

The construction activities necessitate the movement of the workforce who are to deliver the Project. Due to the rural nature of the sites and the lack of alternative options, it is envisaged that all staff will most likely travel to the site via private vehicles. However, in order to minimise private car movements, the Contractor should prepare appropriate workforce travel plans to reduce the impact of workforce travel on local residents and businesses, where reasonably practicable. The Contractor may plan for construction workers to park their personal vehicles at parking spaces available at each of the construction compounds and then they can travel to their work areas in the minimum number of vehicles required; the plan should take into account that construction staff should not park on public roads other than within the work areas.

Pre- and post-condition surveys should be carried out by the Contractor on all roads where works will be carried out. Following the works, all excavated areas shall be reinstated as per the Guidelines for Managing Openings in Public Roads (Department of Transport, Tourism and Sport, 2019). The Contractor should also carry out road sweeping to remove project related debris and materials. During road sweeping, an appropriate TTM and Method Statement should be provided by the Contractor in order to ensure safety of staff and road users.

2.3.7.2 Safety measures

A balance between health and safety for road users, workforce, and local community is required to ensure that all personnel are suitably accounted for. The Contractor should develop a Safe System of Work (SSoW) and ensure a suitable TMP is appropriately implemented and effective in all lighting and weather conditions.

The Table below summarises some of the various safety measures that are being included within the traffic management arrangements to protect various groups.

Table 2-4 Safety measures

Safety Measure					
Communication and advance notification of diversions and roadworks through media, social media, existing or portable Variable Message Signs (VMS) assist road user groups with planning their journeys. Clear signage and physical barriers for Walkers, Cyclists, and Horse-riders (WCHs) should be considered to reduce risk of incursion within work zones or live traffic lanes.					
Lane widths and restrictions, length of traffic management and potential diversion routes have been considered as stated within this Traffic Management Plan. However, the Contractor must ensure implementation of the above Traffic Management to ensure safety during construction works.					
Lane closures and narrow lanes have been considered when works are being carried out adjacent to the live carriageway to provide the lateral safety zones.					
Carriageway closures and suitable diversion routes have been considered when activities such as the demolition of old culverts, installation of new culverts etc is being carried out, to protect all customer groups.					
The maintenance of existing lighting and consideration of appropriate area or task lighting is important for the existing operational network, diversion routes, WCH routes and for the work zones. This is particularly relevant during winter months and during periods of inclement weather and poor visibility.					
Space restrictions will mean adequate safe working zones need to be maintained throughout the construction phases, with a strong emphasis on creating a safe working environment by enforcing health and safety rules and ensuring these rules are upheld.					
Review of construction methodology and sequence to identify and establish sufficient working space to carry out activities safely with the appropriate plant and equipment and maintaining safe means of access and egress is essential.					
To ensure consistency in the visibility of road markings the Designer shall remark existing road markings that are retained.					
Primary consideration should be given to the safety of WCH users including pedestrians, for the construction works that will be carried out within all areas. WCH diversion routes will be considered to ensure that this group can traverse the working area safely. The provision of temporary signalised crossing points and ramps should be considered to provide grade separation at areas of high volume WCH traffic.					

2.3.7.3 Adjacent roadworks

In order to define a list of all works affecting the road network in the vicinity of the scheme or the associated diversion routes, the project team should set up regular liaison meetings with TII, DAA, Fingal County Council and Meath County Council, to ensure that there are no clashes during full road closures and the impact to the road users is minimised across all networks.

2.3.7.4 Significant events and seasonal traffic

A schedule of Bank Holidays is provided below which indicates when Traffic Management restrictions are to be minimised where possible.

Bank Holidays	Dates
New Year's Day	01 January (or First Monday of the Month if fallen on weekend)
St Brigid's Day	First Monday in February
St. Patrick's Day	17 March
Good Friday	Friday preceding Easter Sunday (Note this is a bank holiday and not a public holiday)
Easter Monday	Monday (following Easter Sunday)
Early May Bank Holiday	First Monday of May
June Bank Holiday	First Monday of June
August Bank Holiday	First Monday of August
October Bank Holiday	Last Monday of October
Christmas Day	25 December
St Stephen's Day	26 December

Table 2-5 Bank Holidays (Subject to change)

During the main period of construction works, it is not envisaged that Traffic Management arrangements would be removed and reinstalled at Bank Holidays. This could result in creating unsafe environments, as well as be cost prohibitive, time consuming and disruptive to the local stakeholders.

To minimise the impact of Traffic Management during Bank Holidays, the construction programme should avoid the need to change road layouts unless there is a measurable benefit to the local stakeholders. Lane and full road closures should be avoided during these periods as far as reasonably practicable. To alleviate the local stakeholders' perception of no work taking place, construction works should continue during these periods.

In addition, the following events have been identified as also having an impact on the Project.

- The seasonal effects of tourism/public holidays
- Reductions in school/work trips during holiday periods
- The effect of annual leave on the volume of commuting trips during the summer months
- Changes in the level of retail activity; and
- Sporting, cultural or community events held on the public road.

Dates for each significant events throughout the construction period should be determined during detailed planning and prior to the start of construction works where possible. The Contractor should ensure that any closures during the construction shall have a minimal impact on public events.

The Contractor, as part of their stakeholder engagement plan, should liaise with the relevant authorities to assess the impact of the various annual events and consider using portable Variable Message Signs (VMS) to alert the road users to the potential of increased traffic flows.

2.3.8 Road closures applications

Applications for Temporary Road Closures should typically be made on Fingal County Council and Meath County Council accordingly. The Contractor is responsible for obtaining Road Closures as necessary to fulfil the contractual obligations. To comply with statutory requirements, an application for a Temporary Road Closure should be submitted a minimum of 8 weeks in advance. The Gardaí should also be informed in writing. Particular attention should be given to notifying local stakeholders in advance.

2.3.9 Road opening license

All road openings shall be carried out in accordance with the latest version of the document "Guidelines for Managing Openings in Public Roads (Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads) (Department of Transport, Tourism and Sport, April 2017).

In order to carry out an excavation in a public road, a Road Opening License is required; all Road Opening Licenses should typically be applied through the MapRoad Roadworks Licensing (MRL) system which is managed and facilitated by the Road Management Office (RMO). It is Contractor's responsibility to obtain the Road Opening Licenses.

2.3.10 Public notices

The Contractor should liaise with the Roads Authority in respect of any temporary full road closures, lane closures, and other traffic management controls required to be carried out to ensure the safety of the workforce and the public for the period of the works. The advertising of such notices on the local radio, local press, council websites, and leaflet drops should be considered to warn motorists, local businesses and residents of the changes involved and new road layouts to be expected.

2.3.11 Incident management

In accordance with the Clause 4.3.9 of the Guidance for the Control and Management of Traffic at Road Works (Department of Transport, Tourism and Sport, 2010), the requirement of the Incident Management Plan is established early in the design process and would usually include the provision of an incident management system to record and report all site incidents and those that are related to Traffic Management.

The Incident Management Plan should be established and developed by the Contractor. The purpose of this plan is to set out the broad principles of partnership working between the PSCS, Contractor, Temporary Traffic Operations Supervisor and Emergency Responders in terms of carrying out roles and responsibilities of each party for incident management during the construction of the scheme, focusing on incident identification, response, and recovery.

The incident management system should include, but not limited to, an operational structure with a formal reporting system and review meetings, the name of the person with responsibility for record keeping and an outline contingency plan.

During the works, consideration should be given to the possibility of altering or removing the Traffic Management measures in order to deal with exceptional circumstances, such as high traffic volumes, adverse weather conditions and emergency access.

2.3.12 Communication plan

It is recommended that a Communication Plan should be developed to deliver up to date information about progress and forthcoming full road and lane closures to the public.

The Communication Plan should be developed prior to the start of works to include identification of target audiences, key messages, and communication channels. It should typically set out the processes and procedures for communications including reactive communications to deal with incidents and emergencies on the network.

Proposed communication actions prior to traffic management and associated construction works should typically include:

- Placing of the "Roadworks Ahead" warning signs which should be the first temporary sign visible to the road user on the approach to any roadworks
- The local Authority typically should update in writing key stakeholders on timelines and progress as per the Temporary Closing of Roads Regulations, 1956 S.I. No. 30/1956
- In advance of the works, plans would be communicated through various sources, such as websites, news articles and road signage along the relevant stretch highlighting timelines for works to all affected residents, landowners, and business owners.
- The works should be included on the TII roadworks website as this is potentially the first source of information looked at by the public

Proposed communication actions during construction works:

- Roadside signage can be used to inform the road user of changes to traffic management, construction works, operations and possible delays
- Communication and distribution of newsletters to stakeholders (including all affected residents, landowners, and business owners) to share the progress on the Project
- Regular communications to emergency services and breakdown services to ensure they are aware of the changing road network as the scheme evolves
- Publicity of scheme details for road users at leisure venues, petrol filling stations, local supermarkets and other regularly visited domestic type stores
- Continued use of the TII and Councils Website
- Press releases to the broadcast media
- Twitter and other social media to share works and delays as well as weekly update roadworks emails
- Weekly traffic management liaison meetings with relevant stakeholders

It is recommended that all local residents and businesses are included within a single Project-wide Communication plan to ensure timely, efficient, and effective communication to all parties.

In the preparation of the Construction Stage TMP and during the implementation of the works, the Contractor should typically liaise with the following parties:

- Meath County Council Roads Department
- Fingal County Council Roads Department
- Garda Síochána, ambulance and fire services
- Dublin Airport Authority
- Private and Public Bus Services

The Contractor should typically take into account the impact of the construction works on general traffic, businesses, and local property owners and coordinate the implementation of the developed TMP throughout the duration of the works.

2.3.13 Working hours

Typically, workings hours during construction are expected to be:

- Weekdays 0700hrs to 1900hrs
- Saturday 0800hrs to 1400hrs

At specific locations where impact to local receptors (i.e., residents, wildlife etc) is anticipated, there may be a requirement for 24hour working. The ability to work 24hrs would minimise impact during construction of the scheme and facilitate more efficient operations. This would typically be facilitated by two 12hour work shifts.

The ability for 24hour working would not affect the proposed Traffic Management, but rather reduce the implementation duration, reducing in turn disruption to the road network. This would only be recommended under a full road closure scenario. A full environmental impact assessment will be required if this strategy is to be taken forward, as well as necessary consents to the extra disruption caused to neighbouring properties by working overnight.

2.3.14 Access and Egress

Access to temporary Construction Compounds, HDD compounds, and working areas will be designed to safely accommodate the existing road and active travel users, and the type of construction traffic that will use these accesses during the Construction Phase.

The appointed contractor will provide advanced warning signs, in accordance with the Traffic Signs Manual (Department of Transport, Tourism and Sport, 2019), on approach to the proposed access locations, and entry and exit points throughout the live working area.

During the Construction Phase, there will be some temporary disruption / alterations to access to premises in certain locations along the proposed cable route. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with homes and businesses prior to construction starting in the area.

3. Construction Methodology

3.1 Sequence of Works

The proposed construction sequence to support the TTM for the 'in-carriageway' sections of the cable route as follows:

- Phase 1 Installation of passing bay and joint bay structure
 - Early installation of the passing bay would support the excavation and installation of the ducts, facilitating lorry holding areas and safely parking awaiting delivery vehicles in strategic positions.
- Phase 2 Excavation and installation of cable ducts
 - Assumed to be aligned to the road corridor boundary.
- Phase 3 Installation and jointing of cables
 - All assumptions associated with the installation of the cables are detailed within the Abnormal Load Assessment.

The following aspects are excluded from this Traffic Management report:

- Construction compounds
- Localised utility diversions
- Off-road access points
- HDD access points
- Demobilisation (Note: it is assumed at this stage, Phase 1 TTM will be required for demobilisation at passing bay locations)

3.2 Construction Space

3.2.1 Phase 1 – Installation of Passing Bay and Joint Bays

3.2.1.1 'In-carriageway' Joint Bay

Phase 1 of the works would most likely include the construction of the passing bays (where required) at the joint bay locations. This provides a strategic advantage for the remainder of the Project as small areas are developed that could support the construction process. On completion of the passing bay, it would be proposed that the joint bays are installed under the same phase.

Figure 3-1 and Figure 3-2 show the plan of the expected site setup during Phase 1. It would be proposed that a localised lane closure would be required to support the installation of both the passing bay and joint bay structure. Although the passing bay would be offline to the live carriageway, suitable precautions will be required for delivery vehicles and material handling.

If these two separate activities are completed independently, the proposed traffic management would remain the same. Please note, the demobilisation of the Project and the associated removal of the passing bays will likely require the same traffic management as that required in the installation case.

Following review of the required passing bay and construction space proofing, the key parameters of the joint bay as follows:

- Total road width approximately 10.5m
 - Width of the construction works a minimum of ~6.5m
 - Open lane width 3.3m-4.3m







Figure 3-1 Passing Bay Construction



Figure 3-2 'In-carriageway' Joint Bay Construction

20m

Optimum 3.3m/ max. 4.3m

Figure 3-3 shows the installation of the joint bay and the required construction space. Approximately 7.0m width of construction space would be required for the installation of the joint bays. This required 7.0m is calculated assuming the alignment of the joint bay with the road boundary. It should be noted that the delivery vehicle for the precast joint bay would only temporarily be in position for approximately two hours.

20m

55m



Figure 3-3 'In-carriageway' Joint Bay Construction (Sections)

3.2.1.2 'In-verge' Joint Bay

There are instances along the route where joint bays may be located adjacent to the road in the verge. A suitable construction platform will be required for the safe delivery of materials and installation of the permanent works. It is recommended a suitable platform is designed and tested to ensure the stability of all plant, equipment, and delivery vehicles.

Figure 3-4 shows the proposed construction platform and associated TTM.

Following review of the required construction platform and construction space proofing, the key parameters of the joint bay as follows:

- Total road width approximately 7.5m
 - Width of the construction works a minimum of 4.5m



• Open lane width – 3.3m-4.3m

LEGEND



Figure 3-4 'In-Verge' Joint Bay Construction

3.2.2 Phase 2 – Excavation and installation of cable ducts

To minimise disruption to road users, it would be preferable to work in a linear corridor approach as shown in Figure 3-5. This approach would not be the considerably constrained, as this will create a narrow corridor with live adjacent lanes in operation. This method would have the least impact to the road network.



Figure 3-5 Duct installation

Following review of the required construction space proofing, the key parameters to maintain the road open with a lane closure as follows:

- Total road width approximately 7.5m
 - \circ Width of the construction works a minimum of 4.2m
 - \circ Open lane width 3.3m-4.3m

Figure 3-6 shows the construction space proofing for the installation of the ducts and the associated backfill. A minimum construction space width of 4.2m would be required. It should be noted this is considerably constrained and would likely result in reduced output.

In the event that there is an obstruction preventing the excavator slew, a Safe System of Work will likely be identified by the Contractor.



Figure 3-6 Duct Installation (Sections)

Figure 3-7 shows the potential strategic use of the passing bay as a staging area (for example a lorry holding bay). It would be recommended that the Contractor considers the early implementation of the passing bay at the joint bay locations.



Figure 3-7 Strategic use of passing bay

3.2.3 Phase 3 – Installation, jointing and testing of the cables

3.2.3.1 'In-carriageway' Joint Bay

At 'in-carriageway' locations the proposed traffic management is shown in Figure 3-8. The passing bay will facilitate the safe passage of public vehicles whilst the demarcated zone will provide suitable construction space for installation operations.

Figure 3-9 shows a section of the cable installation and anticipated spatial requirements. This is shown to support the required construction space in Figure 3-8.

Note the passing bay shown facilitates dual cable installation, refinement for single cable direction would likely be defined at detailed design stage.



Figure 3-8 'In-carriageway' cable installation - Plan



Figure 3-9 'In- carriageway' cable installation - sections

3.2.3.2 'In-verge' Joint Bay

At 'in-verge' joint bay locations, the proposed traffic management is shown in Figure 3-10. Although the operations are out of the live traffic flow, the works are still in proximity and consideration to the safety of site staff is required. A lateral safety zone of 0.5m will be required from the working area and suitable access to the construction platform will be required. Due to the slow-moving vehicles, there will be a likely requirement for TTM to ensure the safety of all road users.



Figure 3-10 'In-verge' cable installation - plan

4. Traffic Management Plan

4.1 Proposed Traffic Management Plan

The subsequent sections detail the proposed Traffic Management sections (Table 4-1). Each section builds on the elements discussed in the previous sections and aims to offer a safe solution to all road users in compliance to the relevant guidance and legislative documents.

TTM Sections	Name of Section	Length (m)	Start Ch	End Ch	Council Authority	Туре	No. of Joint Bays
1.01	Woodland	3635	0	3635	Meath	Off-road	4
1.02	R156	7185	3635	10820	Meath	In-carriageway	10
1.03	R157	1530	10820	12350	Meath	In-verge	1
1.04	M3	873	12350	13223	Meath	Off-road	2
1.05	R147	327	13223	13550	Meath	In-carriageway	0
1.06	L5026	1610	13550	15160	Meath	In-carriageway	2
1.07	L1010 West	695	15160	15855	Meath	In-carriageway	1
1.08	Pinkeen River	605	15855	16460	Meath	Off-road	1
1.09	L1010 East	340	16460	16800	Meath	In-carriageway	1
1.10	Nuttstown Road	1410	16800	18210	Meath	In-carriageway	1
1.11	Ward River	70	18210	18280	Meath	Off-road	0
1.12	Priestown Road	915	18280	19195	Meath	In-carriageway	2
1.13	Priest Town	195	19195	19390	Meath	Off-road	0
1.14	Kilbride Road North	1115	19390	20505	Meath	In-carriageway	1
1.15	Kilbride Off-road	80	20505	20585	Meath	Off-road	0
1.16	Kilbride Road South	695	20585	21280	Meath / Fingal	In-carriageway	1
1.17	Hollywood	1346	21280	22626	Fingal	Off-road	3
1.18	M2 HDD South	684	22626	23310	Fingal	In-carriageway	0
1.19	M2 HDD	360	23310	23670	Fingal	Off-road	1
1.20	M2 HDD North	950	23670	24620	Fingal	In-carriageway	1
1.21	The Ward Cross / R121	1575	24620	26195	Fingal	In-carriageway	2
1.22	Ward River	70	26195	26265	Fingal	Off-road	0
1.23	R121	805	26265	27070	Fingal	In-carriageway	1
1.24	R122	1250	27070	28320	Fingal	In-carriageway	2
1.25	Kilreesk Lane	50	28320	28370	Fingal	In-carriageway	0
1.26	Kingstown	790	28370	29160	Fingal	Off-road	1
1.27	R108	1640	29160	30800	Fingal	In-carriageway	2
1.28	Naul Road	2450	30800	33250	Fingal	In-carriageway	4

Table 4-1 Traffic Management Sections

TTM Sections	Name of Section	Length (m)	Start Ch	End Ch	Council Authority	Туре	No. of Joint Bays
1.29	Stockhole Lane West	810	33250	34060	Fingal	In-carriageway	1
1.30	M1 East	3706	34060	37766	Fingal	Off-road	4

4.1.1 Phase 1 Proposed Traffic Management

The decision flow chart for Phase 1 is shown in Figure 4-1. The following traffic management solutions are suggested at this stage:

- 'In-carriageway' Joint Bays
 - Lanes closure
 - Where the road width at the location of the joint bay is greater than 10.5m, a passing bay would not be required and only lanes closure required.
 - Passing bay with lanes closure
 - Where the road width is less than 10.5m and where there is suitable space to construct a passing bay as shown in Figure 3-2, the proposed TTM is a passing bay with lanes closure to facilitate a single traffic signalled lane at the joint bay.
 - Full road closure (with local access arrangements)
 - Where the road width is less than 10.5m and where there is insufficient space to construct a passing bay as shown in Figure 3-2, the proposed TTM is a full road closure with local access arrangements
- 'In-verge' Joint Bays
 - Construction Platform with suitable access TTM
 - Where the road width at the location of the joint bay is greater than 7.5m, a temporary vehicular access platform will be required as shown in Figure 3-4, however no lane restrictions would be required. TTM to protect the workforce and maintain access via the platform would be required.
 - Construction Platform with single lane closure
 - Where the road width at the location of the joint bay is less than 7.5m, a construction platform will be required as shown in Figure 3-4 with a single lane restriction.



Figure 4-1 Phase 1 – TTM Decision Flowchart

The proposed traffic management for Phase 1 is shown in Table 4-2.

TTM Sections	Road	Joint Bay	Chainage (m)	Position	Road Width (m)	TTM Phase 1
		JB1	812	Off-road	N/A	Not required
1.01	N / A	JB2	1560	Off-road	N/A	Not required
1.01	N/A	JB3	2384	Off-road	N/A	Not required
		JB4	3080	Off-road	N/A	Not required
		JB5	3807	In-carriageway	6.5	Passing bay – two lanes closure
	R156	JB6	4587	In-verge	6.5	Temporary construction platform – single lane closure
		JB7	5390	In-verge	7.0	Temporary construction platform
1.02		JB8	6022	In-verge	6.7	Temporary construction platform – single lane closure
1.02		JB9	6821	In-carriageway	6.5	Full road closure
		JB10	7646	In-carriageway	7.0	Passing bay – two lanes closure both PB and JB are on the same side of the road
		JB11	8358	In-carriageway	6.3	Full road closure
		JB12	9088	In-verge	6.9	Temporary construction platform – single lane closure

TTM Sections	Road	Joint Bay	Chainage (m)	Position	Road Width (m)	TTM Phase 1
		JB13	9936	In-verge	6.5	Temporary construction platform – single lane closure
		JB14	10771	In-verge	8.0	Temporary construction platform
1.03	R157	JB15	11577	In-verge	15	Temporary construction platform – adjacent hard shoulder closure
1.04	N/A	JB16	12417	Off-road	N/A	Not required
1.04	IN/A	JB17	13163	Off-road	N/A	Not required
1.00	15026	JB18	13764	In-carriageway	12	Two lanes closure
1.06	L5026	JB19	14549	In-carriageway	3.6	Full road closure
1.07	L1010 West	JB20	15327	In-carriageway	5.0	Full road closure
1.08	N/A	JB21	15920	Off-road	N/A	Not required
1.09	L1010 East	JB22	16719	In-carriageway	5.3	Full road closure
1.10	Nuttstown Road	JB23	17518	In-carriageway	5.3	Full road closure
1 1 7	Priestown	JB24	18366	In-carriageway	5.5	Passing bay – two lanes closure
1.12	Road	JB25	19037	In-carriageway	5.3	Passing bay – two lanes closure
1.14	Kilbride Road North	JB26	19749	In-verge	5.8	Temporary construction platform – single lane closure
1.16	Kilbride Road South	JB27	20613	In-carriageway	5.7	Passing bay - two lanes closure
		JB28	21393	Off-road	N/A	Not required
1.17	N/A	JB29	22036	Off-road	N/A	Not required
		JB30	22593	Off-road	N/A	Not required
1.19	N/A	JB31	23349	Off-road	N/A	Not required
1.20	M2 HDD North	JB32	24215	In-carriageway	6.5	Full road closure
1 7 1	The Ward	JB33	25100	In-carriageway	5.9	Passing bay – two lanes closure
1.21	Cross / R121	JB34	25875	In-carriageway	4.8	Passing bay – two lanes closure
1.23	R121	JB35	26481	In-carriageway	5.3	Passing bay – two lanes closure
1 7 /	D100	JB36	27111	In-verge	6.5	Temporary construction platform
1.24	RIZZ	JB37	27929	In-verge	5.8	Temporary construction platform – single lane closure
1.26	N/A	JB38	28767	Off-road	N/A	Not required
1 27	R108	JB39	29484	In-carriageway	7.4	Passing bay – two lanes closure
1.21		JB40	30187	In-carriageway	7.4	Passing bay – two lanes closure
1,28	Naul Road	JB41	30940	In-carriageway	7.4	Passing bay – two lanes closure
1.28		JB42	31651	In-carriageway	8.0	Passing bay – two lanes closure

TTM Sections	Road	Joint Bay	Chainage (m)	Position	Road Width (m)	TTM Phase 1
		JB43	32531	In-carriageway	7.5	Passing bay – two lanes closure
		JB44	33088	In-verge	7.5	Temporary construction platform
1.29	Stockhole Lane West	JB45	33838	In-carriageway	7.6	Passing bay – two lanes closure
		JB46	34657	Off-road	N/A	Not required
1 20	NI / A	JB47	35424	Off-road	N/A	Not required
1.50	N/A	JB48	36172	Off-road	N/A	Not required
		JB49	36960	Off-road	N/A	Not required

4.1.2 Phase 2 Proposed Traffic Management

The decision flow chart for Phase 2 is shown in Figure 4-2. The following traffic management solutions are suggested at this stage:

- Full road closure (with local access arrangements)
 - Where the residual open carriageway is less than 2.5m the road will be required to be closed, with local access arrangements where necessary. Allowing vehicles to pass on a carriageway less than this width would pose considerable risk to road users and the delivery teams. Refer to Clause 8.4.3.1 and 8.4.3.2 TII Chapter 8 (Department of Transport, Tourism and Sport, 2019)
- Lane Closure with HGV Diversion
 - Where the residual open carriageway is between 2.5m and 3m the road will be required to be closed to HGVs but open to LGVs / cars. All HGVs would be required to utilise the diversion route, this would require VMS and signage to mitigate the risk of HGVs passing the works sites. Refer to Clause 8.4.3.1 TII Chapter 8 (Department of Transport, Tourism and Sport, 2019)
- Lane Closure
 - Where the residual open carriageway is greater than 3m, it is proposed to keep the road open to all road users utilising automated stop / go signals. Consideration to use automated signalling to account for the predominant flow direction. These would remain during the entirety of the section of works (i.e., out of hours included) to ensure safety to all road users and delivery teams. Refer to Clause 8.4.3.1 and 8.4.3.2 TII Chapter 8 (Department of Transport, Tourism and Sport, 2019)



Figure 4-2 Phase 2 – TTM Decision Flowchart

The proposed traffic management for Phase 2 is shown in Table 4-3. For clarity off road sections have been omitted.

TTM Sections	Name of Section	Length (km)	Average Road Width	Phase Two TTM	Diversion Length	Diversion Council
1.02	R156	7.2	(m) 6.5	Full Road Closure	(Km) 24.1	Meath
1.03	R157	1.5	14.5	Hard Shoulder Closure	N/A	N/A
1.05	R147	0.3	14.5	Two lanes closure	N/A	N/A
1.06	L5026	1.6	5.0	Full Road Closure	3.3	Meath
1.07	L1010 West	0.7	5.3	Full Road Closure	20.9	Meath
1.09	L1010 East	0.3	5.3	Full Road Closure	21.3	Meath
1.10	Nuttstown Road	1.4	5.5	Full Road Closure	20.2	Meath
1.12	Priestown Road	0.9	5.3	Full Road Closure	20.7	Meath
1.14	Kilbride Road North	1.1	5.7	Full Road Closure	13.8	Meath / Fingal
1.16	Kilbride Road South	0.7	5.7	Full Road Closure	14.2	Meath / Fingal
1.18	M2 HDD South	0.7	5.8	Full Road Closure	6.5	Fingal
1.20	M2 HDD North	0.9	6.0	Full Road Closure	6.3	Fingal
1.21	The Ward Cross / R121	1.6	5.5	Full Road Closure	8.5	Fingal

Table 4-3 Proposed Traffic Management – Phase 2

TTM Sections	Name of Section	Length (km)	Average Road Width (m)	Phase Two TTM	Diversion Length (km)	Diversion Council Authority
1.23	R121	0.8	5.3	Full Road Closure	9.2	Fingal
1.24	R122	1.2	5.0	Full Road Closure	8.7	Fingal
1.25	Kilreesk Lane	0.1	6.5	Full Road Closure	2.5	Fingal
1.27	R108	1.6	7.5	Single Lane Closure	11.7	Fingal
1.28	Naul Road	2.5	7.5	Single Lane Closure	10.9	Fingal
1.29	Stockhole Lane West	0.8	7.5	Single Lane Closure	11.7	Fingal

4.1.3 Phase 3 Proposed Traffic Management

The decision flow chart for Phase 3 is shown in Figure 4-3. The following traffic management solutions are suggested at this stage:

- 'In-carriageway' Joint Bays
 - Lanes closure
 - Where the road width at the location of the joint bay is greater than 10.5m, a passing bay would not be required and only lanes closure required.
 - Passing bay with lanes closure
 - Where the road width is less than 10.5m and where there is suitable space to construct a passing bay as shown in Figure 3-8, the proposed TTM is a passing bay with lanes closure to ffacilitate a single traffic signalled lane at the joint bay.
 - Full road closure (with local access arrangements)
 - Where the road width is less than 10.5m and where there is insufficient space to construct a passing bay as shown in Figure 3-8, the proposed TTM is a full road closure with local access arrangements.
- 'In-verge' Joint Bays
 - Construction Platform with suitable access TTM
 - Where the road width at the location of the joint bay is greater than 7.5m, a temporary vehicular access platform will be required as shown in Figure 3-10, however no lane restrictions would be required. TTM to protect the workforce and maintain access via the platform would be required.
 - Construction Platform with single lane closure
 - Where the road width at the location of the joint bay is less than 7.5m, a construction platform will be required as shown in Figure 3-10 with a single lane restriction.



Figure 4-3 Phase 3 – TTM Decision Flowchart

The proposed traffic management for Phase 3 is shown in Table 4-4.

TTM Sections	Road	Joint Bay	Chainage (m)	Position	Road Width (m)	TTM Phase 3	
1.01	N/A	JB1	812	Off-road	N/A	Not required	
		JB2	1560	Off-road	N/A	Not required	
1.01		JB3	2384	Off-road	N/A	Not required	
		JB4	3080	Off-road	N/A	Not required	
	R156	JB5	3807	In-carriageway	6.5	Passing bay – two lanes closure	
		JB6	4587	In-verge	6.5	Temporary construction platform – single lane closure	
		JB7	5390	In-verge	7.0	Temporary construction platform	
		JB8	6022	In-verge	6.7	Temporary construction platform – single lane closure	
1.02		JB9	6821	In-carriageway	6.5	Road closure	
		JB10	7646	In-carriageway	7.0	Passing bay – two lanes closure both PB and JB are on the same side of the road	
		JB11	8358	In-carriageway	6.3	Road closure	
		JB12	9088	In-verge	6.9	Temporary construction platform – single lane closure	

TTM Sections	Road	Joint Bay	Chainage (m)	Position	Road Width (m)	TTM Phase 3
		JB13	9936	In-verge	6.5	Temporary construction platform – single lane closure
		JB14	10771	In-verge	8.0	Temporary construction platform
1.03	R157	JB15	11577	In-verge	15	Temporary construction platform – adjacent hard shoulder closure
1.0%	N/A	JB16	12417	Off-road	N/A	Not required
1.04	N/A	JB17	13163	Off-road	N/A	Not required
1.06	15026	JB18	13764	In-carriageway	12	Two lanes closure
1.00	L3020	JB19	14549	In-carriageway	3.6	Road closure
1.07	L1010 West	JB20	15327	In-carriageway	5.0	Road closure
1.08	N/A	JB21	15920	Off-road	N/A	Not required
1.09	L1010 East	JB22	16719	In-carriageway	5.3	Road closure
1.10	Nuttstown Road	JB23	17518	In-carriageway	5.3	Road closure
1 1 7	Priestown Road	JB24	18366	In-carriageway	5.5	Passing bay – two lanes closure
1.12		JB25	19037	In-carriageway	5.3	Passing bay – two lanes closure
1.14	Kilbride Road North	JB26	19749	In-verge	5.8	Temporary construction platform – single lane closure
1.16	Kilbride Road South	JB27	20613	In-carriageway	5.7	Passing bay - two lanes closure
	N/A	JB28	21393	Off-road	N/A	Not required
1.17		JB29	22036	Off-road	N/A	Not required
		JB30	22593	Off-road	N/A	Not required
1.19	N/A	JB31	23349	Off-road	N/A	Not required
1.20	M2 HDD North	JB32	24215	In-carriageway	6.5	Road closure
1 7 1	The Ward Cross / R121	JB33	25100	In-carriageway	5.9	Passing bay – two lanes closure
1.21		JB34	25875	In-carriageway	4.8	Passing bay – two lanes closure
1.23	R121	JB35	26481	In-carriageway	5.3	Passing bay – two lanes closure
1.24	R122	JB36	27111	In-verge	6.5	Temporary construction platform
		JB37	27929	In-verge	5.8	Temporary construction platform – single lane closure
1.26	N/A	JB38	28767	Off-road	N/A	Not required
1 2 7	R108	JB39	29484	In-carriageway	7.4	Passing bay – two lanes closure
1.21		JB40	30187	In-carriageway	7.4	Passing bay – two lanes closure
1.28	Naul Road	JB41	30940	In-carriageway	7.4	Passing bay – two lanes closure
1.20		JB42	31651	In-carriageway	8.0	Passing bay – two lanes closure

TTM Sections	Road	Joint Bay	Chainage (m)	Position	Road Width (m)	TTM Phase 3
		JB43	32531	In-carriageway	7.5	Passing bay – two lanes closure
		JB44	33088	In-verge	7.5	Temporary construction platform
1.29	Stockhole Lane West	JB45	33838	In-carriageway	7.6	Passing bay – two lanes closure
1.30	N/A	JB46	34657	Off-road	N/A	Not required
		JB47	35424	Off-road	N/A	Not required
		JB48	36172	Off-road	N/A	Not required
		JB49	36960	Off-road	N/A	Not required

4.2 TTM Sections

The following sub-sections show the TTM sections along the alignment. The varying colours in the figures refer to the following:

- Blue; Off-road / in-verge cable route
- Red; In carriageway cable route
- Orange; Assumed traffic diversion

4.2.1 Section 1.01 – Woodland

Figure 4-4 the TTM section from Woodland Substation to R156. This section is off-road and therefore the temporary traffic management is not assessed.


Figure 4-4 Section 1.01

Location	Off-road
Section Length	3.6km
Diversion Length	N/A
No. of JB	4

4.2.2 Section1.02 – R156

Figure 4-5 shows the TTM section that runs along R156. This in-carriageway section is on a regional road and has 10no. joint bays along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-5 Section 1.02

Table 4-6 shows a summary of the route section.

Table 4-6 Proposed Traffic Management - Section 1.02

Location	In-carriageway (R156)
Section Length	7.2km
Diversion Length	24.1km
No. of JB	10

4.2.3 Section 1.03 – R157

Figure 4-6 shows the TTM section that runs along R157. This in-verge section is on a regional road and has 1no. joint bay along the alignment.



Figure 4-6 Section 1.03

Table 4-7 shows a summary of the route section.

Table 4-7 Proposed Traffic Management - Section 1.0	3
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Location	In-verge (R157)	
Section Length	1.5km	
Diversion Length	N/A	
No. of JB	1	

4.2.4 Section 1.04 – M3

Figure 4-7 shows the section from the M3 Parkway Roundabout to R147. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-7 Section 1.04

Table 4-8 shows a summary of the route section.

Table 4-8 Proposed Traffic Management - Section 1.0

Location	Off-road
Section Length	0.9km
Diversion Length	N/A
No. of JB	2

4.2.5 Section 1.05 – R147

Figure 4-8 shows the section that runs along R147. This in-carriageway section is on a regional road and has no joint bays along the alignment. The residual open carriageway is greater than 3m and therefore it is proposed to keep the road open to all road users during the works phase.



Figure 4-8 Section 1.05

Table 4-9 shows a summary of the route section.

Table 4-9 Proposed Traffic Management - Section 1.05

Location	In-carriageway (R147)	
Section Length	0.3km	
Diversion Length	N/A	
No. of JB	0	

4.2.6 Section 1.06 – L5026

Figure 4-9 shows the section that runs along L5026. This in-carriageway section is on a local road and has 2no. joint bays along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-9 Section 1.06

Table 4-10 shows a summary of the route section.

Table 4-10 Proposed Traffic Management - Section 1.06

Location	In-carriageway (L5026)
Section Length	1.6km
Diversion Length	3.3km
No. of JB	2

4.2.7 Section 1.07 – L1010 West

Figure 4-10 shows the section that runs along L1010 to the West of Pinkeen River. This in-carriageway section is on a local road and has 1no. joint bay along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-10 Section 1.07

Table 4-11 shows a summary of the route section.

Table 4-11	Proposed	Traffic Manage	ement - Section	1.07

Location	In-carriageway (L1010)
Section Length	0.7km
Diversion Length	20.9km
No. of JB	1

4.2.8 Section 1.08 – Pinkeen River

Figure 4-11 shows the section that crosses the Pinkeen River. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-11 Section 1.08

Table 4-12 shows a summary of the route section.

Table 4-12 Pre	oposed Traffic	Management -	Section	1.08
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Location	Off-road
Section Length	0.6km
Diversion Length	N/A
No. of JB	1

4.2.9 Section 1.09 – L1010 East

Figure 4-12 shows the section that runs along L1010 to the East of Pinkeen River. This in-carriageway section is on a local road and has 1no. joint bay along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-12 Section 1.09

Table 4-13 shows a summary of the route section.

Location	In-carriageway (L1010)
Section Length	0.3km
Diversion Length	21.3km
No. of JB	1

4.2.10 Section 1.10 – Nuttstown Road

Figure 4-13 shows the section that runs along Nuttstown Road. This in-carriageway section is on a local road and has 1no. joint bay along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-13 Section 1.10

Table 4-14 shows a summary of the route section.

Table 4-14 F	Proposed	Traffic	Management -	Section	1.10
	roposea	indinic	management	200011	1.10

Location	In-carriageway (Nuttstown Road)
Section Length	1.4km
Diversion Length	20.2km
No. of JB	1

4.2.11 Section 1.11 – Ward River Crossing I

Figure 4-14 shows the section that crosses the Ward River. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-14 Section 1.11

Table 4-15 shows a summary of the route section.

Table 4-15 Proposed Traffic Management - Section 1.11

Location	Off-road
Section Length	0.07km
Diversion Length	N/A
No. of JB	0

4.2.12 Section 1.12 – Priestown Road

Figure 4-15 shows the section that runs along Priestown Road. This in-carriageway section is on a local road and has 2no. joint bays along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-15 Section 1.12

Table 4-16 shows a summary of the route section.

Table 4-16 Proposed Traffic Management - Section 1.12

Location	In-carriageway (Priestown Road)
Section Length	0.9km
Diversion Length	20.7km
No. of JB	2

4.2.13 Section.1.13 – Priest Town

Figure 4-16 shows the section that runs through Priest Town. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-16 Section 1.13

Table 4-17 shows a summary of the route section.
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Location	Off-road
Section Length	0.2km
Diversion Length	N/A
No. of JB	0

4.2.14 Section 1.14 – Kilbride Road North

Figure 4-17 shows the section that runs along Kilbride Road. This in-carriageway section is on a local road and has 1no. joint bay along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-17 Section 1.14

Table 4-18 shows a summary of the route section.

Table 4-18 Proposed Traffic Management - Section 1.14

Location	In-carriageway (Kilbride Road North)
Section Length	1.1km
Diversion Length	13.8km
No. of JB	1

4.2.15 Section 1.15 – Kilbride Off-road

Figure 4-18 shows the section that crosses the watercourse close to Kilbride Road. This section is off-road and therefore the temporary traffic management is not assessed.





Table 4-19 shows a summary of the route section.

Location	Off-road
Section Length	0.08km
Diversion Length	N/A
No. of JB	0

4.2.16 Section 1.16 – Kilbride Road South

Figure 4-19 shows the section that runs along Kilbride Road. This in-carriageway section is on a local road and has 1no. joint bay along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-19 Section 1.16

Table 4-20 shows a summary of the route section.

Location	In-carriageway (Kilbride Road North)
Section Length	0.7km
Diversion Length	14.2km
No. of JB	1

4.2.17 Section 1.17 – Hollywood

Figure 4-20 shows the section that runs through Hollywood. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-20 Section 1.17

Table 4-21 shows a summary of the route section.

Table 4-21 Proposed Traffic Management - Section 1.17

Location	Off-road
Section Length	1.4km
Diversion Length	N/A
No. of JB	3

4.2.18 Section 1.18 - M2 HDD South

Figure 4-21 shows the section that runs along R121. This in-carriageway section is on a regional road and has no joint bay along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-21 Section 1.18

Table 4-22 shows a summary of the route section.

Location	In-carriageway (R121)
Section Length	0.7km
Diversion Length	6.5km
No. of JB	0

4.2.19 Section 1.19 – M2 HDD

Figure 4-22 shows the section that crosses the M2 motorway. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-22 Section 1.19

Table 4-23 shows a summary of the route section.

Table 4-23 Proposed Traffic Management - Section 1.19

Location	Off-road
Section Length	0.4km
Diversion Length	N/A
No. of JB	1

4.2.20 Section 1.20 – M2 HDD North

Figure 4-23 shows the section that runs along R121. This in-carriageway section is on a regional road and has 1no. joint bay along the alignment. There are no alternative diversion routes suitable during the works phase.



Figure 4-23 Section 1.20

Table 4-24 shows a summary of the route section.

Table 4-24 Proposed Traffic Management - Section 1.20

Location	In-carriageway (R121)
Section Length	0.9km
Diversion Length	6.3km
No. of JB	1

4.2.21 Section 1.21 – The Ward Cross / R121

Figure 4-24 shows the section that runs along R121. This in-carriageway section is on a regional road and has 2no. joint bays along the alignment. There is no alternative diversion route suitable during the works phase.



Figure 4-24 Section 1.21

Table 4-25 shows a summary of the route section.

Table 4-25 Proposed Traffic Management - Section 1.21

Location	In-carriageway (R121)
Section Length	1.6km
Diversion Length	8.5km
No. of JB	2

4.2.22 Section 1.22 – Ward River Crossing II

Figure 4-25 shows the section that crosses Ward River. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-25 Section 1.22

Table 4-26 shows a summary of the route section.

Table 4-26 Proposed Traffic Management - Section 1.22

Location	Off-road
Section Length	0.07km
Diversion Length	N/A
No. of JB	0

4.2.23 Section 1.23 – R121

Figure 4-26 shows the section that runs along R121. This in-carriageway section is on a regional road and has 1no. joint bay along the alignment. There is no alternative diversion route suitable during the works phase.



Figure 4-26 Section 1.23

Table 4-27 shows a summary of the route section.

Table 4-27 Proposed Traffic Management - Section 1.23

Location	In-carriageway (R121)
Section Length	0.8km
Diversion Length	9.2km
No. of JB	1

4.2.24 Section 1.24 – R122

Figure 4-27 shows the section that runs along R122. This in-carriageway section is on a regional road and has 2no. joint bays along the alignment. There is no alternative diversion route suitable during the works phase.



Figure 4-27 Section 1.24

Table 4-28 shows a summary of the route section.

Table 4-28 Proposed Traffic Management - Section 1.24

Location	In-carriageway (R122)
Section Length	1.2km
Diversion Length	8.7km
No. of JB	2

4.2.25 Section 1.25 – Kilreesk Lane

Figure 4-28 shows the section that runs along Kilreesk Lane. This in-carriageway section is on a local road and has no joint bay along the alignment. There is no alternative diversion route suitable during the works phase.



Figure 4-28 Section 1.25

Table 4-29 shows a summary of the route section.

Table 4-29 Proposed Traffic Management - Section 1.25

Location	In-carriageway (Kilreesk Lane)
Section Length	0.05km
Diversion Length	2.5km
No. of JB	0

4.2.26 Section 1.26 – Kingstown

Figure 4-29 shows the section that runs through Kingstown. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-29 Section 1.26

Table 4-30 shows a summary of the route section.

Table 4-30 Proposed	I Traffic Management	- Section 1.26
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Location	Off-road
Section Length	0.8km
Diversion Length	N/A
No. of JB	1

4.2.27 Section 1.27 - R108

Figure 4-30 shows the section that runs along R108. This in-carriageway section is on a regional road and has 2no. joint bays along the alignment. There is no alternative diversion route suitable during the works phase.



Figure 4-30 Section 1.27

Table 4-31 shows a summary of the route section.

Table 4-31	Proposed	Traffic	Management -	- Section	127
	roposed	inume	management	Section	1.21

Location	In-carriageway (R108)
Section Length	1.6km
Diversion Length	11.7km
No. of JB	2

4.2.28 Section 1.28 – Naul Road

Figure 4-31 shows the section that runs along Naul Road. This in-carriageway section is on a regional road and has 4no. joint bays along the alignment. There is no alternative diversion route suitable during the works phase.



Figure 4-31 Section 1.28

Table 4-32 shows a summary of the route section.

Table 4-32 Proposed Traffic Management - Section 1.28

Location	In-carriageway (Naul Road)
Section Length	2.5km
Diversion Length	10.9km
No. of JB	4

4.2.29 Section 1.29 – Stockhole Lane West

Figure 4-32 shows the section that runs along Stockhole Lane. This in-carriageway section is on a regional road and has 1no. joint bay along the alignment. There is no alternative diversion route suitable during the works phase.



Figure 4-32 Section 1.29

Table 4-33 shows a summary of the route section.

Table 4-33	Proposed	Traffic	Management ·	- Section	1.29
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Location In-carriageway (Stockhole Lane)	
Section Length	0.8km
Diversion Length	11.7km
No. of JB	1

4.2.30 Section 1.30 – M1 East

Figure 4-33 shows the section than runs from M1 to Belcamp Substation. This section is off-road and therefore the temporary traffic management is not assessed.



Figure 4-33 Section 1.30

Table 4-34 shows a summary of the route section.

Table 4-34 Proposed Traffic Management - Section 1.30

Location	Off-road
Section Length	3.7km
Diversion Length	N/A
No. of JB	4

4.3 Proposed Construction Machinery

It is expected as part of the installation of the cable into the roads, standard construction machinery will be utilised with minimal reliance on specialist equipment. It would not be foreseeable for the requirement of custom machinery.

Table 4-35 provides a summary of the proposed machinery, itemised by Project activity. The associated quantity is indicative and allocated per gang. The number of working gangs is dictated by the proposed scheme implementation period. Consideration to small tools has not been assessed.

- Phase 1 Installation of passing bay and joint bay structure
- Phase 2 Excavation and installation of cable ducts
- Phase 3 Installation and jointing of cables

Table 4-35 Proposed Machinery

Phase	Activity	Proposed Machinery	Task	Approximate Quantity
		Traffic Management Lorry	Setup and removal of designed traffic management scheme.	2no.
		Site Vehicles	Required for personnel access from compound to sites.	Various
		Welfare Units	Required for on-site working, minimising travel times.	1no.
	Site Setup /	HIAB Lorry	Delivery of various tools, equipment and material within the compound.	1no.
All phases	Site Setup/ Support	HGV Recovery Vehicle	Required for any breakdowns within traffic management zone or contractors' equipment.	1no.
		LGV Recovery Vehicle	Required for any breakdowns within traffic management zone or contractors' equipment.	1no.
		Towable CCTV Unit	Required for safety and protection of road users and workers.	2no.
		Towable Tower lights	Required for safety and protection of road users and workers.	4no.
		10t long reach excavator	Excavation with obstruction within slew zone.	1no.
		9t dual view dumper	Removal of excavation material	3no.
		8-wheel tipper	Removal of excavation material	2no.
Phase 1 – Installation of passing bays and joint bays	Passing Bay	Remote controlled compaction equipment	Compaction of fill within excavated trench.	1no.
		Asphalt Tipper	Delivery of asphalt road surfacing material.	1no.
		Asphalt Paver	Laying of road surface.	1no.
		Roller	Compaction of road surface	1no.

Phase	Activity	Proposed Machinery	Task	Approximate Quantity
		Articulated Lorry	Delivery of plant and materials to the works site	Various
		10t long reach excavator	Excavation with obstruction within slew zone.	1no.
	Joint Bay	9t dual view dumper	Removal of excavation material	3no.
	-	8-wheel tipper	Removal of excavation material	2no.
		Articulated Lorry	Delivery of plant and materials to the works site	Various
		Road Planner	Removal of asphalt road surface for re- use.	1no.
		10t long reach excavator	Excavation with obstruction within slew zone.	1no.
	Excavation	8t excavator	Excavation with no obstructions.	1no.
		9t dual view dumper	Removal of excavation material	3no.
		8-wheel tipper	Removal of excavation material	2no.
	Duct/jointing bay Installation	Articulated Lorry	Delivery of plant and materials to the works site	Various
		8t excavator	Lifting and installation of ducts/jointing bays	1no.
Phase 2 - Excavation and	Deale	Concrete Delivery Vehicle	Delivery of concrete – suggested 8m ³ vehicles.	Various
installation of ducts		10t long reach excavator	Moving concrete from vehicle into trench	1no.
		8t excavator	Loading dumper with material from stockpile for backfill.	1no.
	Duckinking	9t dual view dumper	Moving material from stockpile location to backfill location.	2no.
		Remote controlled compaction equipment	Compaction of fill within excavated trench.	1no.
	Road	Asphalt Tipper	Delivery of asphalt road surfacing material.	1no.
	Reinstatement	Asphalt Paver	Laying of road surface.	1no.
		Roller	Compaction of road surface	1no.
		Oversized vehicle	Delivery of cables to jointing bays.	Various
Phase 3 – Installation	Cable installation	Articulated Lorry	Delivery of plant and materials to the works site	Various
and jointing of Cables	Cable installation	Cable Winch(s) and pulling equipment	Installation of cables through ducting.	1no.

Please note that the quantity of vehicles is not the same as vehicle loads/movements. It is the expected quantity of plant associated with each activity.

4.4 Risks and assumptions

Table 4-36 highlights the assumptions and risks with regards to the proposed traffic management requirements and the associated indicative high-level programme.

Table	4-36	Risks	& A	ssum	otions
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No.	Assumption		Hazard	Mitigation
1	Consent and License Approval	It is assumed that the relevant authorities will permit the detailed traffic management along designed route. The aspect of road user safety is highlighted but the duration of impact and disruption is not accounted for at this stage.	Consent for the required traffic management is not permitted and an alternative solution is required.	Engagement with consenting authorities required.
2	Cable Alignment	It is assumed that the cable is aligned to one side of the road to minimise the working zone and the associated road network. The alignment is unlikely to be aligned to a curb line due to the likely presence of utility services, tree roots. The alignment will also need to account for cable radius in reference to the position of the carriageway.	The alignment of the cable Option away from the outer edge of the carriageway will increase the working zone, in turn reducing the open carriageway. This will increase the likelihood of a road closure.	Further detailed design of the cable alignment and associated profile.
3	Diversion Routes	It is assumed, in accordance with 8.2.4.6 of Chapter 8 that the any diversion route should have the same characteristics of the road that is closed. In effect, the closure of a regional road will require the diversion to follow a regional road.	Extensive diversions highlighted in section 4.2.	In accordance with 8.2.4.6 (c) the shortest possible route should be used. To maintain safety of all road users, alternative solutions need to ensure compliance with 8.2.4.7, stating use of junction improvement, signal alterations, road markings or convoys may be permissible.
4	Ground Conditions	It is assumed that the ground is suitable for re-use and that the ground is of suitable for basic shoring/trenching techniques.	Extreme ground conditions (i.e., rock, weak or high- water table) requiring specialist remediation requirements. Increase in imported backfill requirement's	Detailed ground investigation to identify the suitably of the ground.
5	Uncontaminated Ground	It is assumed the ground is uncontaminated and that all removed subsoil can be re-used, subject to chemical and physical testing.	Excessive contaminated ground, requiring suitable stockpiling and remediation.	Detailed ground investigation to identify the risk of ground contamination.
6	Utilities	It is assumed that the location of services is accounted for in the design and do not hinder the installation process.	Alignment in close proximity to sensitive/high risk services that require specialist support and delay progress.	Requirement for GPR surveys identify existing services and any detectable watercourse crossings. Required for inclusion within the design assessment.

5. Recommendations

To enable successful implementation of the proposed scheme, the following aspects are recommended to improve programme and budget assurance:

1) Agreement of cable alignment

As advised in Section 4.4 the cable alignment is key to providing an accurate assessment of the required traffic management scheme. The current proposed traffic management plan is a best-case scenario and relies on the cable alignment being tight to the nearside curb line. If the cable alignment is to move away from the curb line, this will increase the working room, in turn reducing the live carriageway width. This effect will most likely increase the number of road closures required.

2) Procurement of specific oversized load vehicles

Use of specialist equipment with up-front investment will reduce site operations and increase efficiency when installing the cables. This could be with the side loader or the turntable option. These vehicles have the ability to be used on subsequent projects.

3) GPR Survey

Following the site review, it is evident there are a significant number of utilities in the road network, at locations along the route with substation bases. It was identified predominantly water and gas networks along the route. Any interface with existing services with hinder progress and will likely cause delay. There may also be considerable safety implication working alongside such services (i.e., medium pressure gas main). These should be identified through GPR surveys to allow a full constructability assessment.

4) Early engagement with consenting authorities

Early engagement with the consenting authorities will support the permitting of the abnormal load and provide assurance to the programme. The engagement will highlight areas of concern and provide the client/contractor the ability to address these.

6. References

Department of Transport, Tourism and Sport. (2010). *Guidance for the Control and Management of Traffic at Roadworks*. Department of Transport.

Department of Transport, Tourism and Sport. (2019). *Chapter 8 Temporary Measure and Signs for Road Works*. Transport Ireland.

Department of Transport, Tourism and Sport. (April 2017). *Guidelines for Managing Openings in Public Roads.* Department of Transport.

Health and Safety Authority. (2009). Guidelines for working on roads.

Appendix B – East Meath-North Dublin Grid Upgrade - Abnormal Load Assessment
Jacobs

East Meath-North Dublin Grid Upgrade – Abnormal Load Assessment

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Eirgrid Plc EirGrid

East Meath-North Dublin Grid Upgrade 6 March 2024





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1. Introduction

1.1 Scope

This report assesses the deliverability and logistics associated with the installation and jointing of the cables on the East Meath-North Dublin Grid Upgrade project best performing option. Specifically, this assessment considers the required logistics to transport the cable drums and the 400kV transformer from the designated Port to the project work site.

This assessment is to be reviewed in conjunction with the report of the independent abnormal load specialist (see Appendix A) who have undertaken visual analysis along the route and identified potential risks and opportunities associated with the movement of the cable drums.

1.2 Design Information

1.2.1 Cable Drums

The logistics assessment of the cable drum transportation is based on the following:

- Cable joint bay design as per ESB 400kV Joint Bay PE422-D7001-013-002 Rev 00 (Issued 10/03/10)
- Cable drum description/properties: 4.3m external diameter, 4.0m barrel length and 35.4t (As detailed by Jacobs Cable Designer)
- Passing bay proposed details 321084AJ-JAC-ZZ-XX-DR-C-0001.
- Communication cables are assumed to be delivered and installed with readily available equipment. It is assumed that the 400kV cables is the onerous case.

1.2.2 400kV Transformer

The logistics assessment of the 400kV transformer transportation is based on the following:

- Transformer design as per Transformer 500 MVA 371.9/220/10.5 kV (2163190-101 Rev A) received from EirGrid on 02/01/2024.
- Transformer dimensions 12.8m long, 4.4m tall (excluding bushings) and 4.5m wide.
- Transformer weight 227,500kg excluding oil.

2. Abnormal Load Requirements

2.1 County Councils

According to the Irish County Councils requirements, a load is considered abnormal when the weight or any dimensions exceeds the maximum permitted for the particular type of vehicle as defined in the S.I. No. 5/2003 - Road Traffic (Construction and Use of Vehicles) Regulations 2003 (Irish Statute Book, 2003). Specifically, a load is considered abnormal when:

- Length exceeds 16.5m in the case of an articulated vehicle, or
- Width exceeds 2.75m, or
- Height exceeds 4.65m (subject to Regulation 2(2) of S.I. No. 366/2008 Road Traffic (Construction and Use of Vehicles) (Amendment) Regulations 2008) (Irish Statute Book, 2008)), or
- Weight of any axle exceeds the limits stated in S.I. No 5 of 2003.

Application for permit is required in order to authorise transporting abnormal loads on public roads maintained by the Councils. Applicants are required to give 4 working days' notice to Councils prior to the date of the proposed journey to allow for processing of permit.

Applicants shall also give notice in writing, not less than 4 working days before applying for a Permit, to the Commissioner of Garda Síochána enclosing a copy of the application.

The applicant must also contact TII's Motorway Traffic Control Centre a minimum of 72 hours in advance of the journey, where the load width is greater than 3m, to obtain clearance to travel on the Motorway/National Dual Carriageway Network. The Motorway Traffic Control Centre will confirm if any roadworks is planned along the route that will impact the abnormal load journey.

2.2 City Council - Dublin

According to Dublin City Council requirements, a load is considered abnormal if its weight or any of its dimensions exceeds the following limits.

- Length exceeds 16.5 metres
- Width exceeds 2.9 metres
- Weight exceeds 44.0 tons

Application for permit is required in order to authorise transporting abnormal loads on public roads maintained by the Dublin City Council.

The application must be submitted to Dublin City Council at least 30 working days prior to the date of the proposed journey. The permit expires three months after the date of issue, and as there are no automatic renewals, an application must be submitted every time a new permit is required.

Applicants shall also give notice in writing to the Commissioner of Garda Síochána and the local authorities for any other areas of Dublin, e.g., Fingal, Dun Laoghaire – Rathdown, and South Dublin County Council, through which the abnormal load will be transported.

2.3 Garda Síochána

In accordance with S.I. No. 147/2009 - Road Traffic (Specialised Vehicle Permits) Regulations 2009 (Irish Statute Book, 2009), and S.I. No. 461/2010 - Road Traffic (Specialised Vehicle Permits) (Amendment) Regulations 2010 (Irish Statute Book, 2010), Garda Síochána administrated a permit system and list of Designated Routes for the movement of loads not exceeding 27.4 metres in length and 4.3 metres in width on the major inter-urban routes and to Cork, Rosslare and Ringaskiddy Ports.

As per Garda Síochána requirements, an abnormal load must comply with the weight and height restrictions specified by the S.I. No. 5/2003 - Road Traffic (Construction and Use of Vehicles) Regulations 2003 and the S.I. No. 366/2008 - Road Traffic (Construction and Use of Vehicles) (Amendment) Regulations 2008, respectively.

A Permit for Specialised Vehicles application must be submitted to and signed by the Garda Siochána Permits Officer in order to grant permission for the movement of abnormal loads as defined by the above Regulations, on inter-urban routes specified in the Schedule of Designated Roads. The application for a permit shall be submitted at least 5 working days prior to the date of the proposed journey.

Each vehicle, which operates under this system, travelling on:

- National Primary or National Secondary route shall have an escort vehicle to the front with a flashing amber light(s) and a 'Wide Load' sign visibly displayed
- Dual carriageway or Motorway shall have an escort vehicle to the back with a flashing amber light(s) and a 'Wide Load' sign visibly displayed

Loads in excess of 4.65 meters in height, 4.3 meters in width and 27.4 metres in length are not covered under the remit of this Permit and independent authorisation from the Local Authority concerned and/or Minister for Transport is required.

2.4 Dublin Tunnel

According to the Dublin Tunnel requirements, a load is considered abnormal if any of its dimensions exceeds the following limits:

- Width exceeds 2.9 metres
- Length exceeds 25.0 metres

The Dublin Tunnel is subject to a maximum permitted vehicle height of 4.65 meters.

A minimum of 48 hours' notice is required in order to authorise transporting abnormal loads through the Dublin Tunnel. Abnormal loads will only be allowed for movement between 2200hrs and 0500hrs. Hauliers are required to provide their own escort vehicle(s), which will be accompanied by a Dublin Tunnel Authorized Officer.

2.5 ESB Networks

The Road Traffic (Construction and Use of Vehicles) (Amendment) Regulations 2008 defines a high load as any load that is higher than 4.65 metres at its highest point. ESB Networks standard clearances for electricity lines on designated local high load routes that cross public roads are designed to enable loads up to 4.65 metres high to pass safely. It is the responsibility of high load transporters to plan and implement a safe system of work.

According to the ESB Networks Code of Practice (CoP) for Avoiding Danger from Overhead Electricity Lines (ESB Networks, 2019), a lateral area near an overhead electricity line must also be isolated from the work site by physical barriers. The dimensions of this hazard zone are related to the voltage of the overhead line. For 110kV and above, the minimum horizontal safe distance between the plant /machinery and the overhead line is 10 meters plus the falling distance of the fully extended boom (Figure 2-1).



Figure 2-1 Plant and machinery minimum safe distance (ESB)

In addition, ESB Networks CoP defines an exclusion zone around a live overhead electricity line which must never be breached in order to avoid electrical arcing or flashover. The dimensions of this exclusion zone for operating plant and machinery are determined by the voltage of the overhead electricity line; for 400kV, the exclusion zone must be eight meters (Figure 2-2).



Figure 2-2 ESB Networks overhead electricity lines exclusion zone (ESB)

A road transport operator must notify ESB Networks of their intention to move a high load under or close to ESB Networks overhead electricity lines or equipment, providing accurate information on the high load. A road transport operator shall also comply with all precautions and control measures advised by ESB Networks and with all directions given by any ESB Networks staff that escort the high load.

3. Logistics Strategy

This section considers the key decisions that will influence the logistics and handling methodology, including; port selection, movement sequence and transportation method. Each option within this section has significant advantages and disadvantages and will require the client and contractor to identify key implementation drivers to support the decision-making process. As the project develops, a preferential option will be developed.

Two key logistical hubs, Dublin and Belview port, are identified for the purposes of delivery of the cable drums and 400kV transformer to Ireland. Following Policy updates from Dublin port, it is unlikely that the port will accept project cargo. Therefore, Belview port is the single option considered for this abnormal load assessment. There are alternative ports available however the distances are significantly greater and will likely increase the overall project duration and cost. Section 3.1 explains further the port options and the expected transportation routes.

Following delivery of the cable drums to the chosen port, there are two cable drum handling methods; direct delivery from the port to work site or delivery to interim storage and a second movement to the works site. It is assumed that the 400kV transformer will be delivered directly from the port to Belcamp substation.

Figure 3-1 and Figure 3-2 provide a visualisation of the two options available, each blue dot indicates an abnormal load movement. Please note that the removal of the empty cable drum will remain as an abnormal load due to its height and width.



Figure 3-2 Logistics Options – Two-stage Delivery



The direct delivery option requires less abnormal load permits and associated escorts; however, this could present a supply and efficiency risk. The two-stage delivery option provides better material supply assurance, however both options present inherent risks and opportunities that would need to be agreed between the client and the contractors. Table 3.1 provides a high-level comparison of the two distinct handling options.

Delivery Option	Minimum Abnormal Load Movements	Advantages	Disadvantages
Direct delivery i.e. Port to Joint Bay	Port – Site – Port (2no.)	Reduced number of abnormal load movements Reduced transportation risk – singular movement to site Reduced reliance on escort vehicles	Transportation and cable installation solution to be integrated Increased number of specialist transportation vehicles Increased port storage
Two-stage delivery	Port – Compound – Site – Compound –	Greater site flexibility, ability to create capacity in compounds to mitigate external factors (i.e. port loading)	Increased number of vehicle movements and associated risk of damage
i.e. Port to Compound, Compound to Joint Bay	Port (4no.)	Local specialist vehicles movements, long distance movements with traditional low loaders	Increased requirement for lifting and handling equipment (i.e. cranes)

Table 3	3.1	Loaistics	Option	Comparison
Tuble .		Logistics	option	companison

3.1 Port Options

3.1.1 Option 1 – Belview Port

Belview Port is part of the Port of Waterford, approximately 170km South of the project area. All abnormal loads travelling from Belview Port to the project area would require oversize load permits from Kilkenny, Carlow, Kildare, Dublin and Meath (Figure 3-3). If the M50 is utilised for transportation along the route, South Dublin and Fingal would be required to issue permits. As advised by the abnormal load specialist, all overbridges along the route have clearance for loads up to 5.0m.

Following consultation with the abnormal load specialist, it was advised that although Belview Port is in greater distance from the project area than Dublin Port, there are considerable benefits. The key benefits as follows;

- Minimal time restriction on vehicle movements

All vehicles will be permitted to use the port location on a 24-hour basis. It would not be recommended to move vehicles during daytime due to the disruption to local traffic. The 24-hour basis of the port does permit vehicles to attend the Port earlier than 2200hrs and load the cable drums within the port maximising the period of movement.

- No requirement for Garda escort vehicles

Due to the location of Port, there is a negligible requirement for Garda escort, therefore removing interface and resource demands, providing greater assurance to the delivery programme.



Figure 3-3 Logistics Option 1 - Belview Port



3.1.2 Option 2 – Dublin Port

Dublin Port is the closest to the project area, with a distance of 35km to Woodland Station and 10km to Belcamp Substation. Road access is supported via the M50 with access points to various key points along the route utilising the M1, N2, N3 and M3. All vehicle movements out of the port are between 2200hrs and 0500hrs. As identified in Section 2.4, the Dublin Tunnel is subject to a maximum height of which the cable drum surpasses this limit. Therefore, a suitable overground diversion will be required to avoid the Dublin Tunnel (Figure 3-4). All loads will typically be under Garda escort, increasing external interface and the associated cost impact.



Figure 3-4 Logistics Option 2 - Dublin Port, Potential Overground Route

All vehicle movements out of Dublin port will require oversize load permits from Dublin City, Fingal and Meath. There is no impact to overbridges along this route, on the assumption the cable drum diameter does not increase.

As identified in Section 3, following Policy updates from Dublin port, it is unlikely that this port will accept project cargo. Therefore, Belview port is the single option considered for this abnormal load assessment.

3.2 Delivery Strategy

3.2.1 Option 1 – Direct Delivery of Cable Drums

3.2.1.1 Option 1.1 - Low loader with mobile crane

This option utilises a truck with a low loader trailer to be loaded at the port. The vehicle will then travel to the specific joint bay under the support of escort vehicles. Once at the joint bay the low loader will be off-loaded using a mobile crane, rigged in the closed section of road. During offloading, the low loader will be parked in the passing bay, utilising a statics type C road closure (i.e. less than 15mins). The crane will lift the cable drum onto an un-winding rig to secure the cable drum. Once in position, the low loader will then leave the working area and the road re-open under the temporary traffic management conditions. The site setup is shown in Figure 3-5.

Offloading the cable drum onto an unwinding machine (see Appendix B for further details) would be recommended as opposed to simple jack system. The route is not flat and there are sections on inclines. The use of the unwinding machine will prevent the drum from coming free and posing a risk to site operatives and the public. Great control can be applied to the unwinding through using a turn assist and braking system to ensure the integrity of the cable.

The option utilises readily available equipment and machinery without the requirement for custom fabrication or procurement of assets. The mobile crane will require an abnormal load permit to travel to the worksite and will be supported by approximately 3no. articulated lorries with the ballast on board.

Figure 3-5 shows the required exclusions to ensure the safety of the machinery and those working on site. This creates considerable constraint as a significant number of roads are lined with overhead LV infrastructure. In addition, ground pressure from mobile crane should be considered in order to avoid potential damage to existing underground utilities.



Figure 3-5 Site Layout - Low loader with mobile crane

To provide a safe working area for the installation team, a passing bay of 140m in length would be required. This accounts for a lateral safety zone, longitudinal safety zone and a cone taper zone. It is assumed that the space proofing to the left of the bay is the same as that to the right of the passing bay.

Although this option negates the requirement for specialist equipment, it requires considerable site setup and careful assessment to ensure the stability of the crane. This does minimise the quantity of abnormal loads and associated escort vehicles for moving the cable drums. Of the four options, this would be one of the least favourable due to the risk and required quantity of space.

3.2.1.2 Option 1.2 - Bespoke turntable trailer

As with the other direct delivery options the process will commence at the port with the drum being loaded to the trailer to be transported to the required joint bay under the support of escort vehicles.

As described by the title this solution utilises a purpose-built turn table fitted to the trailer which is used to mount the cable drum and allow it to be rotated through 90 degrees (See Figure 3-7). When loaded for

transport the drum can be loaded with its longest dimension parallel to the carriageway providing the benefit of a reduction to the overall width of the load during transport.

When the delivery vehicle arrives at the specific joint bay location it will park on the existing carriageway then utilising the turn table the drum will be rotated through 90 degrees which will then enable the drum to be unwound directly off the back of the trailer into the joint bay. During this operation it is possible to maintain one way traffic via the passing bay which will be controlled with appropriate traffic management. The delivery vehicle will remain on site until the drum has been emptied then will leave the site transporting the empty drum to be off loaded at the designated area, see Figure 3-6 for the indicative site layout. Note the traffic management for the working area is the same as Option 1.1.

This option does utilise specialist equipment however offers several benefits. If the equipment is purchased, it may be required on future project of a similar nature; the benefit of such investment of an asset may be recoverable transfer. Another benefit of this option is that as previously stated it allows the width of the load to be reduced which will improve navigating the route especially on the narrower sections of highway. This option further negates the need for any lifting equipment at the joint bay locations due to unwinding off the back of the trailer. This not only reduces craneage costs, working platforms and the risk profile of the task but also allows for traffic flows to be maintained throughout the works. Whilst this option will still require abnormal load permits for the delivery vehicle this will have considerably less vehicle movements than the option with the crane.

The disadvantage of this option is that only one cable drum can be transported per vehicle at a time and the next cable drum cannot be collected from the port until the empty drum has been offloaded in the designated area.



Figure 3-6 Site Layout - Bespoke turntable trailer



Figure 3-7 Plan view of specialist trailer

3.2.1.3 Option 1.3 - Side-loader trailer

This option starts by having the side loader trailer loaded with a cable drum at the port. This option has a lot of similarity to Option 1.1, however utilises purpose-built equipment and rather than requiring separate cranage this option utilises a self-offloading trailer i.e. a trailer mounted crane a system often used for self-offloading shipping container trucks, as shown in Figure 3-8.

This option requires the drum to be transported with the drum's largest dimension perpendicular to the carriageway making the overall transport width wider than Option 1.2. Once at the specific joint bay location the vehicle will be required to park in the passing bay utilising a statics type C road closure (i.e. less than 15mins). The trailer will then self-offload using the trailer mounted crane and will lift the cable drum onto an un-winding rig to secure the cable drum. Once in position, the low loader will then leave the working area and the road re-open under the temporary traffic management conditions. The site setup for delivery and installation is shown in Figure 3-9 and Figure 3-10. The traffic management arrangement for the work area for installation is the same as Option 1.1 and 1.2 however, can be reduced in size slightly. Once the cable drum has been emptied the delivery vehicle will return to site to reload the empty drum and transport to the designated area, again because the trailer is self-offloading this will not require any further craneage at the designated area.







Figure 3-9 Site Layout - Side-loader trailer (Delivery)





The benefits of this option include, similarly to Option 1.2, the specialist equipment purchased could be used on future project of a similar nature, it eliminates use of separate craneage so reduces the requirement for working platforms subject to the load requirements of the side loader trailer. It also has a reduced number of vehicle movements to Option 1.1 relating to the crane set up.

Disadvantages are that during the offloading process the road will have to be closed, due to the vehicle and trailer leaving site it will need a location it can park up in close proximity to each joint bay, ready for collection of the empty drum.

3.2.2 Option 2 – Two Stage Delivery of Cable Drums

3.2.2.1 Option 2.1 - Low loader with secondary trailer

The two-stage delivery approach required a series of storage compounds to be set up at strategic locations along the route which would need establishing first, allowing the drums to be transported from the port and distributed to the storage compounds. This would most likely be done using a method similar to Option 1.1 utilising low loaders and mobile or crawler cranes.

This option utilises an adjustable cable drum trailer towed by an articulated tractor unit from the storage locations. This would require the cable drum to be loaded onto the trailer at the storage areas using a mobile or a crawler crane and then be transported to the specific joint bays. Once at the works location the vehicle would park in the carriageway and the cable would be unwound from the trailer into the joint bay. The site setup for delivery and installation is shown in Figure 3-11. Similar traffic management as per the previous options would be required due to the vehicle remaining on site for the installation. The length of the TM would be longer than the options where the vehicle is taken off site after offloading. This option does not require a road closure and can maintain one way traffic under the appropriate traffic management. Once the cable drum is empty it would be removed from the joint bay back to the designated area using the trailer.



Figure 3-11 Site Layout - Low Loader with secondary trailer

Benefits of this is that on site it requires no lifting at each joint bay so experiences the same benefits as Option 1.2.

Disadvantages include the transport width is wider than the options that allow for the drum to be rotated. Also, the cost of setting up the storage compounds, double handling of the drums and additional craneage required at each location needs to be considered. Due to the nature of the cable trailer, it can only travel up to 10km/hr so could impact on the time take to deliver the drum to the joint bays.

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3.3 Compound Strategy

To support the abnormal load assessment, a key component is the compound strategy. Both Dublin and Belview Port have secure compound storage, albeit at a premium. If an interim compound solution is required, i.e. a two stage deliver process, the positioning of the compounds will be key for success. As part of the excavation and duct installation assessment, it would be recommended there would be between five and six compounds. Considering proportionate spacing along the cable route, it would be recommended that each compound would support approximately 7km of route.

Assuming each compound supports 7km of route, a total of 30no. cable drums would require storage. This would require approximately 500m2 of storage space, further space would be required for delivery vehicles (with adequate swept path clearance), offloading machinery (i.e. crawler cranes), welfare, plant storage, offices and car parking. Approximately 10,000m2 would be required at each compound to support both the cable installation and earthworks aspects of the project.

At this stage of the project, a total of 5no. construction compounds have been identified along the route (Figure 3-12), for which the landowner support has been confirmed. The size of these compounds is sufficient to store the cable drums as well as satisfy the rest of the space requirements mentioned above.



Figure 3-12 Locations of the Construction Compounds

3.4 Summary – Cable Drum Logistics

In summary, there are several options available to the client and contractor, this includes choice of port, delivery option and vehicle type for the delivery of cable drums. The vehicle selection affects the installation methodology of the cable and the abnormal load requirements. An integrated vehicle approach will avoid multiple vehicle movements and will reduce the quantum of handling, in turn reducing the risk to the integrity of the cable. Table 3.2 provides a comparison of the various options, an approximate cost, and a high-level rating. All costs are subject to change and contractual agreement between supply and purchasing parties.

In consultation with the abnormal load specialist, there is currently no requirement for significant enabling works along the transport routes identified on the provision that the assumed vehicle transport does not significantly differ. Expected enabling works for all options would include adjustment of overhead cable and localised tree/vegetation pruning.



Delivery Option	Methodology	Approximate Construction Zone Length/width	Approximate Passing Bay Length/Area	Approximate Cost	Minimum Abnormal Load Movements	Preference Rating
	Low loader with crane offload at joint bay	70m/7.5m	140m/770m ²	Low loader trailer €180,000 plus truck Site and port/compound mobile crane required	Port – Site – Port 2no.	Low
Option 1 Direct delivery i.e. Port to Cable Joint Bay	Side-loader trailer	35m/6m	115m/380m ²	Side Loader trailer €310,000 plus truck Unwinder - €170,000	Port – Site – Port 2no.	Moderate- high
	Bespoke turntable trailer	45m/6m	100m/450m ²	Bespoke turntable trailer €450,000 plus truck Mobile crane in compound/port required	Port – Site – Port 2no.	High
Option 2 Two-stage delivery i.e. Port to Compound, Compound to Joint Bay	Low loader to Compound, Secondary towed cable drum trailer	55m/7m	125m/600m ²	Low loader trailer €180,000 plus truck Secondary trailer €180,000 plus truck	Port – Compound – Site – Compound – Port 4no.	Low- Moderate

Table 3.2 Logistics Option Comparison

3.5 400kV Transformer Delivery Strategy

The 400kV transformer is likely to be delivered directly from the port to Belcamp Substation. The transformer would be lifted via a crane onto the specialist multi-axle vehicle trailer at the port and the vehicle would transport the transformer to the station where it would be lifted from the trailer into position in the proposed substation works.

The vehicle to be used is a multi-axle trailer and tractor unit, adopting a conventional approach for abnormal deliveries of this nature. The trailer is comprised of several modular platform vehicles, which are typically available in 2, 3, 4 and 6-axle versions. The vehicle is illustrated in Figure 3-13 below.



Figure 3-13 400kV transformer specialist delivery vehicle

Considering the overall length of the tractor and trailer unit, which is approximately 40 metres in length, this load is not expected to be covered under the remit of the permitting process administered by Garda Síochána and independent authorisation from the relevant local authorities and/or Minister for Transport is likely to be required.

The delivery route for the 400kV transformer is highly uncertain at this stage given the port will be largely dependent on shipping logistics at the time of transformer manufacture. Therefore, for assessment purposes, it is assumed that Belview Port will be used, and a similar route to cable drum delivery will be adopted. This



route will follow the motorway network from the port to Belcamp Substation and the final section of the route from the M1 motorway to Belcamp Substation following the R139. This section of the route offers a suitable road alignment and standard for the delivery of the transformer. Localised temporary traffic management may be required to facilitate the turn into the substation access road, and it is also recommended that ESB and/or the appointed contractor assesses the load capacity of the bridge on the access road to ensure that the live loads associated with the transformer delivery are within the permissible limits, as defined by the asset owner.

4. Temporary Traffic Management

4.1 Overview

The subsequent sections provide the basis for the management of traffic expected during construction of the CP1021 project, on the basis of the designs shown in the planning documents. The Traffic Management Plan shall be developed by the appointed Contractor during detailed design into a more detailed Construction Stage Traffic Management Plan based on their specific design proposals. The role of Project Supervisor Design Process (PSDP) may be taken over by the Contractor and as such a Traffic Management Plan for their proposed design must be prepared in consultation with Transport Infrastructure Ireland (TII) and the relevant County Councils. The Temporary Traffic Management Designer shall prepare Detailed Temporary Traffic Management Designs for all locations where works are planned on, or impact on, any public road.

Prior to commencing the works, the plan must be developed into an Operational Traffic Management Plan by the Project Supervisor Construction Stage (PSCS). The appointed PSCS/Contractor of the project is required to carry out the Safety Audit on Operational Traffic Management Plans prior to commencing the works. The PSCS shall co-ordinate the implementation of the developed Traffic Management Plan during construction of the works.

The developed Traffic Management Plan requirements will include the provision of facilities for the safe passage of pedestrian and vehicular traffic and measures to keep the impact of the works on the roads, and local communities and road users, to a minimum. All traffic management controls proposed by the Contractor must be in accordance with the documents referenced herein.

4.2 Guidance documentation

The Contractor shall comply with the requirements of:

- Traffic Signs Manual Chapter 8 Temporary Traffic Measures and Signs for Roadworks, Department of Transport, Tourism and Sport, 2019
- Guidance for the Control and Management of Traffic at Road Works, Department of Transport, Health and Safety Authority, National Roads Authority and Local Government Management Services Board, second edition 2010
- Guidelines for Managing Openings in Public Roads (Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads), Department of Transport, Tourism and Sport, second edition April 2017
- Guidelines for Working on Roads, Health and Safety Authority, 2009

These Guideline documents shall be read in conjunction with primary Safety, Health and Welfare at Work legislation, including the Act 2005, the Construction Regulations 2013, and any amendment to them.

4.3 Cable Drum Movement Traffic Management

Following consultation with the abnormal load specialist, during the movement of the cable drums from the Ports to the compounds or cable joint bays, it is likely that escort vehicles will be required. The escort vehicles will support the oversized load vehicle by ensuring a suitable safe zone by adjusting the position, speed, or direction of traffic by other road users. The escort vehicles act primarily in the safety function, to ensure the safety of all road users but also to support the oversized load vehicle with overcoming particular obstructions.



At this stage it is not foreseen that specific road closures will be required, but rather the loads will be supported by escort vehicles. The requirement and number of escort vehicles and Garda support is at the discretion of the Permits Officer for each Council or consenting authority along the route. Without engagement at this stage, the quantity of escort vehicles cannot be confirmed, however, it is expected to be between 2-4 vehicles per load. On agreement of the final cable drum and specific oversized load vehicle, the consenting authorities can be engaged and the exact requirements for the oversized load permit can be jointly agreed.



5. Risks and Opportunities

This section provides an assessment of the potential risks and opportunities associated with the movement of the cable drum. Each identified risk and opportunity consider the overall logistics strategy. This is separate to the hazard risk register which is captured in a separate document. Table 5.1 provides the identified deliverability risks, Table 5.2 identifies the deliverability opportunities. As the detailed design progresses, this will need to be reviewed and updated.

East Meath-North Dublin Grid Upgrade – Abnormal Load Assessment

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	Table 5.1 Deliverability Kisks					
#	Risk	Description	Potential mitigations			
1	Design and construction programme – interface between cable manufacturer, logistics and civils contractor	The design, construction and cable manufacture/installation programmes are highly interdependent. Cable installer and civils may not be same contracting organisation, creating interfaces that could be difficult to project manage	A baseline programme to understand these interfaces (including EirGrid governance/design/long lead in items) could be developed and QSRA applied to understand risks. Procurement strategy should reflect risks			
2	Third party approvals of abnormal load permits	Extensive approval process for abnormal load permits complicated by potential high numbers of movements	Early engagement with issuing authority (Garda and Local Authorities). 'Season ticket' strategy if possible to reduce admin. Digital solutions by cable installer/contractor			
3	Physical obstructions (overheads, low structures)	Low overhead structures preventing movement of cable drum, requiring excessive diversions	Overhead infrastructure survey including vertical clearances.			
4	Poor ground conditions not able to support crane/ weak structures limiting maximum axle loading	Insufficient capacity in existing structures to support vehicles. Inadequate ground to support crane/winching operations	Survey to identify structures along transportation route. Identify structures at risk and assess load capacity. Review of GI survey data with geotechnical temporary works engineer			
5	Insufficient working space/turning clearances	Insufficient space to manoeuvre all construction vehicles to facilitate the movement and installation of the cables.	Swept path analysis with selection of haulage and logistics vehicles to identify constraints. Diversions and alternatives likely to be required.			
6	Extensive cable logistics enabling works in cost/schedule or planning	Enabling works may be required to facilitate the offload of the cable drums. This could include; crane platforms, road widenings, utility diversions etc.	Development of cable bay strategy to support logistics assessments			

Table 5.1 Deliverability Risks

East Meath-North Dublin Grid Upgrade – Abnormal Load Assessment

Jacobs

	Table 5.2 Deliverability Opportunities				
#	Opportunity	Description			
1	Investment in specialist equipment to integrate lifting and installation	Use of specialist equipment with up-front investment will reduce site operations and increase efficiency when installing the cables. This could be with the side loader or the turntable option. These vehicles have the ability to be used on subsequent projects.			
2	Early submission of trial abnormal load permits	The abnormal load specialist is able to submit oversized load permits to the relevant authorities at an early design stage to understand the likelihood of permission being granted. There would be no requirement to transport the load, but rather provide assurance that the proposed solution is transportable.			
3	Early engagement with Port authorities	Early engagement with the port authorities will support the logistics assessment and provide reassurance to cost and programme. This will further support the business case for the quantity of specialist transportation vehicles and compound strategy. If the port authorities provide strict operating time frames, this will provide less flexibility to the contractor and increase risk to the programme.			
4	Early engagement with consenting authorities	Early engagement with the consenting authorities will support the permitting of the abnormal load and provide assurance to the programme. The engagement will highlight areas of concern and provide the client/contractor the ability to address these.			
5	Primary initial route overhead cable survey	It has been identified the risk of low cables along the route. An early assessment of the low cables will provide key information and allow scoping and planning as to the extent of alterations required.			

6. Conclusion

In order to facilitate the 400kV transformer delivery and the transportation and installation of cable drums on the CP1021 project, specialist engagement has been undertaken with the abnormal load supplier and suitable vehicles for transportation solutions have been identified. It must be noted that an element of enabling works will be required, this is expected to be vegetation trimming (within the permissible environmental timeframes) and raising any low overhead cables. There is no requirement to undertake significant diversions during the transportation of the cable drums.

Following the logistics assessment of the cable transportation, it is concluded that the two-stage delivery, i.e. Port to Compound, Compound to Joint Bay, is the assumed delivery option for determining traffic movements and informing the environmental assessment at this stage of the project.

It is expected that the 400kV transformer will be delivered directly from the port to Belcamp substation, using a specialist multi-axle trailer. It is assumed that Belview Port will be used, following a similar route for cable drum delivery. The route to Belcamp substation largely follows the motorway network and is not anticipated to pose any significant challenges for an abnormal load delivery of this nature.

It is recommended that the Client and Contractor commence early engagement with the relevant consenting authorities to ensure that permits are able to be issued during the implementation phase. It is evident that investment in specialist vehicles is required to support the installation of the cables at the joint bay site. The market engagement requires further development with regards to proposed installation equipment suitable for the corridor nature of the work. It is evident that specialist logistics trailers will need to be procured for this project and other projects planned by ESB/EirGrid.

7. References

- Department of Transport, Tourism and Sport. (2010). *Guidance for the Control and Management of Traffic at Roadworks*. Department of Transport.
- Department of Transport, Tourism and Sport. (2017). *Guidelines for Managing Openings in Public Roads.* Department of Transport.
- Department of Transport, Tourism and Sport. (2019). *Chapter 8 Temporary Measure and Signs for Road Works*. Department of Transport.

ESB Networks. (2019). ESB Networks Code of Practice for Avoiding Danger from Overhead Electricity Lines. Health and Safety Authority. (2009). Guidelines for working on roads.

- Irish Statute Book. (2003). S.I. No. 5/2003 Road Traffic (Construction and Use of Vehicles) Regulations 2003.
- Irish Statute Book. (2008). S.I. No. 366/2008 Road Traffic (Construction and Use of Vehicles) (Amendment) Regulations 2008.

Irish Statute Book. (2009). S.I. No. 147/2009 - Road Traffic (Specialised Vehicle Permits) Regulations 2009.

Irish Statute Book. (2010). S.I. No. 461/2010 - Road Traffic (Specialised Vehicle Permits) (Amendment) Regulations 2010.



Appendix A. Aylward Abnormal Load Report



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Jacobs

Client: Jacobs

Project: Belcamp to Woodlands cable route

Date: 03-08-2023

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Rev	Status	Prepared By	Reviewed By	Approved By	Issue Date
00	Issue for Review	Marc Aylward			03/08/2023
01					
02					

Contents:

- 1. Purpose of Report
- 2. Site Address
- 3. Key Personnel Client & Aylward Heavy Haulage
- 4. Cargo Details
- 5. Vehicle Specification
- 6. Special Observations for Abnormal Load Movements
- 7. Special Observations for Escort Vehicles
- 8. Route Details
- 9. General & Specific Route Observations
- 10. Site Access & Restrictions
- 11. Site Photographs
- 12. Drawings
- 13. Schedule of Deliveries
- 14. Conclusions & Actions Required

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1. Purpose of Report

This report is being compiled to plan out a safe passage for the transport of abnormal loads between the Port of Waterford and the storage locations located between Belcamp substation and Woodlands substation.

It also outlines the basic schedule of offloading and installation of the modules.

The report will outline the route used, special observations, key personnel and equipment so as everyone involved understands their role and procedures in place.

2. Site Address

Loading: Port of Waterford, Bellview, Co. Kilkenny **Offloading:** North Dublin area – to be identified

3. Key Personnel – Client & Aylward Heavy Haulage

Marc Aylward – AHH +353 87 7600777 Elliott Neale – Jacobs + 447960436577



4. Cargo Details / Loading procedure

To be identified

Specific lashing points to be identified and adequate lashing equipment to be used. No lashing equipment to come into contact with finished product, rubber or soft packing to be positioned between lashings and module if required.

- Aylward personnel will assist in the placing of items on the trailers and will advise loading chief when centred.
- Rubber mating to be placed under all steel items or timber cribbing if deemed necessary.
- Lashing will be by chain and ratchet for large items and cargo straps for smaller items.
- Loader to provide access to lashing points, mewp or ladder.
- No cargo to be transported before being lashed to the trailers.
- Always wear PPE on site, i.e. Safety Boots, High Visibility Top & Hard Hat at a minimum.
- Always adhere to the speed limit.
- Proceed around site on specified routes identified by road markings & signs.

5. Vehicle Specification

Tractor units: 6 x 4 units > 120t 8 x 4 units > 250t

Trailers: 3/4 axle wafer low loaders 3/4 axle cable drum trailers

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6. Special Observations for Abnormal Load Movements

Specific county council route details to be confirmed once permits are in place.

Normal travel hours

Kilkenny CC: No travel restrictions Carlow CC: No travel restrictions Kildare CC: No travel restrictions South Dublin CC: 23:00 – 06:00 Fingal CC: 23:00 – 06:00

Although some councils do not enforce travel time restrictions, we will normally not drive during school drop off / collection times to avoid any unnecessary delays.

7. Special Observations for Escort vehicles

Warning vehicle(s)/Escort(s) if required should comply with European Best Practice Guidelines for Abnormal Road Transports (Chapter 7 / Annex 7).

2 x Private escort vehicles per convoy of 2. Two-way radio communication between all vehicles. Handheld two-way radio to accompany driver when outside of vehicle.

2x vehicles to be in front on single carriageways 1x vehicle in front and 1 x at rear on dual carriageway / motorway.

Cargo measuring 3.5m + to be accompanied by Police escort on National and regional roads in Fingal CC area.

Cargo measuring 4.3m + to be accompanied by Garda escort on Motorway network in Fingal CC area and South Dublin CC area.

This would be normal practice but will be clarified on receipt of permits.

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8. Route Details



Bellview Port - N29 - N25 - N9 - M9 - M7 - N7 - M50 - R139 - Belcamp 220kv

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Bellview Port – N29 – N25 – N9 – M9 – M7 – N7 – M50 – N3 – M3 – R147 – R154 – L6207 – Belcamp 220kv

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<u>Local access routes</u> JB 1 to JB17 – Access via M3 – R157 – R156 JB18 to JB25 – Access via M3 – R157 – L5026 – L1010			
JB26 to JB35 – Access via N2 – R121			
JB35 to JB44 – Access via M1 – R132 – L2020 – R108 – R122			
JB44 to JB46 – Access via M1 – R132 – Stockhole Lane			
JB47 to JB49 – Access via M50 – R139 – Belcamp 220kv			
https://earth.google.com/web/@53.46747412,- 6.53012717,91.79657773a,11711.30497401d,34.99988302y,0h,0t,0r			

9. General & Specific Route Observations

	Location	Observation	Comment
<u>1.</u>	<u>JB18</u>	Traffic Island	Remove sign / Kerb timbers placed
<u>2.</u>	JB18 to JB25	Heavy foliage	Tree / Hedge trimming required
<u>3.</u>	Roundabout on R121	Traffic Island	Remove signage / Wrongside
<u>4.</u>	JB30 to JB35	Heavy foliage	Tree / Hedge trimming required
<u>5.</u>			
<u>6.</u>			
<u>7.</u>			
8.			

10. Site Access & Restrictions

Access through site to be identified on site visits.

11. Site Photographs

To be identified

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12. Drawings



VEHICLE SPECIFICATIONS

Aylward Heavy Company Haulage 22,327 mm Length Incl. Load Total Mass 63,200 kg

TRACTOR

General 202 LS 620 ld Name Aylward Dimensions Front Overhang 1,597 mm FTKP 5,197 mm Front Axles Amount 1 1 6,421 kg 10,000 kg 6,900 kg 1,500 kg 8,400 kg 8,396 kg Empty Capacity Empty Combination Load Mass Actual Load

Load Axle 1

Rear Axles	
Amount	2
Empty	5,739 kg
Capacity	26,000 kg
Empty Combination	9,266 kg
Load Mass	11,134 kg
Actual Load	20,400 kg
Load Axle 2	10,199 kg
Load Axle 3	10,199 kg

TRAILER

General Id Name	EURO-96-04(P) AHH25
Axles Amount Capacity Empty (retracted) Empty (extended) Empty Combination Load Mass Actual Load Per axle	4 56,000 kg 12,000 kg 11,500 kg 12,034 kg 22,366 kg 34,400 kg 8,600 kg
Kingpin weight Capacity Empty Empty Combination Load Mass Actual Load	50,000 kg 4,000 kg 3,966 kg 12,634 kg 16,600 kg
Dimensions Front Overhang Neck KPTR-min KPTR-max Extended	800 mm 3,860 mm 17,130 mm 24,880 mm 0 mm

LOAD 1 ld

Id	Cable drum - 35t
Name	Cable drum - 35t
Mass	35,000 kg
Length	4,200 mm
Height	4,200 mm
Centre of gravity	2,100 mm
Load Position	3,261 mm

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13. Schedule of Deliveries

твс

14. Conclusions & Actions Required

In general, the route is straightforward without any major street furniture removal requirements.

Once storage locations have been identified, we can take a closer look at the routes from there.

One major obstacle will be dealing with abnormal load movements within Fingal CC area, where they insist on Garda (Police) escorts with most oversize loads. These will come at a huge additional cost to the project. Perhaps as the job progresses we could arrange a sit down with the local council and discuss potential options around escorts and travel times.
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END OF REPORT

Prepared by: Marc Aylward

Signed by: Marc Aylward

Position: Transport planner

Date: 03/08/2023



Appendix B. Supplier Datasheet



Broshuis Low Loader



Trailer specifications

Dimensions and weights



Weights in kg	Nethe	rlands	Germany		England	
	C & U	Special types	C & U	Special types	C & U	Special types
Maximum fifth wheel load	35000	35000	35000	35000	35000	35000
Maximum bogie load	27000	30000	24000	30000	24000	37500
Gross load capacity	62000	65000	59000	65000	59000	72500
Tare weight, app.	21500	21500	21500	21500	21500	21500
Net load capacity, app.	40500	43500	37500	43500	37500	51000

Your benefits



Premium quality



Optional complete metalized



Low tare weight



Transport of 30 ft and 40 ft containers

Neck

- Single beam hydraulic pivoting and detachable neck. Maximum fitfth wheel load is 35 T.
- Fifth wheel height 1320 mm
- Neck width 2530 mm

BROSHUIS

- Rear swing cleareance 2500 mm
- Hard wood floor of 28 mm thick
- 3,5" Kingpin, fitted under a ball bearing turntable. The turntable is connected to two double action hydraulic steering rams. Holder is suitable for mounting a 2" kingpin
- A air stinger is provided with 2 separate operable cilinders to support the neck whilst removing the gooseneck.
- 10T certified lashing rings (max. Load 5T) . According NEN12640
 - TÜV Certificate
- 32 mm holes in the side rave, to use as lashing point
- Divided at the side raves of the neck, dim. 96x66x6mm, suitable for stakes of 81x51mm
- Spare wheel carrier at front of the gooseneck. Suitable for one spare wheel.
- Alu cover plate placed in the floor between the beams of the neck

Floor

- 1x extendible
- Bed height 390 mm (loaded). Beam height 300 mm
- With main beams of high tensile steel
- Split at front side of the bed
- Width of loading area 2750 mm
- No floor fitted between the beams to increase loading area. The under flange is prepared for a detachble floor
- Preparation for swing-out outriggers in the outer spine
- All air and service lines are located in an energy chain within the central main beam. Resulting in improved ground clearance and reduced maintenance
- Retaining nuts M24 fitted to the inner beam suitable for 8 T lashing rings.
- 13.4T certified lashing rings divided in the side rave of the loading floor, placed every approx. 1.2 meter, according EN12650 with TÜV Certificate

Axle bogie

- Gigant 12T axles
- Axle quantity: 3
- The axles are fitted with hydraulic suspension, the hydraulic cilinders are fitted in front of the axle for maximum protection. Left and right side can be adjusted separetly.

• Broshuis hydraulic steering system, consists of two fully independent circuits.

- Butterfly section, with adjustable conical bearing, resulting in extremely low maintenance,

- Adjustable steering rods, to correct axle alignment tracking to compensate for wear during the life of the trailer.

- Air, electrical and hydraulic service lines are housed inside the central spine(s) in an energy chain

- All axles are hydraulic steered
- Distance between axles is 1360 mm
- 10T certified lashing rings. According to EN12640, TÜV Certificate
- 32 mm holes in the side rave, to use as lashing point
- Width of loading area 2750 mm
- A raise and lower valve is fitted to the hydraulic suspension for ease of loading or unloading. The left and right floor height can be operated seperatly. 2 LED indicators are installed to set the correct floor height. Operation from the neck.
- Manual override steering with 3kW electrical pump
- Electrical hydraulic override steering system, to allow the axles to steer independently of the tractor unit, by means of buttons. Butterfly section, with adjustable conical bearing, extremely low maintenance adjustable steering rods, to correct axle alignment tracking to compensate for wear during the life of the trailer. Air, electrical and hydraulic service lines are housed inside the central spine(s) in an energy chain
- Two air line Wabco brake system, EC-approved design with an automatic load sensing device. Spring type chambers fitted to two axles for the hand brake. Incl. EBS
- An hydraulic pressure gauge is connected to the suspension for determing the axle loads
- Tyre brand to choice of Broshuis (Continental, Goodyear or comparable). 285/70 R19.5
- A troughs in the centre of the lower deck for an excavator arm, width 724 mm

Lights

- · Lights are complete in LED
- 2 pairs of 3-chambers rear lights and Led sidemarker-lights. Conform EU-specifications
- One fog light
- One rear flashing beacon connection at the rear side
- On each side at the neck and axle bogie a connector fitted with holder for extendible marker board lights
- Connector for over width marker board lights: 3 pin plug

Accessories

- Spare wheel 1x
- EBS connector
- Connectors at the front: Dual 7 pin SAE plugs
- Air couplings palm type



- A 35mm2 cable between truck and trailer for the use of any electrical power supply
- 24V power connector NATO
- Mudguard under the light bar
- The chassis is equipped with white reflective tape on sides and red reflective tape on the back

Paintwork

- Finished in one colour. (non-metallic)
- After chassis assembly, the support brackets for valves, air tanks and pipe and wiring runs are fitted. The completed chassis is then shot blasted and immediately painted according to the Broshuis 2K paint system. The final fitting of all the components is carried out after the chassis has been through the preservation process
- Supplied Axles are painted black, for better rust prevention



Hammar Side Loader



Datum Date 2022-09-02 Beteckning Our ref. Offer No. 225092

Er beteckning Your ref.

> Jacobs Att: Elliot Neale Cotton Centre, Cottons Lane London, SE1 2QG United Kingdom

Dear Elliot,

Please find this offer for our Hammar DrumLoader with accessories for your consideration.

Drumloader

- Item 1 HAMMAR 155 H-35 "Cable Drum solution"
- Item 2 Radio Remote Control
- **Item 3** Central lubrication

Operation

Item 4 Separate engine on the HAMMAR

Others

- Item 5 Handling of various drum sizes
- Item 6 Top Spreader
- Item 7 Spare wheel incl. winch
- **Item 8** 20' container handling
- **Item 9** Freight from Sweden to UK



Phone +46-(0)33 29 00 00 Fax +46-(0)33 29 00 01 Web www.hammar.eu E-mail info@hammar.eu





Item 1 HAMMAR 155 H-35

One HAMMAR 155 H with fix chassis and fix cranes for transport and handling of cable drums with maximum fixed diameter of 4,5m and maximum fixed width of 4,0m. Maximum weight of drums is 35t.

Size and weight of actual drums to be specified.

The HAMMAR has 3 axles and is suitable for a 3-axle tractor unit.

General about HAMMAR 155

The HAMMAR 155 model is based on our advanced high-performance model 151, with the difference that it incorporates our "MegaTransfer" [™] step over type stabiliser legs.

The stabiliser leg reaches over a normal width companion trailer or truck and rests on the ground on the other side. With its extreme outreach of 3,1m the HAMMAR becomes extremely stable in all type of handling.

This is a HAMMAR with great handling area and with a number of benefits such as being a master of transferring to and from other chassis

Advantages

- Stabiliser outreach 3,1 metres
- High lifting capacity
- o Great handling area
- Extremely flexible supportlegs

The HAMMAR 155 H-35

- Capacity of handling and transporting cable drums up to Ø 4,5m and up to 4,0m width to and from ground and other trailers.
- Has a total height of 4,7m with a turntable height of 1200mm (1265+25mm rising) and with a cable drum of Ø 4,0m loaded.
- Have hydraulically extendable sideway beams for the cable drum to rest on. Normal vehicle width is 2550mm, with widening possibilities to maximum 4,0m. The beams are lockable in its inner position and in an outer transport positon.

The beams on the lifting side are extendable 100mm extra and the drum stoppers are also foldable, all to make it safe and easy to load and unload. The distance between the beams lengthwise is 2,1m.

• Have a ground clearance, in the normal transport position, of approx. 100mm. Maximum ground clearance, with raised air suspension, is approx. 250mm





- Has two pair anchor lashings on the lover frame. LC 10 000 daN/pcs
- Is equipped with HAMMAR patent pending stabiliser legs reaching over trailers, truck frames or rail wagons and rests on the ground on the other side.
- Have two, fully hydraulic operated, extra support leg on the non-lifting side for extra stability.
- Have chain spreader to keep chains apart when handling the cable drums.
- Remote emergency shut down as standard
- is, on customer request, left or right-hand side lifting.
- is equipped with the HAMMAR Safety Lifting Hooks.

Weights	Technical
Max SWL (Safe Working Load)	35.0 tonnes
Max bogie pressure	36.0 tonnes
Max King Pin pressure	18.0 tonnes
Unladen weight of HAMMAR 155 H	12.7 tonnes

The HAMMAR 151 H is equipped with:

Axles:	BPW 3 x 12 tonnes, third axle self steering and to be locked from inside the cabin when reversing. Installations in the tractor are not included.			
Bogie:	BPW air suspension type SL 1310 + 1310 mm with raise and lowering function.			
Tyres:	6 pcs 425/65R22.5 with coarse pattern (10t load).			
Rims:	Steel.			
King Pin:	2" JOST.			
Brake system:	WABCO two circuit. EBS 4S/3M, with four sensors and three modulators. Power supply via ISO 7638. The EBS-system is featuring RSS - Roll Stability Support.			
Parking brake:	Automatic with spring brakes, manually operated			
Wheel brakes:	Disc brakes on all axles.			
Landing leg:	JOST, with two speed operation, especially developed for trailers with air suspension. The feet allow a movement of 125 mm lengthwise.			







Twistlocks:	4 pcs. HAMMAR/BLAIR
Directional valves	Fully hydraulic operating system. The inlet section in the valves incorporate an emergency stop - the HAMMAR will be emergency stopped independently of the tractor unit. The accuracy of the hydraulic system enables a fast, safe and exact operation of the HAMMAR.
Operating system:	Remote control by cable, joystick. Prepared for rpm- control of the truck engine. Installations in the tractor are not included.
Working lights:	One LED on each crane and 2 LED in the rear.
Support pads:	2 pair of composite support pads to be used under stabiliser foot to reduce ground pressure when needed.
Width marking:	Illuminated width markings front and rear, extendable out to 4,0m, designed to local legal requirements.
Flatbed cover:	I-beams and alloy checker plates on the low bed is fitted with a rubber mat to protect if cable is hanging down.
Camera system:	Rear camera is mounted and one camera is also mounted on the side for positioning the HAMMAR next to a cable drum. Operator will see when he is in right position to the cable drum from a display. Colour LCD display is supplied but mounting in your truck cab is not included.
UK Service:	HAMMAR has a well-trained and skilled Service Agent covering Great Britain. Service Agent has parts in stock and parts from Sweden HQ are supplied within 24 hours.

Weight: 13 000 kg

Price: SEK 3 322 000





Item 2 Radio Remote Control

Cordless radio remote, Scanreco, for all functions on the HAMMAR Sideloader. The portable transmitter is a one hand unit. The operator can overlook the operation from any position suitable. The transmitter has symbols that show each function. The control buttons have two modes -a light pressure gives "low speed", a harder provide "high speed" on the crane movements. It has a display where the shift position, battery voltage and legs-on-the-ground are being indicated.

Three rechargeable batteries (AA) and a 24V plug-in charger are included. The unit complies with all pertinent EU standards.

Our standard cable remote control, with joysticks, is also included in the delivery and can be plugged in within seconds, should the need arise. Weight: 6 kg



Price: SEK 34 100

Item 3 Central lubrication

Complete installation of an automatic centralised lubrication system with an air pressure driven piston pump mounted on the HAMMAR supplying all grease points on the cranes, as well as on the trailer. Gives exact dosage and distribution of the lube with adjustable intervals. The grease reservoir is made of stainless steel. The system is controlled from a user interface mounted on the trailer. The control unit has LEDlights and surveys the pump function, the grease level in the reservoir and also has pressure alarm and low level alarm on lubricant level etc. At power brake (e.g. disconnecting the trailer) the lubrication program will always continue from previous position through memory storage. Weight: 17 kg



Price: SEK 56 600





Item 4 Separate engine on the HAMMAR

One independent Power Pack for drive of the hydraulics on the HAMMAR. The engine is an environmentally sensitive Stage V engine complying with EU latest environmental requirements.

The engine is a four cylinder 2.5 litres common rail KOHLER turbo diesel, with a full **55.4 kW power** @ 2600 rpm and 300 Nm @ 1500 rpm.

The engine is directly driving a hydraulic pump. The Engine is protected from overheating or low oil pressure. The cranes will have the same speed regardless of the weight lifted.

The engine is protected against overheating and/or low oil pressure, and is equipped with pre heat injection, to facilitate cold starting. The engine works for surrounding temperature between -40 and 50+ $^{\circ}$ C.

The following is included:

4-cylinder water cooled KOHLER common rail turbo diesel engine, twin flow hydraulic piston pump, return oil filter, hydraulic oil tank 160 l, fuel tank 90 l.

The power pack is completely mounted and built in a rigid frame and with hatches for easy access and service. The hydraulics can be stopped from the portable manoeuvre box. The engine is ADR-equipped. Weight: 720 kg

Price: SEK 219 100







Item 5 Handling of various drum sizes

Capability for handling drums with a various diameter from 4,5m down to 3,5m by sliding the cranes.

This option requires the cranes to be fitted with a special sliding arrangement and an extra 200mm I-beam will be fitted on top if the existing chassis beam. Please note this affects the total height of the sideloader without load. Width of the drums can be 2,5m to 4,0m. Weight: 700kg

Price: SEK 177 200





Item 6 Top Spreader for various drum sizes

Top spreader for handling drums when container corner castings is not available on a drum or to be flexible in handling any drum by using the centre hollow beam same way as traditional crane lifting.

The spreader is hydraulically operated and can in folded position be placed on the trailer chassis between the cranes during transport. In operation the spreader is folded out over the drum and steel wire ropes are used to loop around the centre beam of the drum.

This new design of Top Spreader is capable of handling different sizes of drums by hydraulically fold/deploy over the drum depending on drum size.

Capacity:
Drum diameter= 3500mm to 4500mmDrum width= 2270mm to 4000mmSafe Working Load (SWL) = 35tWeight:1 300kg

Price: SEK 414 700

Lifting tool adjustable Max load (max weight drum)(all sizes) 35T Drum diameter 3.5-4.5m Drum width 2270-4000mm (outer flange measurement)





THIS DOCUMENT SHALL NOT BE SHOWN, COPIED OR DISTRIBUTED TO ANY PERSON OR COMPANY WITHOUT WRITTEN APPROVAL









Item 7 Spare wheel incl. winch

One complete spare wheel 425/65R22.5 with coarse pattern on steel rim with winch mounted on the trailer chassis behind rear crane. Weight: 181kg



Price: SEK 16 200

Item 8 20' container handling

Capability to handle and carry 20' ISO container and flats with the drumloader. Crane base and beam adjusted and fitted with twist locks, mounted on the side of the trailer. By sliding the cranes to 20' distance this option gives the possibility to load, unload and cart fully loaded 20' container for ie. Installation equipment used at sites.

Please note that this option requires that Item 5 is chosen. Weight: 100kg

Price: SEK 28 500



Item 9 Freight from Sweden to UK

The HAMMAR delivered from factory in Sweden to port of Immingham. Weight: 0kg

Price: SEK 45 000





Offer overview

	Item	Description	Price (SEK)	Weight
<u>Dr</u>	umloa	der		
	1	HAMMAR 155 H-35	3 322 000	13 000 kg
	2	Radio Remote Control	34 100	6 kg
	3	Central lubrication	56 600	17 kg
<u>Op</u>	eratio	<u>n</u>		
	4	Separate engine on the HAMMAR	219 100	720 kg
Ot	<u>her</u>			
	5	Handling of various drum sizes	177 200	700kg
	6	Top Spreader	414 700	1 300 kg
	7	Spare wheel incl. winch	16 200	67 kg
	8	20' container handling	28 500	100 kg
	9	Freight from Sweden to UK	45 000	0kg





The HAMMAR is designed in close contact with our customers and users, which has resulted in a flexible and highly standardised product with low maintenance costs.

The HAMMAR is adapted to local road regulations, regarding lightning, reflectors, under run protection (rear and lateral), axle pressure and turning radius.

The cranes and the trailer are Swedish quality products. They are manufactured in our own factory in Sweden, using the highest quality Swedish steel, especially prepared to give the best function together.

The HAMMAR is delivered media blasted, primed and top coated. A two-component epoxy primer is used as a base. The top coating is a two-component polyurethane paint.

The cranes are black as standard and the wheels are silver-grey. The under-run protection is made from extruded aluminium, and is not painted. The trailer is painted in a solid colour of your choice. All parts are painted before assembly for the best result.

We educate and train, during one day, one or two operators at our, or the customer's, facilities. This is done in connection with the delivery, and it is a requirement for full validity of the warranty of the equipment.

Service and maintenance agreement is handled separately with our local Service Agent in UK and can be supplied upon your request.

Prices:	Per unit and in SEK.
Terms of payment:	30% down payment with the order, 70% before delivery from Hammar Maskin AB, Sweden.
Terms of delivery:	Ex Works, Olsfors, Sweden (INCO-terms 2010). Apart from this Hammar General Terms and Conditions of Sale 2020-12-07 is valid.
Other terms:	In accordance with Hammar General Terms and Conditions of Sale 2020-12-07
Time of delivery:	At present, about 10 months from confirmed order and receipt of down payment.
Warranty:	36 months on cranes and chassis structure including all Hammar fabricated components.12 month on other ancillary equipment i.e. axles, suspension, engine, lighting etc. <i>Hammar General Terms and Conditions of Sale 2020-12-07</i> is valid.
Validity:	Our offer is valid one (1) month from the date of the offer.

All documents for homologation are included in the delivery.

If I can be of any further assistance, please feel free to contact me.

Yours faithfully, HAMMAR MASKIN AB

C Fred Sandberg





Custom Turn Table



Modern Transport Engineers Australia Pty Ltd

15 Millennium Place Tingalpa Qld 4173 Australia Phone 61-7 3393 5100 Mike Mobile 61 04 47 947444 <u>mike@modtrans.com.au</u> <u>admin@modtrans.com.au</u> <u>www.modtrans.com.au</u> www.modtrans.co.nz

31st August 2022

Jacobs City Walk Leeds LS11 9DX United Kingdom Phone

1

Mobile +4475 66808278

Email: rafaela.konstanta@jacobs.com

Ref: A200220

Attention: Rafaela Konstanta

Dear Sirs

Further to your inquiry and our subsequent discussions our company is pleased to submit our quotation to you for the following trailer.

THREE ROWS OF EIGHT STEERING DROP-BED CABLE TRAILER

Base Model Specifications:

- Special Drop-bed deck design
- Width 2950mm closed Width 4270mm open.
- Widening by 4 hydraulic rams.
- Hydraulic suspension with NEW low maintenance quick change rams.
- MTE 17.5" ten stud 225PCD Axles, 12-1/4" x 5-1/2" brakes with outboard drums.
- Axle spacing 1830mm 1830mm.
- Axle Retraction to all axles to facilitate maintenance.
- 215 x 17.5" 16ply tyres on steel wheels.
- Two Spare tyre <u>carriers only</u> vertical mount type.
- Hydraulically adjustable gooseneck.
- 3-1/2" king pin two positions on an oscillating skid plate.
- Hydraulic power source truck.
- Hella LED lights to ADR 4198 with 1 Rotating light in ramp.
- Capacity GVW 80,000kg.
- Tare weight from 14,500kg (approx.)
- Two chain bins on spine of trailer.
- Heavy duty Hydraulic landing legs.

MANUFACTURERS OF:

Tilt Decks : Transporters 10 to 250 tonne : House Removal Trailers : Jacking Plants 6-30,000 litre Bitumen Tankers : Platform Trailers20- 800 tonne: Tipping Trailers

Continuation sheet 2

- Fully Enclosed deck over suspension
- Signs supplied "Do not overtake" and "OVERSIZE".
- Steering axle
- Swivel Frame for unwinding of cable drum
- 50HP Power Pack
- Remote control Proportional .
- Sandblasted, Etch primed and painted in Two-pack to your fleet colours.

Base price:

\$658,650 .00 AUD

(Six hundred and fifty-eight thousand six hundred and fifty dollars) <u>CNF AUD - plus GST</u> (Cost Including Freight landed) Melbourne, Sydney, Brisbane, Perth.

Extras:

Description	Qty.	Price Each (Excl. GST)	Total (Excl. GST)
Extra spare tyre and steel wheel.		\$480	
Extra spare tyre and Alloy wheel.		\$520	
Aluminium Wheels. (Polished and/or Machined Finish). (12.8kg wheel saves 280kg over trailer set).		\$250	
MTE 50mm Drop in King pin		\$240	
Gauges for load indication		\$650	
3R8 Centralised greasing - brakes and suspension		\$10,700	
3R8 Centralised greasing with Timer - brakes and suspension		\$12,400	
3R8 Manual Greasing system 8 points per suspension out to a manual block.		\$6,200	
Hubodometer.		\$120	
Two Tone paint.		\$1,550	

Total Price of Extras Taken: \$

Continuation sheet 3

Terms:

(Quote is valid for 30 days from date of Quote)

10% deposit with confirmed order. Balance prior to the delivery date

Note: Ownership does not pass on until the goods are paid in full. Our company reserves the right to dispose of the said goods if the balance is not paid within 14 days of notified delivery date or completion. Please also note MTE late payment terms.

Delivery:

Delivery by water to Ireland after confirmed order and acceptance of our trading terms. A date will be finalised on order and shipping costs to be added.

Registration:

Registration and stamp duty is not included

Warranty:

As per our "On Highway Warranty Agreement"

Kind Regards

Allen Caldwell \ National Manager

Modern Transport Engineers Australia Pty Ltd 15 Millennium Place Tingalpa QLD 4173



al@modtrans.com.au | www.modtrans.com.au | www.mtwtruckandtrailerparts.com.au





А



Cable Unwinder

Technique for cable laying and overhead line construction

- Energy cable laying up to 680 kV
- Fibre optic, mini and micro cables
- Cable winding and length measuring
- Overhead line construction up to 110 kV
- · Seminars and product instructions

Cable winding units stationary



- Possible configurations:
- Drum flange brakes, one or both sides, breaking force 12,5 resp. 25,0 kN at cable.
- With an additional pre- and emergency brake braking forces to 50,0 kN are possible.
- Drive of the brakes per manual hydraulic pump or by electro-hydraulic drive
- Drum drives one-side or double sides, pulling force 16,0 kN resp. 32,0 kN
- Adjustable on the site to any drum width.

Code	Туре	Cap.	Drum-D	Int. width	kg
331736	KTU 20 ST	20 t	2000-3700	any adjustable	1.870,00
331738	KTU 20 ST	20 t	2800-4300	any adjustable	1.880,00
331740	KTU 25 ST	25 t	3600-5100	any adjustable	1.945,00
331750	KTU 55 ST	55 t	3600-5100	any adjustable	1.980,00
331752	KTU 55 ST	55 t	4300-6000	any adjustable	1.980,00

11:00 - 03.11.2022







SEB Cable Drum Trailer



[END OF DOCUMENT]

Jacobs



East Meath - North Dublin Grid Upgrade Construction Environmental Management Plan – Appendix C

Construction Resource and Waste Management Plan

EirGrid

March 2024



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Appendix C – Construction Resource and Waste Management Plan

1. Introduction

1.1 The Purpose of this Construction Resource and Waste Management Plan

This Construction Resource and Waste Management Plan (CRWMP) has been prepared to present the approach and application of waste management and mitigation measures for the construction of the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). The CRWMP will ensure that waste arising during the Construction Phase will be managed and disposed of in a way that ensures compliance with the provisions of Number 10 of 1996 - Waste Management Act, 1996 (as amended) (hereafter referred to as the Waste Management Act), and associated Regulations to ensure that optimum levels of reduction, reuse and recycling are achieved.

The CRWMP has been prepared in accordance with the Environmental Protection Agency's (EPA) Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects (EPA 2021a) (hereafter referred to as the EPA WMP Guidance). The project life cycle of the CWRMP is illustrated in the EPA WMP Guidance as shown in Image 1.1.



Image 1.1: Project Life Cycle of the Plan (EPA 2021a)

The CRWMP is based on the estimated quantities of waste generation and the proposed management measures from the Proposed Development at the planning stage. The requirement to develop, maintain and operate this CRWMP will form part of the contract documents for the Proposed Development and will be updated by the appointed contractor in advance of the commencement of construction activities on-site. Waste sent offsite for recovery or disposal will only be conveyed by an authorised waste contractor and will be transported from the Proposed Development site to an authorised site of recovery / disposal in a manner which will not adversely affect the environment. All employees will be required to comply with the obligations under this CRWMP.

The appointed contractor will be responsible for the further development of this CRWMP and the implementation of all necessary protocols and measures to ensure regulatory compliance, including the provision of data to the local authorities to enable fulfilment of reporting obligations.

The appointed contractor will be required to regularly revisit the CRWMP throughout the Construction Phase of the Proposed Development so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and to ensure that data is collected on an ongoing basis so that it is as accurate as possible.

1.2 Structure of this CRWMP

Design Out Waste (EPA 2015) notes the preparation of a Waste Management Plan within the early design and feasibility phases provides a framework to carry out design reviews, and will be used as an implementation, benchmarking, monitoring and reporting tool throughout the overall construction process.

This CRWMP has been prepared in line with the recommendations of the EPA WMP Guidance (EPA 2021a) for Tier 2 projects ('larger scale projects, including Strategic Infrastructure Developments, Strategic Housing Developments, infrastructure projects (road, rail, gas, energy)') and consequently addresses the following:

- Introduction;
- Development Description;
- Roles and Responsibilities;
- Design Approach;
- Key Materials, Quantities and Costs;
- Site Management; and
- Site Infrastructure.

1.3 Relevant Guidelines, Policy and Legislation

Resource and waste management takes place in a legislative and policy framework. Applicable legislation, policy and best practice was reviewed as part of the preparation of this CRWMP. The key components of European Union (EU), national and local policy, legislation and guidance relevant to the proposed construction and demolition (C&D) waste are summarised as follows:

- Prevention and minimisation of waste is the preferred option;
- Where C&D waste is generated, it will be source separated to facilitate reuse and recycling and to maximise the diversion of waste from landfill;
- Where waste may not be prevented or recycled, it will be transported and disposed of in accordance with applicable legislation and without causing environmental pollution; and
- Waste may only be transferred by a waste collection permit holder and delivered to an authorised waste facility.

The following guidance and policy documents used in preparation of the CRWMP were:

• EPA WMP Guidance (EPA 2021a);

- Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity (Update Report 2020) (Regional Waste Management Offices 2020);
- National Waste Management Plan for a Circular Economy 2024-2030 (Regional Waste Management Offices 2024);
- Circular Economy Action Plan, for a Cleaner and More Competitive Europe (European Commission 2020);
- Circular Economy Programme 2021-2027 (EPA 2021b);
- The Department of Communications, Climate Action and Environment (DCCAE) A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020-2025 (DCCAE 2020);
- The Department of Environment, Climate and Communications (DECC) Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (DECC 2022);
- The Eastern Midlands Region Waste Management Plan 2015-2021 (Eastern Midlands Waste Region (EMWR) 2015);
- Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA 2015); and
- Transport Infrastructure Ireland (TII) The Management of Waste from National Road Construction Projects (TII 2017).

The following directives and legislation were reviewed as part of the preparation of this CRWMP and are the central driver of waste policy in Ireland:

- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (hereafter referred to as the Waste Framework Directive);
- S.I. No. 323/2020 European Union (Waste Directive) Regulations 2020 (hereafter referred to as the Waste Directive Regulations);
- S.I. No. 163 of 1998 Waste Management (Hazardous Waste) Regulations 1998;
- S.I. No. 86/2008 Waste Management (Facility Permit and Registration) Regulations 2008, as amended;
- S.I. No. 821/2007 Waste Management (Facility Permit and Registration) Regulations 2007;
- S.I. No. 820/2007 Waste Management (Collection Permit) Regulations 2007, as amended;
- S.I. No. 419/2007 Waste Management (Shipments of Waste) Regulations 2007;
- S.I. No. 189/2015 Waste Management (Landfill Levy) Regulations 2015;
- S.I. No. 126 of 2011 European Communities (Waste Directive) Regulations 2011 (as amended);
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (hereafter referred to as the Landfill Directive);
- Waste Management Act;
- Number 26 of 2022 Circular Economy and Miscellaneous Provisions Act 2022; and
- Number 12 of 1997 The Litter Pollution Act 1997 (Revised).

1.3.1 Irish Waste Management Targets

Under the Waste Framework Directive, EU Member States must achieve 70% of material recovery of non-hazardous and non-soil-and-stone C&D waste by 2020.

With respect to the Proposed Development, the most applicable target is laid out in Article 11(2)b of the Waste Framework Directive regarding C&D waste:

"By 2020, the preparing for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials, of non-hazardous construction and demolition waste excluding naturally occurring material defined in category 17 05 04 in the list of waste shall be increased to a minimum of 70 % by weight".

The EPA reported in August 2023 that Ireland achieved 85% material recovery in 2021 (the most recent year for which statistics are available), surpassing the 70% EU target (EPA 2023a).

Every effort will be made to achieve the required level of material recovery of C&D waste as part of the Proposed Development in accordance with EU targets under the Waste Framework Directive as well as regional waste management targets. A baseline of available C&D waste capacity within the Eastern-Midlands Waste Region (EMWR) was calculated in Chapter 15 (Waste) in Volume 2 of the Environmental Impact Assessment Report (EIAR) (included in the planning application pack) and is summarised in Table 1.1.

Table 1.1: Summary of Approximate Annual Capacity for Soil and Stone Waste within the EMWR (EPA 2023b; EPA 2024; National Waste Collection Permit Office (NWCPO) 2024)

Facility Name	Number of Facilities (November 2023)	Approximate Maximum Capacity per Annum C&D / Soil and Stone Waste (tonnes)
Landfills	3	363,000
Incinerators	2	50,000
Soil Recovery Facilities	8	3,555,000
Local Authority Waste Facility Permits / Certificates of Registration	148	4,000,000
Total	161	7,968,000

1.4 Objectives of the CRWMP

The overall objective of the CRWMP is to minimise the quantity of waste material generated and disposed of as a result of the Construction Phase of the Proposed Development. The key principles which drive this objective are the Circular Economy model and the Waste Hierarchy. These are explained further in the following sections.

1.4.1 Circular Economy

The principal objective of sustainable resource and waste management is to use resources more efficiently, where the value of products, material and resources is 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. Image 1.2 illustrates the circular economy model.

As stated in the National Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020-2025 (Government of Ireland 2020):

"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, For a Cleaner and More Competitive Europe (European Commission 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 decades". The Whole Government Circular Economy Strategy 2022-2023 (Government of Ireland 2021), sets out a policy framework for transitioning to a circular economy, including measures to reduce the circularity gap, raise awareness and support investment into circular initiatives and to identify barriers.



Image 1.2: The Circular Economy (Government of Ireland 2020)

1.4.2 Waste Hierarchy

The Waste Framework Directive defines waste as "any substance or object that the holder discards or intends to or is required to discard".

The Waste Hierarchy, as shown in Image 1.3, prioritises prevention over reuse, recycling, recovery and disposal. It established the order of preference for the management of waste, with the most preferential management method being to prevent the creation of waste in the first place. The ultimate goal is to reduce, as far as possible, the quantity of waste disposed of to a landfill, thus increasingly treating waste as a resource.

The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource) and reduce, as far as possible, the amount of waste that is disposed to landfill.


Image 1.3: Waste Hierarchy (as per the Waste Framework Directive)

2. Roles and Responsibilities

The Electricity Supply Board (ESB) will be responsible for the appointment of the contractor. The CEMP, to which this CRWMP is appended, lists specific roles and their responsibilities with respect to the management of the CEMP, including a 'Waste Manager'. Refer to Section 1.5 of the CEMP for further details on other Environmental Project Construction Team roles.

The appointed contractor will appoint a suitably qualified person as Waste / Resource Manager to implement and maintain the CRWMP. The Waste / Resource Manager will be responsible for the following:

- Detailing and maintaining the CRWMP, and updating it as appropriate;
- Implementing the CRWMP throughout the Excavation, and Construction Phases of the Proposed Development;
- Following each update or revision of the CRWMP, providing the CRWMP to the Client, appointed Contractor(s) and all relevant personnel;
- Ensuring that all personnel are instructed about the objectives of the CRWMP and informed of the responsibilities which fall upon them as a consequence of its provision. This will be carried out during the induction process for new personnel;
- Communicating the requirements of the CRWMP using for example, toolbox talks, prominently displayed notices and audits as relevant;
- Maintaining accurate records of waste / surplus materials generated and the costs associated with waste generation and management; and
- Ensuring, where training is required regarding the handling and management of waste on-site, that it is provided, where required.

The appointed contractor and all personnel handling wastes must be in a position to:

- Distinguish reusable materials from material suitable for recycling;
- Ensure maximum segregation of waste and recyclables at source;
- Co-operate with the appointed Contractor(s) on best locations for stockpiling reusable material;
- Separate material for recovery; and
- Identify and liaise with operators of recovery outlets as appropriate.

Copies of the CRWMP will be made available to all relevant personnel.

The appointed contractor will review this Section of the CRWMP, add in the details of the personnel and outline their specific responsibilities. The hierarchy of all personnel designated with responsibilities under this CRWMP will be included to make clear the reporting chain.

3. Design Approach

3.1 Proposal for Managing Waste Arisings

The Proposed Development, as with any such infrastructure project, will result in the generation of surplus materials and waste. This material will need to be handled in a manner which is in compliance with all applicable legislation as well as the client, local and national policy.

Waste arisings will be managed in accordance with the principles outlined in the Waste Management Hierarchy as outlined in Section 1.4.2. In order of priority, the Waste Management Hierarchy sets out the most desirable approaches to waste management in the following order:

- 1. Prevention;
- 2. Reduction / Minimisation;
- 3. Reuse;
- 4. Recycle;
- 5. Other Recovery (including energy recovery); and
- 6. Disposal.

3.2 Waste Reduction / Prevention

Where reasonably practicable, opportunities for the prevention of waste will be considered throughout all stages of the Proposed Development. Measures such as, design optimisation, careful planning of material use and storage, good practice with respect to the handling of materials, and the reuse of material on site will be prioritised.

In accordance with EPA WMP Guidance (EPA 2021a), the following measures will be implemented to reduce and / or prevent the generation of excess surplus materials and waste throughout the Construction Phase of the Proposed Development:

- Materials required for the construction of the Proposed Development will typically be ordered and managed on a 'Just-In-Time' basis, in so far as is reasonably practicable. This will reduce the potential for over-ordering, and will reduce the potential for materials to be damaged or spoiled due to prolonged storage times;
- Where materials are required to be stored, they will be stored in a suitable manner in an appropriate storage area or receptacle. This will reduce the potential for losses or spills, and reduce the potential for damage due to incorrect storage measures; and
- Waste storage areas will be clearly defined and separated from material storage areas to prevent potential contamination of materials, making them unsuitable for their intended use.

Clean excavated material will be reused within the Proposed Development as fill or for landscaping, where reasonably practicable, to avoid the material needing to be removed for management elsewhere. Where reuse within the Proposed Development is not feasible, either due to the material being inappropriate for such reuses or being in excess of what is required, alternative solutions will be explored to prevent the material becoming a waste. The option to manage any surplus clean soil and stone material as a by-product in accordance with Article 27 of S.I. No. 126 of 2011 – European Communities (Waste Directive) Regulations

2011 (as amended) will be investigated. Where this is deemed to be an appropriate option, the appointed contractor will be responsible for:

- Storage of any Article 27 material in such a manner that does not compromise its suitability for further use under Article 27 (i.e. stored separately to any waste materials, stored away from any potential sources of contamination, etc.);
- Identifying appropriate and compliant locations for the reuse of such material; and
- Submitting the required EPA notification (including completing all assessments and documentation required in order to make that notification).

3.3 Waste Reuse / Recycling

Waste generated during construction of the Proposed Development will be reused on-site, where practicable. Opportunities for recycling will be employed for any waste that cannot be reused.

The appointed contractor will be responsible for maximising reuse and recycling of waste materials arising from the construction of the Proposed Development, and for achieving the waste management targets set by the Client. Disposal will only be considered as a last resort where there are no viable options for reuse or recycling available.

The following measures will be implemented by the appointed contractor in order to maximise the potential for reuse or recycling of any waste generated by the Proposed Development:

- Clean excavated soil and stone, which is not suitable for reuse within the Proposed Development or elsewhere as a by-product in accordance with Article 27, will be managed as a waste:
 - Waste soil and stone will be stockpiled on-site in advance of removal by a contractor in possession of an appropriate Waste Collection Permit. Waste will be collected in a timely manner and will not be stored for longer than six months. Where there is a requirement for storage in excess of six months, the appointed contractor will be responsible for attaining the applicable waste facility consent (Certificate of Registration or Waste Facility Permit from the local authority, or waste licence from the EPA);
 - Stockpile sizes and forms will be appropriate to the nature of material being stockpiled. Different material types will not be mixed in stockpiles;
 - Where materials have different end uses (i.e. reuse on site, reuse as a by-product, or being treated as a waste) they must be stockpiled separately to prevent contamination; and
 - \circ $% \left(Any \right) =0$ Any waste soil and stone generated will be taken to a suitably licensed or permitted waste facility.
- Suitable waste storage receptacles will be made available for all recyclable waste types (e.g. skips or collection areas will be enclosed where required to prevent damage from the weather);
- Waste will be segregated at source to improve the level of reuse and recycling, with labelling / signage used to denote where each waste stream is to be stored; and
- Waste which is unsuitable for reuse / recycling will be stored separately to recyclables in order to prevent contamination.

3.4 Other Waste

Hazardous waste generated on-site will be managed by the appointed contractor in accordance with applicable legislation. Where all viable options for reuse / recycling have been exhausted, only then will waste be disposed of. This type of waste will likely be composed of predominantly mixed municipal wastes and hazardous waste. Where cross contamination of other waste streams occurs, this can also render a reusable or recyclable waste unsuitable for reuse / recycling, resulting in a requirement for disposal.

Typical types of hazardous waste on construction projects generally consist of:

- Batteries;
- Oil-contaminated items (e.g. oily rags, filters);
- Bentonite from HDD works;
- Fluorescent lightbulbs (where used in temporary site offices and welfare facilities);
- Packaging for hazardous material (e.g. pain cans, fuel / oil drums);
- Contaminated spill clean-up materials (e.g. absorbents, cloths);
- Contaminated soils (if encountered during excavation); and
- Bituminous mixtures containing coal tar (potential to encounter in road planings where there are road surfacing materials dating from pre-1980s).

Hazardous waste generated on-site will be managed by the appointed contractor in accordance with applicable legislation and national policy as follows:

- Appropriate, segregated waste receptacles will be provided for the storage of the different hazardous waste streams, with each hazardous waste type to be stored separate from other hazardous waste types;
- Hazardous waste storage will be on hardstanding and/or bunded to avoid leaking of contaminated material into the underlying soil;
- Appropriate signage will be used to denote the disposal areas for hazardous waste;
- Hazardous waste will only be collected by contractors in possession of a suitable Waste Collection Permit and will be disposed of to a suitably licensed hazardous waste facility; and
- Records of hazardous waste will be kept and retained for a minimum of three years in accordance with the requirements of S.I. No. 163 of 1998 Waste Management (Hazardous Waste) Regulations, 1998.

4. Key Materials, Quantities and Costs

4.1 Introduction

The most environmentally sustainable means of managing excavated material is its prevention and minimisation (refer to Section 1.4). The appointed contractor will be responsible for the implementation of these measures for the Proposed Development. In recent years there has been a shift in focus on best practice waste management and waste minimisation in construction and an increase in the reuse of construction by-products in projects.

4.2 Key Materials / Waste

It is anticipated that the main waste streams which are likely to arise during the Construction Phase as a result of excavation activities as well as from surplus construction materials and damaged materials. These are listed in Table 4.1. The List of Waste (LoW) code is provided for each waste type, with an asterisk (*) denoting any waste types which are hazardous.

Waste Type	LoW Code	
Concrete	17 01 01	
Wood, glass and plastic	17 02 01 – 17 02 04*	
Bituminous mixtures	17 03 01* - 17 03 03*	
Metals	17 04 01 – 17 04 11	
Soil and Stones	17 05 04	
Wastes of liquid fuels	13 07 01* – 13 07 03*	
Absorbents, filter materials, wiping cloths and protective clothing	15 02 02* – 15 02 03	
Batteries and accumulators	16 06 01* – 16 06 06*	
Vegetation	20 02 01	
Waste packaging	15 01 01 – 15 01 11*	
Municipal waste (separately collected fractions)	20 01 01 – 02 01 99	
Mixed municipal waste	20 03 01	
Note: Codes with an * are hazardous waste types		

Table 4.1: Main Waste Types Likely to be Generated During Construction

4.3 Estimated Material / Waste Quantities

The waste types and estimated quantities likely to be generated during the Construction Phase of the Proposed Development are set out in Table 4.2. The total forecast of surplus excavation material from the Proposed Development will be 255,727 tonnes, which is equivalent to approximately 3% of the C&D waste management baseline per annum for the EMWR set out in Table 1.1.

Location	Waste / Surplus Material Type	Quantity (m ³)	Quantity (tonnes)	
Cable Route				
In-Carriageway	Asphalt*	3,666	8,432	
	Engineered Fill	14,663	32,259	
	Subsoil	31,160	46,740	
Off-Road / In-Verge	Subsoil	16,848	25,272	
	Engineered Fill (Haul Roads)	20,992	46,182	
Permanent Access Tracks	Top Soil	3,192	4,469	
Belcamp Substation				
Permanent Access Tracks	Topsoil	80	112	
Earthworks	Subsoil	11,200	16,800	
Woodland Substation				
Earthworks	Subsoil	50	75	
Enabling Works				
Passing Bays	Asphalt*	578	1,329	
	Engineered Fill	2,310	5,082	
	Subsoil	1,733	2,600	
Construction Platforms	Engineered Fill	4,050	8,910	
	Subsoil	1,350	2,025	
Compounds	Engineered Fill	25,200	55,440	
Totals By Material				Proportion of Total (%)
	Asphalt*	4,243	9,761	3.1
	Topsoil	3,272	4,581	2.4
	Subsoil	62,341	93,512	45.5
	Engineered Fill	67,215	147,873	49.0
	Total	137,072	255,727	100

Table 4.2: Estimate of Waste Quantities During the Construction Phase

Construction works areas, site offices and temporary facilities are also likely to generate waste during the Construction Phase (e.g. municipal type wastes by construction employees, packaging, food waste, etc.). Segregation facilities will be provided on the construction site to ensure that recovery and recycling of such materials is maximised.

Hazardous wastes which are likely to arise include waste electrical and electronic equipment, batteries, oil / fuel residues and oil contaminated items. With specific regard to asphalt / bituminous waste, while the overall quantity will be relatively small, this material may contain coal tar which would be categorised as hazardous waste. It is conservatively assumed at this stage that 50% of road surface material could contain coal tar and would be categorised as hazardous waste. This would result in a potential hazardous waste quantity of 5,019 tonnes. Typically, hazardous waste generated in Ireland is transported to and disposed of at facilities in England or it is diverted from landfill through cold recycling applications. The Hazardous Waste capacity in England in 2022 was 11,882,411 tonnes (United Kingdom Government Waste Statistics 2022). In the worst-case scenario of all potential coal tar waste going to landfill from the Proposed Development, this would represent approximately 0.0004% of capacity.

The Construction Phase will require the importation of a number of key construction materials for the Proposed Development works. This material will include items such as engineering fill, concrete and asphalt. Table 4.3 provides an estimate of the quantities of the major materials required to complete the Construction Phase of the Proposed Development.

Location	Imported Material Type	Quantity (m ³)	Quantity (tonnes)
Cable Route			
In-Carriageway	Asphalt	3,666	8,431
	Engineered Fill	21,079	46,373
	Concrete / CGBM B	20,546	-
Off-Road / In-Verge	Engineered Fill (Haul Roads)	20,992	46,182
	Concrete / CBGM B	11,085	-
Permanent Access Tracks	Engineered Fill	4,788	10,534
Joint Bays	Concrete	796	-
Belcamp Substation			
Permanent Access Tracks	Engineered Fill	120	264
Civils & Foundations	Concrete	1,964	4,714
400kV GIS Hall	Steel	-	127
Woodland Substation			
Civils & Foundations	Concrete	107	257
Enabling Works			
Passing Bays	Asphalt	578	1,328
	Engineered Fill	2,310	5,082
	Subsoil	1,733	2,599
Construction Platforms	Engineered Fill	4,050	8,910
	Subsoil	1,350	2,025
Compounds	Engineered Fill	25,200	55,440

Table 4.3: Estimate of Material Quantities	s Required for the Construction Phase
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In addition to the quantities outlined in Table 4.3 there will be equipment and plant required for the substations, such as shunt reactors, transformers (current and voltage), cable sealing ends, surge arrestors, gantries, post insulators, disconnectors, circuit breakers, GIS bushings, bulk head lighting and lighting masts. There will also be approximately 150 drums of insulated copper cabling (37.5km multiplied by three phases) required for the cable route. These items will be acquired for the project pre-fabricated from specialist manufacturers.

4.4 Route Options for Resource / Waste Management

4.4.1 Article 27

Surplus excavation materials may be declared a by-product (under Article 27 of S.I. No. 126 of 2011 – European Communities (Waste Directive) Regulations 2011 (as amended)) 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 reuse of by-products. This plays a role in Ireland's implementation of Circular Economy principles.

An Article 27 notification to the EPA, under Article 27, is required to achieve by-product status for soil and stones. It is noted that the use of Article 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 is 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 an Article 27 EPA notification in relation to excavation material from the Proposed Development, the appointed contractor will be responsible for submission of the Article 27 notification to the EPA. Where it is proposed to use soil from offsite with an Article 27 notification, the appointed contractor will be responsible for carrying out any necessary due diligence regarding the material and ensuring that all EPA guidelines relating to that Article 27 notification have been complied with before the soil is imported into the site. Where feasible, appropriate and available, Article 27 materials arising from other sites will be used in the development of this site. The appointed contractor is responsible for ensuring all applicable regulatory requirements under waste, planning and other laws are complied with prior to movement of excavation material. Any hazardous waste arising will be managed in accordance with the applicable legislation.

This Section of the CRWMP will be updated by the appointed contractor with the specific details if / when a by-product end user has been identified and the By-Product Notification has been made to the EPA.

4.4.2 Waste Management

Where removal of wastes from the Proposed Development is unavoidable, it will be delivered by the appointed contractor only to facilities which are authorised under the Waste Management Act and which hold the appropriate Waste Licence, Waste Facility Permits, or Certificates of Registration.

Where the appointed contractor proposes to deliver excavated materials from the Proposed Development to facilities holding a Certificate of Registration, Waste Facility Permit or EPA Waste Licence, the appointed contractor will be responsible for ensuring the authorisation is valid and allows acceptance of the relevant LoW Code. Waste will only be transported from site by vehicles in possession of an appropriate Waste Collection Permit for the type of waste being transported and the area in which it is being transported. The appointed contractor will retain records of the wastes transported from the site and the Waste Collection Permits of the transporters.

The location and availability of appropriate waste management facilities for management of all waste arising from the Proposed Development will need to be reviewed by the appointed contractor in advance of the commencement of construction, and updated throughout the Construction Phase as required. Where practicable, waste facilities near to the Proposed Development will be used in order to reduce the impacts associated with transportation of the waste.

Suitable waste facilities will be identified for each waste stream. The appointed contractor will keep records of Waste Licences, Waste Facility Permits, or Certificates of Registration for any facilities being used by the Proposed Development. Waste will only be transported from site by vehicles in possession of an appropriate Waste Collection Permit for the type of waste being transported and the area in which it is being transported. The appointed contractor will retain records of the wastes transported from the site and the Waste Collection Permits of the transporters.

4.5 Cost of Resource Management

The total cost associated with the management of surplus materials and waste from the Proposed Development will be calculated. At this preliminary stage in the Proposed Development, the costs of materials and waste disposal are unknown. Once exact quantities of materials and wastes are known, the full

costs can be calculated by the appointed contractor. Such calculations will be reviewed and amended as needed throughout the Construction Phase.

The costs of waste management will depend on the waste management routes selected and waste management contractors used. The Landfill Levy as per S.I. No. 189/2015 - Waste Management (Landfill Levy) Regulations 2015 is currently €75 per tonne of waste being disposed of to landfill. It will therefore be economically advantageous to divert as much material as possible away from the disposal route. This will be weighed up by the appointed contractor in advance of, and during, the Construction Phase of the Proposed Development to find the best solutions.

The total cost of waste management associated with the Proposed Development will be calculated in regard to the purchase of costs of materials, handling costs, storage costs, transportation costs, revenue from sales, disposal costs etc. Costs will be recorded for the range of C&D materials and waste arising.

5. Site Management

The following management measures will be included in the CRWMP and will be implemented, in so far as is reasonably practicable:

- Waste and materials will be stored in suitable containers and at suitable locations to avoid cross-contamination or pollution due to leakages or littering. Where required, bunding or drip trays will be used to contain any potential leakages. Any stockpiling required will be appropriately sized and segregated;
- 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;
- 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 excavated material cannot be reused within the Proposed Development works, opportunities for reuse as a by-product in accordance with Article 27 of .l. No. 126 of 2011 – European Communities (Waste Directive) Regulations 2011 (as amended) will be sought. Where this is also unsuitable, material will be sent for recovery or recycling;
- Source segregation: All materials will be segregated at source during construction works and removed offsite to a permitted / licensed facility for recycling;
- Material management: 'Just-in-time' delivery, where practicable, will be used to minimise material wastage;
- General construction waste and by-products will be reused within the Proposed Development, where practicable, or appropriately reused (in accordance with Article 27 of .I. No. 126 of 2011

 European Communities (Waste Directive) Regulations 2011 (as amended))), recovered, recycled or disposed of offsite, as arranged by the appointed contractor;
- Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation; and
- Waste auditing: The quantity and types of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations to which waste and materials will be delivered will be recorded along with the quantity to each facility. Records will show material, which is recovered, which is recycled and which required disposal.

5.1 Waste / Resource Manager

As outlined in Section 2, the Waste / Resource Manager will take responsibility for all aspects of waste management at the different stages of the Construction Phase and overall implementation of the CRWMP and associated procedures.

The Waste / Resource Manager will be technically competent and appropriately trained, and will take responsibility to ensure the objectives and measures contained within this CRWMP are transposed into the detailed CRWMP, and are subsequently implemented including associated target reuse / recycling rates. The Waste / Resource Manager will facilitate effective communication of the waste management objectives with all operatives associated with the Proposed Development (including site staff, external contractors and suppliers).

The Waste / Resource Manager will maintain accurate records on the quantities of waste / surplus materials generated and the real cost (including purchasing) associated with waste generation and management. The recording of summary information will further assist the implementation of the plan.

The Waste / Resource Manager will ensure that reporting and recording requirements are met and all necessary resources are in please to support the implementation of the detailed CRWMP.

5.2 Site Personnel

All site personnel will be responsible for adhering to the requirements of the CRWMP which are applicable to their role on the Proposed Development. This includes, but is not limited to, helping in the maintenance of a clean and tidy site, compliant storage of waste and materials, adherence to all waste management rules and notices as applicable to their role and work location, and reporting (and responding to where applicable) any spills or waste issues that may arise to the Waste / Resource Manager.

5.3 Training

All site personnel will be made aware of their responsibilities with respect to the implementation of this CRWMP. This will be covered through training, including:

- Site induction training for new site operatives; and
- Periodic toolbox talks to refresh operatives on their requirements, particularly after updates to the CRWMP or following any incidents or issues arising from improper waste management practices.

The topics to be covered in training will include:

- The site-specific waste management procedures and role of all site operatives in implementing these procedures;
- The key personnel responsible for waste and resource management;
- Commitments and targets for waste and materials management;
- Information on the waste storage areas, including any specific storage requirements for specific materials;
- Detail how waste and materials will be segregated and the importance of adhering to the required source segregation policies;
- Details on response to incidents such as spills;
- Information on the handling of any hazardous wastes; and
- Document control requirements.

5.4 Sourcing and Management of Materials and Waste Services

The appointed contractor will be responsible for the sourcing of materials and the appointment of suitable waste contractors. Considerations when identifying these will include transportation requirements for imported materials and exporting of waste, material sources, sustainability within supply chains, availability of materials, costs of material supply and waste management, and opportunities for waste minimisation through agreements to return unused surplus materials. All of these considerations will be weighed when procuring suppliers or waste contractors to ensure the most efficient and sustainable resource and waste management.

5.5 Record Keeping

Records of all waste and materials will be kept by the appointed Contractor(s). These records will include, but not be limited to:

- Records of updates to the CRWMP;
- Minutes of meetings with respect to materials and waste management;
- Records of deliveries of materials on site;
- Records of waste quantities collected from site;
- A copy of Waste Licences / Waste Facility Permits / Certificates of Registration for any waste facilities to which waste from the site is transported;
- A copy of Waste Collection Permits for any waste collection vehicles being used to transport the waste to the waste facilities;
- Copies of any Waste Transfer Forms from the transfer of hazardous waste;
- Copies of any Transfrontier Shipment paper work where any waste from the site is to be shipped outside of Ireland for treatment / disposal (if applicable);
- Training records;
- Records of any site inspections and audit findings and any remedial actions undertaken as a result; and
- Records of any environmental incidents.

5.6 Communications

The requirements and contents of the CRWMP will be communicated to site operatives through site induction training and toolbox talks as outlined in Section 5.3.

The Waste / Resource Manager will be the designated contact person for any communications associated with waste and resource management during the Construction phase. They will be responsible for any communications with the Local Authorities, Client, local community or any other interested parties. This may include:

- Regular updates (as required) to the Client on resource and waste targets, procedures or issues;
- Providing the CRWMP to the relevant Local Authority if requested;
- Management of any resource or waste-related complaints received by the appointed Contractor(s);
- Engagement with the Client, Local Authorities or EPA with respect to any site inspections / audits, including being available to the inspector / auditor during any site visits, providing any requested records, and liaising with respect to close out of any corrective or follow-up actions required; and
- Preparation of a final report on resource and waste management on completion of the Proposed Development.

5.7 Audits / Inspections

Audits / inspections are an important aspect of environmental management of the Construction Phase of the Proposed Development. These will be carried out by the Waste / Resource Manager on a regular basis to ensure that the CRWMP is effective and fit for purpose. Audits / inspections may also be carried out by the Client (or someone acting on their behalf), by the Local Authorities or by the EPA.

Regular audits / inspections by the Waste / Resource Manager will aid in the identification of potential issues or areas for improvement and will aid in the regular review and update of the CRWMP. These inspections / audits will range from regular checks of the materials and waste storage areas to ensure they are kept tidy and being utilised correctly, to larger audits of the project's performance against the targets / KPIs set at the start of the Construction Phase. Where issues are identified they will be remedied as quickly as possible.

Where audits / inspections are undertaken by the Client, the Local Authorities or the EPA, the Resource / Waste Manager will be responsible for accommodating this, including meeting with the auditor(s) / inspector(s), escorting them to any places they wish to see on site, and providing them with any information or records they wish to examine. Where non-compliances or areas for improvement are identified by the auditor(s) / inspector(s), the Resource / Waste Manager will be responsible for actioning these and reporting on progress towards close-out to the auditor(s) / inspector(s).

Remedial actions will always be taken as quickly as possible. Where actions can be taken immediately (i.e. housekeeping issues, signage issues, etc.) these will be closed out as soon as practicable. For actions required in relation to policies or procedures, these will be actioned as soon as reasonably practicable and by an agreed close-out date.

6. Proposed Development Infrastructure

For the Construction Phase of the Proposed Development, temporary Construction Compounds have been proposed at various locations and are illustrated in Section 4.5.6 in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR (included in the planning application pack). The Temporary Construction Compounds (TCCs) are as follows:

- TCC0: Chainage 0, located off the Redbog Road, with an approximate area of 1ha;
- TCC1: Chainage 3,550, located off the R156, with an approximate area of 0.8ha;
- TCC2: Chainage 10,600, located off the R156, with an approximate area of 1ha;
- TCC3: Chainage 21,600, located off the Ballymacarney Road, with an approximate area of 1.6ha;
- TCC4: Chainage 26,850, located off the R121, with an approximate area of 1ha;
- TCC5: Chainage 34,800, located off Stockhole lane, with an approximate area of 1ha; and
- TCC6: Chainage 37,700 located off Stockhole Lane adjacent to Belcamp Substation, with an approximate area of 1.6ha.

The temporary Construction Compounds will contain site office and welfare facilities for construction personnel. Car parking facilities will also be provided at these sites. Materials such as topsoil, subsoil, concrete etc., will be stored at the Temporary Construction Compounds for reuse as necessary. All necessary authorisations, under the Waste Management Act, will be obtained prior to undertaking temporary storage.

There is also a temporary HDD Compound at both the reception and launch locations at each HDD crossing. These compounds will not be used for the storage of materials for the wider route or for site offices but will be used to facilitate the works required adjacent to and under the motorways and railway. A laydown area is also required for each HDD crossing. The temporary HDD Compounds will be located within the Planning Application Boundary and are as follows:

- M3 HDD Compound West (HDD1a): Chainage 12,850, located off the Woodpark Road, with an approximate area of 0.23ha;
- M3 HDD Compound East and Laydown Area (HDD 1b): Chainage 13,050, located off the R147, with an approximate area of 0.31ha;
- M2 HDD Compound South (HDD 2a): Chainage 23,400, located off the R121, with an approximate area of 0.15ha;
- M2 HDD Compound North and Laydown Area (HDD 2b): Chainage 23,600, located off the R121, with an approximate area of 0.45ha;
- M1 HDD Compound West (HDD 3a): Chainage 34,250, located off the Stockhole Lane, with an approximate area of 0.22ha; and
- M1 HDD Compound East and Laydown Area (HDD 3b): Chainage 34,450, located off the Stockhole Lane, with an approximate area of 0.43ha.

With respect to resource and waste management at the Temporary Construction Compounds, the appointed contractor will, at a minimum:

- Set up designated storage locations for materials and waste, including areas for stockpiling;
- Put up signage to indicate what materials or waste will be stored, and the specific storage locations;
- Provide appropriate storage receptacles for each material, i.e. bunded storage cabinets, drip trays, bins, skips, secure containers for hazardous waste, etc.;
- Ensure any storage areas will be suitably contained or bunded as required;
- Ensure storage areas are large enough and are safely accessible for any personnel or vehicles which need to access them;
- Situate storage areas away from areas which pose a high risk to human or natural environments, and they will be set up in accordance with any mitigation measures or planning conditions as applicable (e.g. suitable buffer zones, maximum heights, suitable bunding, etc.); and
- Ensure storage areas are kept tidy, and that materials are not stored longer than required.

The storage areas will be set up in a location and configuration which provide adequate space for deliveries or collections to take place.

6.1 References

Department of Environment, Climate and Communications (DECC) (2022). Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'

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

Eastern Midlands Waste Region (EMWR) (2015). Eastern Midlands Region Waste Management Plan 2015 - 2021

Environmental Protection Agency (EPA) (2015). EPA Research 146 Design Out Waste Factsheets

EPA (2018). Waste Classification – List of Waste and Determining if Waste is Hazardous or Non-Hazardous

EPA (2019). Guidance on Soil and Stone By-Products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011

EPA (2021a). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects

EPA (2021b) Circular Economy Programme 2021-2027

EPA (2023a). Construction & Demolition Waste Statistics for Ireland [Online]. Available from: https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/construction-demolition/ [Accessed February 2024]

EPA (2023b). Waste Infrastructure in Ireland [Online]. Available from: https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/infrastructure/ [Accessed February 2024]

EPA (2024). Waste Licence Search [Online]. Available from: https://epawebapp.epa.ie/terminalfour/waste/index.jsp [Accessed February 2024]

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

National Waste Collection Permit Office (NWCPO) (2024). Local Authority Waste Facility Register [Online] Available from https://facilityregister.nwcpo.ie/ [Accessed February 2024]

Regional Waste Management Offices (2020). Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity - Updated report 2020

Regional Waste Management Offices (2024). National Waste Management Plan for a Circular Economy 2024-2030

Transport Infrastructure Ireland (TII) (2017). The Management of Waste from National Road Construction Projects. Standard GE-ENV-01101

UK Government Waste Statistics 2022 [Online]. Available from: https://www.data.gov.uk/dataset/aa53a313f719-4e93-a98f-1b2572bd7189/2022-waste-data-interrogator [Accessed February 2024]

Directives and Legislation

Directive 1999/31/EC of 26 April 1999 on the landfill of waste

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

Directive 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC

Regulation (EC) No. 1013/2006 of the European Parliament and of the Council of 14 June 2006 on Shipments of Waste

Number 10 of 1996 - Waste Management Act 1996 (as amended)

Number 12 of 1997 – The Litter Pollution Act 1997 (as amended)

Number 26 of 2022 – Circular Economy and Miscellaneous Provisions Act 2022

S.I. No. 163 of 1998 – Waste Management (Hazardous Waste) Regulations 1998

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

S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007 (as amended)

S.I. No. 821/2007 - Waste Management (Facility Permit and Registration) Regulations 2007

S.I. No. 86/2008 - Waste Management (Facility Permit and Registration) Regulations 2008 (as amended)

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

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

S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020



East Meath - North Dublin Grid Upgrade Construction Environmental Management Plan – Appendix D

Surface Water Management Plan

EirGrid

March 2024



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Appendix D – Surface Water Management Plan

1. Introduction

This Surface Water Management Plan (hereafter referred to as the SWMP) for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) details the control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase.

The control and management measures are best practice approaches that can be used to protect surface water during the Construction Phase of the Proposed Development.

1.1 Objectives

The objectives of the SWMP are to:

- Ensure sediment and pollution control requirements can be built into the design stage, and land take requirements for the Proposed Development, are defined as far as practicable;
- Minimise, and where possible, avoid potential for sediment, silty water, and other contaminants such as oil, fuel, concrete, cement, and other materials to discharge to a watercourse;
- Minimise the area and duration of exposed ground which has the potential to create runoff; and
- Minimise any potential impacts in the event of an accidental spillage or site runoff by providing appropriate control and containment measures on-site and by maintaining sediment and pollution controls throughout the Construction Phase of the Proposed Development.

1.2 Relevant Legislation, Policy and Guidelines

The SWMP and the control and management measures relating to surface water management have been prepared with regard to the following guidance documents, where relevant:

- Construction Industry Research and Information Association (CIRIA) Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (CIRIA 2001);
- CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane et al. 2006a);
- CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al. 2006b);
- Best Practice Guide BPGCS005 Oil Storage Guidelines (Enterprise Ireland 2003);
- PUB C692 Environmental Good Practice on Site, 3rd Edition (CIRIA 2010)
- Control of Water Pollution from Linear Construction Projects. Technical Guide (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);
- National Roads Authority (NRA) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2005);
- Transport Infrastructure Ireland (TII) Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1) (TII 2015a);
- Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (hereafter referred to as the TII Guidelines) (TII 2007);
- Guidance Note on Storage and Transfer of Materials for Scheduled Activities (Environmental protection Agency 2004);
- Road Drainage and the Water Environment DN-DNG-03065 (TII 2015b); and
- Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).

The following directive and legislation were also considered:

- Number 10 of 1996 Waste Management Act 1996 Revised (hereafter referred to as the Waste Management Act 1996 (as amended) (hereafter referred to as the Waste Management Act);
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD));
- S.I. No. 324 of 2011 European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011; and
- S.I. No. 291 of 2013 Safety, Health and Welfare at Work (Construction) Regulations 2013, as amended by S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021.

1.3 Contents of this Surface Water Management Plan

Table 1.1 provides the contents of the SWMP, and where details can be found in this document.

Content	Section of the SWMP
Introduction	1
Roles and Responsibilities	2
Environmental Incident Response Plan	3
Control and Management Measures	4
General Measures	4.1
Temporary Construction Compounds / Laydown Areas	4.1.1
Control of Sediment	4.2
Open Trench Water Crossings	4.3
Use of Concrete	4.4
Vehicles and Plant	4.5
Water Body Crossings	4.6
Monitoring of Water Bodies	5
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1.4 Potential Sources of Water Pollution

The main activities / areas where sediment and surface water runoff and pollution generation have the potential to arise include the following:

- Earthworks including planing, excavation and processing, transportation of materials (within
 and outside the Proposed Development), and deposition of materials and temporary
 stockpiling (if required). The most significant area of concern regarding sediment control for
 the Proposed Development is when existing low porosity surfaces (existing roads and
 footpaths) are removed, and the underlying granular layers are disturbed and exposed.
 Typically, these surfaces are likely to be exposed during the following activities associated with
 the Proposed Development:
 - The preparatory and site clearance works;
 - Creation of the excavated cable trench, Joint Bays and Passing Bays;
 - Infilling of trenches;
 - Tracking of machinery; and
 - Vegetation clearance.

- Construction vehicles and machinery erosion of exposed surfaces can result in excessive volumes of eroded material entering surface water features. Access track construction may affect surface runoff patterns, creating alternative flow paths and promote erosion of previously unaffected areas;
- Construction of structures and concreting activities concrete, grout and other cement-based products which would typically be used in the construction of structures are highly alkaline and can generate very fine, high alkaline silt (11.5 pH) which has the potential to flow as runoff to surface water features;
- Watercourse crossings, in-stream works, and riverbank works there is a higher likelihood of
 impacts on surface water quality when construction is taking place over or near surface waters
 (e.g. silty water can more easily find a pathway either via drains or overland flow to the water
 body and impact on its baseline water quality); and
- Temporary Construction Compounds (including temporary Horizontal Directional Drilling (HDD) Compounds) and machinery refuelling areas there is potential for welfare facilities and wastewater to be discharged to surface water bodies which can impact surface water quality.

2. Roles and Responsibilities

The roles and responsibilities of key stakeholders are outlined in Section 1.5 of the Construction Environmental Management Plan (CEMP), to which this SWMP is appended.

The TII Guidelines (TII 2007) identifies the role of an Environmental Manager (EM). The EM, or equivalent, will ensure the successful development, implementation, and maintenance of the SWMP.

A full-time on-site Environmental Clerk of Works (EnvCoW) will be appointed prior to the commencement of works. The role of the EnCoW will be to monitor and report on compliance with planning consents, environmental permits, legislation and mitigation.

3. Environmental Incident Response Plan

An Environmental Incident Response Plan (EIRP) has been prepared for the Proposed Development (see Appendix A of the CEMP). The EIRP will ensure that in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP includes measures to address surface water related incidents such as accidental spillages of noxious substances (e.g. oil and significant releases of sediment or concrete washings). The EIRP details are not repeated in this Section of the SWMP. However, it should be read in conjunction with the general measures set out in this SWMP.

4. Control and Management Measures

4.1 General Measures

A number of measures will be implemented in order to manage surface water in and around construction works and to prevent impacts to surface waters as a result of construction activity. The appointed contractor will be required to update and implement this SWMP, which will form part of the overall appointed contractor CEMP. The measures outlined below will be included at a minimum in the updated SWMP.

The CEMP and the Construction Resource Waste Management Plan (CRWMP) (included as Appendix C of the CEMP), outline measures to control and manage activities and waste at the surface to prevent issues such as accidental spillage or increased runoff as a result of hardstanding or precipitation infiltration into stockpiles, exposed soils and silt. The CEMP and CRWMP will be implemented in full.

The appointed EnCoW will monitor and regularly inspect the implementation of all ecological and surface water mitigation contained in the CEMP, Environmental Impact Assessment Report (EIAR), this SWMP and the NIS (which are all included in the planning application pack), and will act as a liaison between the Electricity Supply Board / EirGrid and An Bord Pleanála in the discharge of planning conditions relating to biodiversity and surface waters.

All works will be carried out in accordance with the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).

Works method statements will be agreed with IFI for all water body crossings and the Office for Public Works (OPW), where required. The works method statement will include details on monitoring requirements for instream concrete pouring works, handheld turbidity monitoring for in-stream works and will include the following:

- Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose;
- Established concrete washout management areas will be designated to control the discharge of concrete washout;
- An emergency response plan will be developed and communicated to site staff prior to the concrete pour being undertaken;
- The EnCoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated; and
- The EnCoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary.

An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions. Met Éireann (red, amber, yellow) warnings will be monitored daily by the EnCoW by accessing the Met Éireann website (Met Éireann 2024). Works will be stopped where red weather warning are issued. Where an amber weather warning is issued, works will be monitored by the EnCoW and stopped where deemed appropriate based on the site conditions.

4.1.1 Temporary Construction Compounds and HDD Compounds / Laydown Areas

4.1.1.1 Temporary Construction Compound Establishment

All surface water runoff will be intercepted and directed to appropriate treatment systems / settlement facilities for the removal of pollutants prior to discharge.

4.1.1.2 Security

The Temporary Construction Compounds and HDD Compounds will be fenced off, lit (during working hours) and secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment, if required, to prevent acts of vandalism that could result in leaks or spills from materials.

4.1.1.3 Welfare Facilities

Temporary Construction Compounds will be engineered with appropriate services as discussed in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.

Temporary welfare facilities will need to be used (e.g., portable toilets in the vicinity of works). Welfare facilities will discharge wastewater either to an existing sewer (where available), with the permission of the

utility operator, or to a sealed holding tank to be collected and disposed of in an appropriate manner to a suitably licensed facility off site by a licensed contractor.

4.1.1.4 Fuel Storage

- All hydrocarbons used during the Construction Phase will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out in the Environmental Protection Agency (EPA) IPC Guidance Note: Guidance Note on Storage and Transfer of Materials for Scheduled Activities (EPA 2004);
- All chemical and fuel filling locations will be contained within signposted, designated bunded areas, a minimum of 20m from any surface water drain or watercourse;
- At the Temporary Construction Compounds, where the site is pervious, an area of hardstanding will be installed in a demarcated area for refuelling, and vehicle / plant cleaning and service areas. This area will be drained to a soak away if possible, or to local surface water drains, with the permission of the asset owner;
- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
 - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled;
 - Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed, and staff will be trained on the procedures to be followed;
 - Spill kits will be provided at all Temporary Construction Compound locations and will be carried by all crews during underground cable installation and substation upgrade works;
 - Spill kits will be of adequate size for the volume of substances being carried; and
 - Containers and equipment will be stored on a firm, level surface.
- Procedures and contingency plans will be in place at each works area to address the cleaning up
 of small spillages, as well as dealing with an emergency incident (see Appendix A (EIRP) of the
 CEMP). A stock of absorbent materials such as sandbags will be kept at each work site, on plant
 working near water and particularly at refuelling areas and where fuel or oil is stored. Any
 sandbags deployed in the containment of a spillage will be disposed of appropriately as per
 guidance on the spillage they were deployed to contain;
- The storage of fuels, other hydrocarbons and other chemicals within the Temporary Construction Compounds will be in accordance with relevant legislation and best practice. In particular:
 - Fuel tanks, drums, and mobile bowsers (and any other equipment that contains oil and other fuels) will be housed within a bund of at least 110% capacity of the fuel tank itself or at least 25% of the total volume of the containers, whichever is greatest. The fuel tank will be double skinned. There will be no passive drainage from the bund, and any water collected within it will be pumped out and removed off site for disposal; and
 - For any designated area(s) for oils, fuels, chemicals, hydraulic fluids etc., storage and refuelling will be set up at least 10m from any surface water drains or watercourses (as per the range of CIRIA Guidance listed in Section 1.2) and the storage location within the Temporary Construction Compounds will be organised, so as to be as far away from surface water drains or watercourses as is practicable, to minimise risks from leaks and spills. Refuelling and storage of fuels will be carried out on impermeable surfaces.
- Storage of fuel and refuelling will be undertaken within bunded areas, with double skinned tanks and carried out on impermeable surfaces. Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas. No plant refuelling will take place within 10m of a watercourse.

4.1.1.5 Bentonite Storage

There is a requirement for HDD to take place below major infrastructure that will be crossed by the Proposed Development (crossing of the M1, M2 and M3 Motorways) to prevent disruption to public services. HDD will require the use of bentonite clay. Bentonite is an absorbent aluminium phyllosilicate clay which is mixed with water during the drilling process to form a slurry. The slurry is used as a drilling fluid due it its unique properties which aid it to manage viscosity and fluid control, air in hole cleaning and wellbore stabilisation, lubrication and the cooling of down hole drilling equipment. Bentonite is also used in the grouting and sealing of boreholes as it expands when mixed with water. These attributes make bentonite a good drilling fluid, however, it is harmful to the water environment if not stored and used correctly.

Therefore, the storage of bentonite will include the following measures:

- The storage area will be equipped with containment structures to prevent the spread of bentonite in case of spills or leaks;
- Bentonite will be stored within compound areas on impermeable liners to minimise the risk of groundwater contamination;
- The storage area will be watertight to prevent water leaking in to bentonite pellets causing expansion in runoff;
- Storage areas will be regularly cleaned and inspected to identify and address potential issues promptly;
- Bentonite storage areas will be clearly labelled with appropriate warning signs;
- When bentonite is to be used at a site location outwith the compound area, mixing will take
 place within a contained and sealed environment to prevent bentonite runoff entering surface
 water features; and
- The appointed contractor will develop specific method statements for the use of bentonite during HDD works. These will contain methods for monitoring the drilling fluid return to ensure no bentonite is being lost to formation during drilling (i.e., bentonite breakout).

4.1.1.6 Storage of Materials and Waste

Where material is required to be stored:

- A buffer zone of 20m will be maintained between storage and working areas and sensitive water bodies (i.e. those designated under the WFD), taking account of the minimum working area required to facilitate the works;
- Storage areas for solid materials, including waste soils (where applicable), will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow);
- Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills; and
- All containers of any size will be correctly labelled indicating their contents and any hazard warning signs.

A register of all hazardous substances, which will either be used on-site or expected to be present (in the form of soil and / or groundwater contamination) will be established and maintained. This register will be available at all times and will include as a minimum:

- Valid Material Safety Data Sheets (MSDS);
- Health and safety and environmental controls to be implemented when storing, handling, using and in the event of spillage of materials;
- Emergency response procedures / precautions for each material; and

• The Personal Protective Equipment (PPE) required when using the material.

Waste may be stored at the Temporary Construction Compounds for a limited amount of time to help to limit the number of vehicle movements to and from site as far as possible, in order to minimise effects on the local roads (refer to Appendix C (CRWMP) of the CEMP). Where waste is required to be stored:

- All collected waste will be managed in accordance with the Waste Management Act, and associated Regulations;
- All waste will be stored in secure designated areas, in enclosures or containers to prevent material being dispersed by the wind;
- Designated areas will be sited at least 10m away from surface water drains or watercourses to limit the risk of escape and contamination of watercourses;
- Safe handling of all potentially hazardous materials will be emphasised to all construction personnel employed;
- Waste storage containers will be labelled with their waste type and their List of Waste (LoW) code. Any labelling will be consistent with Industry Best Practice at the time construction commences and reviewed annually;
- Liquid wastes will be stored in containers within bunded zones with secondary containment of at least 110% capacity of the largest container or at least 25% of the total tank capacity inside the bunded zone (whichever is the greatest); and
- Incompatible or hazardous wastes will be stored and handled in accordance S.I. No. 324 of 2011 – European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011.

4.2 Control of Sediment

There are a number of sources of sediment or silt-laden water on a construction site, including silty runoff from stripped soils, and the stockpiling of soils. Control measures for each of these will be provided, as follows.

4.2.1 Silty Water Runoff

- Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins;
- Cut-off ditches, berms or diversion channels will be utilised around working area boundaries, where possible, to limit surface water entering the excavated areas and silty water running off the site into surface water drains or watercourses;
- Silt fences and silt traps will be installed prior to commencement of works and will be inspected daily to inform adaptive management as required. The locations of the same will be determined by the EnCoW. Site restoration, post works, will be carried out in agreement with relevant statutory consultees and with IFI, where relevant to watercourses;
- Silt fences will be inspected regularly by the EnCoW. These inspections will be daily during the proposed construction works, and regularly on completion of the works until bare areas have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately;
- Silt traps will be located in small drains where flow is low, and silt fences will be located where runoff from large areas needs to be controlled;
- Silt fences will be installed in the working areas and not at the water body;
- Where distances between the works and water body allow, a minimum setback distance of 20m from the water body will be maintained;

- Proposed construction access routes will be delineated, such that an appropriate set back distance from water bodies is maintained;
- Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site; and
- Weather conditions will be taken into account by the appointed contractor when planning construction activities to minimise the risk of silty water runoff from the site.

4.2.2 Silt Trap

The purpose of a silt trap is to reduce the level of solids in slow flowing water. The silt trap works by allowing a build-up of water behind it slowing the flow and allowing solids to settle out. The following requirements will apply during the Construction Phase:

- Silt traps will be placed in drains downstream of working areas where the volume of water flow is expected to be low and will be identified on-site by the EnCoW;
- Silt traps will be made of terram, not mesh;
- The silt trap will be staked into the banks of the drain / water body, such that no water can flow around the sides;
- he material will be bedded into the drain bed / water body to prevent water flowing beneath it;
- The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it;
- Inspections will be carried out daily during the proposed Construction Phase works by the EnCoW, and after heavy rains and / or strong winds; weekly on completion of the works for at least one month, and monthly thereafter until bare areas have developed new growth;
- Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom;
- The silt trap will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

4.2.3 Silt Fences

The following measures will be implemented in relation to silt fences during the Construction Phase:

- Silt fences will be installed prior to the commencement of works and will be inspected daily by the site team and EnCoW to inform adaptive management, as required. The locations of the same will be determined by the EnCoW;
- Site restoration post-works will be carried out, in agreement with IFI. These works will include riverbank stabilisation, gravel replacements, bank profiling and planting where required. In all cases, the site will be restored post-installation;
- Silt fences will be installed downslope of the area where silt is being generated;
- To be effective, the silt fence will contain the area where silt is generated and will terminate on high ground (i.e., an elevated area not adjacent to any watercourse);
- The base of the silt fence will be bedded at least 15cm to 30 cm into the ground at 2m intervals. The manufacturer's installation instructions will be followed during installation to ensure that the silt fence is appropriately installed;
- Once installed, the silt fence will be inspected regularly by the EnCoW, daily during the
 proposed Construction Phase works, and regularly on completion of the works until bare areas

have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately;

- Two lines of silt curtain / fence will be installed, for the receptors listed in Table 12.7 in Chapter 12 (Hydrology) in Volume 2 of the EIAR), unless otherwise agreed by the EnCoW;
- Any build-up of sediment along the fence boundary will be removed daily;
- Silt fences will be maintained until vegetation on the disturbed ground has re-established;
- The silt fencing will be left in place until the works are completed (which includes removal of any temporary ground treatment) and will remain in place until bare areas have developed new growth;
- Silt fences will not be removed during heavy rainfall;
- The silt fence will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

4.2.4 Stockpiling Material

The following measures will be implemented for the stockpiling of materials. During construction, mobilisation sites will either be cleared in stages to prevent bare earth being exposed to ambient conditions for prolonged periods, or the bare earth will be immediately covered in a gravel / plastic covering to reduce the likelihood of sediment laden runoff following rainfall events. Stripped soil will be stockpiled more than 10m away from the surface interceptor drain and watercourses. Stockpiles will be in a dry zone that is not subject to flooding (i.e. outside the 1:100 flood extent (1% Annual Exceedance Probability)).

The following measures will be put in place by the appointed contractor for stockpiling of material:

- Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins;
- Topsoil stripping in close proximity to any watercourses will be undertaken in dry weather conditions and all stockpiles will be located at least 10m from a watercourse or removed off site. Stockpiles within 200m of a watercourse will be covered to prevent rainwater leaching in to and mobilising the material.
- There will be designation of appropriate locations set back from watercourses and methods for stockpiling soil, aggregates, chemicals, etc. Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site;
- Where an excavation contains a combination of acceptable and non-acceptable material for reuse, the excavation will be conducted so that the acceptable material is excavated and stockpiled separately without contamination by the unacceptable material;
- Temporary stockpiles will be located away from surface water drains or watercourses at a minimum distance of 10m;
- The topsoil, and upper level of subsoil, will be stripped and stockpiled in identified locations;
- For watercourse crossings, stockpiles will not be located anywhere within the crossing working area;
- No stockpiles will be located within a European or National designated site or within a floodplain area; and
- Management of stockpiles to prevent siltation of watercourse systems through runoff during rainstorms will be required with the final measures to be determined by the appointed contractor. The following measures or equivalent measures will be included, at a minimum:

- Allowing the establishment of vegetation on the exposed soil. Where the stockpiles will not be present long enough for vegetation to be established, they will be covered to reduce rain infiltration and runoff;
- Providing silt fences or silt traps at the base of the stockpile to mitigate runoff during rain events;
- o Surrounding stockpiles with cut-off ditches to contain runoff;
- Directing any runoff to the site drainage system or filter drains along the construction working width and to the settlement pond (or other) treatment systems; and
- Providing bunds or another form of diversion to keep runoff from entering the stockpile area.

For mitigation relating to the stockpiling of riverine material excavated during the watercourse crossings, refer to the Hydrology Mitigation Measures in Table 6 of the CEMP (as taken from Chapter 12 (Hydrology) in Volume 2 of the EIAR).

4.3 Open Trench Water Crossings

The primary method for the crossing of water bodies will be open cut trenching. This approach will require the provision of a dry working area, which will be determined by the appointed contractor, but is likely to involve fluming / over pumping on smaller watercourses. This crossing method requires water bodies to be protected from the potential impacts outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR (included in the planning application pack). The following mitigation measures will be implemented along with the mitigation mentioned in Section 4 to minimise the impacts associated with open cut watercourse crossings:

- No works on water bodies will be allowed to commence until the relevant Risk Assessment Method Statements (RAMS) and pertinent Health and Safety documents are received from the specialist appointed contractor and are reviewed and agreed by the Client's representative. The appointed contractor documents will include method statements, open trenching risk assessments and environmental management plans specific to the area where the trenching is to take place. These plans will be submitted by the appointed contractor to the Employer's Representative on-site for review and comment, prior to commencing open trench operations. In addition to this, for the in-channel crossings, the appointed contractor will be required to prepare detailed construction method statements. Such method statements will be provided to IFI for approval;
- All open trenched water body crossings will take place during the June to September period in
 order to avoid the period of salmon and trout spawning, unless otherwise agreed with IFI.
 Consultation to-date with IFI indicates that for the crossings of the Tolka_020 (WB06), as a
 minimum, instream timing restrictions will apply as per the Guidelines on Protecting Fisheries
 During Construction Works in and Adjacent to Waters (IFI 2016);
- Any natural bed substrate (up to a depth of 30cm) removed from the water bodies will be stored separately to other stockpiled material, and covered with suitable waterproofing to prevent the washout of fines. Where a depth of 30cm is not present, the full depth of the layer will be removed to where the substrate is mainly clay or sand;
- The ground preparation works (such as soil stripping, hardstand formation) adjacent to the water body crossing will be carried out in the same manner as that for other works activities;
- Dewatering of the excavation will be treated on-site, and where necessary, pumps will be used to remove excess water from excavations. De-watering volumes will be treated using settlement tanks before the settled water is returned to the water body. A second tank in series with the first will be used if the first is not sufficient to remove enough solids. Pumped over water will be directed to a splash plate to prevent erosion of the riverbed / bank at the downstream outlet;
- Where technically feasible (i.e., where space and topographic constraints allow), fluming will be used as opposed to over pumping to provide a dry working area for the watercourse crossing. Where sites can be flumed, the diameter of the flume pipe will be chosen to accommodate

flows at the time, with spare capacity to cover that predicted over the period that the works are expected to last. A clay material will be used around the flume pipe to create a seal and prevent leakage and loss of flow volumes;

- Where fluming cannot be achieved, and damming and pumping methods are to be used for open trenching, sandbags will be used with an impermeable barrier. Material excavated from the trench (and an upstream pump sump, if required) will be placed on terram on level ground as far back from the water body edge, as is practicable, and surrounded on its downslope side by a silt fence and / or impermeable berm to prevent material re-entering the water body. This material, if deemed suitable, can be used to partially backfill the trench. However, a significant amount of material will be in excess and will be removed from site by a suitably licensed handler to a suitably licensed facility. All pumps will be monitored on a daily basis, and if failure occurs, pumps will be repaired or replaced as soon as possible;
- The natural bed material removed which was set aside will be used to reinstate the stream bed after the ducts have been installed and the flume pipe has been removed, as well as all the damming materials. The stream bed will be reinstated at the same level and grade as it was prior to the works to ensure that there are no changes in channel bed gradient;
- All bank surfaces will be reinstated using biodegradable stabilising materials (e.g. coir matting), which will be allowed to degrade and revegetate naturally from wind-blown seed. A silt fence will be placed along the riverbank where the works were undertaken to prevent solids washed off during heavy rainfall from entering the stream while the surface re-vegetates. This measure will be particularly important at sites which slope to the edge of the water body;
- Mitigation measures outlined in Section 4.2.1 to Section 4.2.4 will be employed, where appropriate, under the direct supervision of the EnCoW; and
- Visual monitoring, supported by visual turbidity monitoring of receiving waters, will be conducted by appointed contractor's EnCoW for the duration of the works. Post-reinstatement, weekly monitoring will also be undertaken until vegetation is established.

4.4 Use of Concrete

- The use and management of concrete in or close to watercourses will be carefully controlled to avoid spillage. Alternate construction methods are encouraged, for example, the use of pre-cast concrete or permanent formwork will reduce the amount of in-situ concreting required;
- Weather conditions will be taken into account when planning construction activities which require the use of wet concrete, to minimise the risk of the runoff of concrete 'washout' from site;
- Where concrete batching is proposed by the appointed contractor, this activity will be carried out at least 20m from surface water drains or watercourses. Washout from such mixing plant will be carried out only in a designated contained impermeable area;
- Batching and mixing activities and material storage areas will be located at least 10m (as per the CIRIA Guidance listed in Section 1.2) away from surface water drains or watercourses;
- Chute washout will be carried out at designated locations only, at least 10m from surface water drains or watercourses. These locations will be signposted throughout the construction works areas;
- Chute washout locations will be provided with appropriate designated, contained impermeable areas and treatment facilities, including adequately sized settlement tanks;
- The clear water from the settlement tanks will be pH corrected prior to discharge to any surface water drains or watercourses, or alternatively disposed of as waste to a licensed facility;
- Where temporary batching plants are required on-site, these will be located a minimum of 10m from any watercourse or drain (with exception to batching within a seal, dry working area);

- Washout from the batching process will be isolated from watercourses and drains and collected in a lined container. The container will be appropriately sized such that its capacity is at least 110% of the expected washout volume;
- The clear water from the settlement tanks will be pH corrected prior to discharge to any surface water drains or watercourses, or alternatively disposed of as waste to a licensed facility in accordance with the Duty of Care for Waste;
- Placing and/or batching of concrete in or near watercourses will be carried out under the supervision of the EnCoW;
- Wet concrete operations adjacent to and within water bodies will be avoided where possible, with a minimum separation distance of 20m, with the exception of when working within a sealed dry working area (e.g., during a trenched crossing);
- The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, where possible, and remote from water bodies or potential pathways to water bodies;
- There will be no hosing of concrete, cement, grout, or similar material spills into surface water drains or watercourses. Such spills will be contained immediately, and runoff prevented from entering the watercourse. Contained runoff will be collected and treated / disposed of appropriately; and
- Discharge of washout water to wastewater (foul) sewer will only be carried out with the express permission of the sewerage utility operator and will be treated to the standard required, for example, because of its high pH (alkalinity), washout water may need treatment before disposal to the foul sewer.

4.5 Vehicles and Plant

- Vehicles and plant provided for use on the Proposed Development will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure that they are free from leaks and are promptly repaired when not in good working order;
- Vehicles and plant will not park near or over surface water drains or watercourses, and where practicable, will only use pre-defined construction access routes throughout;
- Refuelling of vehicles and plant will be carried out on bunded hardstanding surfaces, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas;
- The appointed contractor will provide wheel washing facilities, and any other necessary measures to remove mud and organic material from vehicles at the Temporary Construction Compounds, where necessary. These will be located at least 10m away from any surface water drains or watercourses;
- Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location;
- A buffer zone of 20m will be maintained between storage and working areas and sensitive (WFD designated) water bodies, taking account of the minimum working area required to facilitate the works;
- Tracking beside streams will be avoided where practicable to avoid damage to the bankside. Where tracking of plant and machinery is necessary, steps will be taken to reduce the impact to channel banks through the provision of track mats or similar to reduce the impacts on the substrate;
- Geotextile or timber matting will be used on soft ground unless the EnCoW advises, before or after monitoring, that use of a wide-tracked machine alone would produce relatively lower siltation risk, than the installation and removal of bog mats;
- Concrete will be brought to site by covered truck. Wet concrete operations adjacent to water bodies will be avoided where possible, with a minimum separation distance of 20m, with exception of in-stream pours which would be undertaken within a sealed dry working area. The

appointed contractor(s) will ensure that all concrete truck washing / cleaning is undertaken off site where possible and remote from water bodies or potential pathways to water bodies; and

• Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces.

4.6 Water Body Crossings

There will be a requirement to provide a water body crossing on Dunboyne Stream_010 to facilitate construction access. At this stage it is anticipated that the temporary crossing will become a permanent crossing in this location to facilitate the new permanent access track to Joint Bay 1. The crossing will be subject to an extensive options appraisal during detailed design, which will determine the most appropriate crossing methodology. The following mitigation measures will be implemented during detailed design, along with the mitigation mentioned throughout Section 4, to minimise the potential for impacts associated with water body crossings.

4.6.1 Culvert Crossing

- Implement best practice associated with the design of culvert crossings (SEPA 2010; IFI 2016);
- The culvert will be positioned on the straightest part of the water body and aligned with the water body bed in this location;
- Culvert lengths will be the minimum required to facilitate the crossing;
- Bottomless or clear span culverts will be favoured during the detailed design stage with respect to closed pipe culverts;
- All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse (and will be agreed with IFI during the detailed design stage);
- Where possible, pre-cast elements for culverts and concrete works will be used;
- Culverts will be installed such that, where practicable, they align with the existing channel gradient and maintain existing channel width. This will help to ensure adequate water depth and velocity for fish passage;
- The natural riverbed level and slope will be maintained, by burying the culvert invert below the natural bed level. The culvert invert will be embedded to a minimum depth of 300mm (millimetres), or as agreed with IFI during the detailed design stage;
- All guidance / mitigation measures proposed by the OPW or the IFI will be incorporated into the detailed design of the proposed culvert;
- A sediment retention system (e.g. baffles) will be installed within culverts, where required, based on channel gradient and likely flow conditions;
- A low flow channel will be considered during the detailed design stage to account for periods of low flow during summer months. The low flow channel will be designed in conjunction with the hydraulics of the culvert with input from an experienced fluvial geomorphologist; and
- Energy dissipation at culvert outlets (where deemed necessary, based on hydraulic analysis during the detailed design stage) will be designed with reference to appropriate guidance and technical standards guidance.

4.6.2 Bridge Crossing

In relation to the proposed crossing on Dunboyne Stream_010, should the detailed design identify a bridge crossing as the preferred option, the detailed design will consider the following:

- Implement best practice associated with the design of culvert crossings (SEPA 2010; IFI 2016);
- Abutments will be set back from the river channel and banks to allow the continuation of the riparian corridor underneath the structure. This will help to minimise or prevent the need for

bed and bank reinforcement, reduce the risk of creating a barrier to fish passage and will allow mammal passage under the bridge structure;

- The distance between the bridge abutments will be designed to be as wide as possible to maintain the bank habitat, maximising the riparian corridor and allowing the water body some space to move;
- The natural channel width will be maintained;
- The foundations (of abutments) will be buried deep enough to minimise or prevent the need for bed or bank reinforcement or bridge weirs or aprons. This will maintain the natural bed material and bed levels, protecting habitat and allowing fish passage;
- The foundations will be buried deep enough to allow for scour during high flows. A suitably qualified engineer or geomorphologist will be consulted to advise on an appropriate depth;
- The structure will be designed to facilitate the passage of woody debris;
- The requirements for bed and bank reinforcement will be considered, only if the risk of erosion cannot reasonably be eliminated through the above measures;
- The length of bed and bank protection will be restricted and green bank protection measures will be implemented, where applicable;
- Bridge piers / abutments will be designed to minimise impacts on morphological processes such that abutments are set back on the floodplain. In-channel structures will not be favoured as part of the detailed design; and
- The crossing location will be identified with input from an experience geomorphologist to identify preferential crossing locations within the Planning Application Boundary in relation to channel alignment.

5. Monitoring of Water Bodies

A detailed CEMP will be established prior to construction by the appointed contractor. This will follow best practice for the storage, handling and disposal of hazardous / non-hazardous materials to prevent chemical pollution. All fuels or chemicals kept on the construction site will be stored in protected containers and all refuelling and maintenance will be carried out in bunded containment areas. Refuelling and maintenance in areas draining directly to water bodies will be avoided, as far as is practicable. Oil interceptors will also be installed in appropriate locations. Equipment will be regularly inspected and maintained. Where inspections show defects, equipment will be repaired immediately or taken out of use using a 'Tag Out Lock Out' until sufficient repairs can be implemented and signed off. Accidental spillages will be contained and cleaned up immediately using methods appropriate to the substance spilled. Remediation measures will be carried out in the unlikely event of pollution of the surface water environment.

The appointed contractor will carry out visual monitoring of surface water control measures (settlement tanks, silt fences, silt traps, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of all water bodies crossed by the Proposed Development will be carried out by the appointed contractor. A record of inspections will be maintained.

Indicators that water pollution may have occurred include the following:

- Change in water colour;
- Change in water transparency;
- Increases in the level of silt in the water;
- Oily sheen to water surface; and
- Floating detritus, or scums and foams.

If hydrocarbons are observed or other waste quality parameters are suspected to have been exceeded, as a result of the of an incident but where a visual inspection may not provide sufficient information to conclude,

an investigation will be carried out to determine whether any element of the construction of the Proposed Development could be causing the contamination. If any potential sources of contamination are observed, appropriate actions will be taken (depending on the source and nature) to prevent further contamination and the incident will be recorded and investigated in more detail to prevent a recurrence. If required, the relevant regulatory authorities will be informed.

6. References

CIRIA (2001). Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532)

CIRIA (2005). PUB C650 Environmental Good Practice on Site, 2nd Edition.

CIRIA (2006a). Control of Water Pollution from Linear Construction Projects. Technical Guide (C648).

CIRIA (2006b). Control of Water Pollution from Linear Construction Projects. Site Guide (C649).

Enterprise Ireland (2003). Best Practice Guidelines BPGCS005 – Oil Storage Guidelines

IFI (2016). Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters

Met Éireann (2024). Weather Forecast. [Online] Available at https://www.met.ie/

Murnane et al. (2006a). CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide

Murnane et al. (2006b). CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide

NRA (2006). Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

SEPA (2010). Wat-sg-25 Engineering in the water environment: good practice guide – River Crossings, Second Edition.

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

TII (2015a). Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1).

TII (2015b). Road Drainage and the Water Environment DN-DNG-03065.

Directives and Legislation

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water

Number 10 of 1996 – Waste Management Act 1996 (Revised)

S.I. No. 324 of 2011 – European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011

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

S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021



East Meath - North Dublin Grid Upgrade Construction Environmental Management Plan – Appendix E

Invasive Species Management Plan

EirGrid

March 2024



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Appendix E – Invasive Species Management Plan

1. Introduction

This Non-Native Invasive Species Management Plan (hereafter referred to as the ISMP) has been prepared for the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). This ISMP contains the management recommendations in respect of preventing the spread of and managing a range of non-native invasive plant species along the Proposed Development. Invasive Species (IS), Invasive Alien Species (IAS) or Invasive Alien Plant Species (IAPS) are terms sometimes referenced in legislation and or guidance. They are referred to as non-native invasive species in this ISMP but are interchangeable.

The ISMP describes the options available to manage and prevent the spread of Third Schedule, non-native invasive plant species identified in the vicinity of the Proposed Development. Only non-native invasive plant species listed on the Third Schedule of S.I. No. 477 of 2011 – European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) (hereafter referred to as the Birds and Natural Habitats Regulations) are dealt with in this ISMP.

The ISMP will be developed prior to the commencement of any on-site works for the Proposed Development. Construction works can disturb stands of Third Schedule non-native invasive plants and / or soils contaminated with non-native invasive plant material, as well as potentially leading to a new infestation. Therefore, management measures contained in the ISMP will be implemented to avoid any direct or indirect impacts to habitats and species contained within the locality or as a result of its introduction to the area.

1.1 Purpose of this Plan

The purpose of this ISMP is:

- To provide guidance on the removal of existing non-native invasive species on-site;
- To ensure that non-native invasive plants do not become established on-site;
- To ensure that non-native invasive species do not become dominant in all or parts of the landscape; and
- To implement a monitoring programme to detect the presence of non-native plant species as well as to monitor the success of the ISMP.

The objective is to identify, remove and where possible, prevent establishment of non-native invasive species, as required by legislation. This ISMP is Appendix E of the Construction Environmental Management Plan (CEMP) (included as a standalone document in the planning application pack).

1.2 Structure of this Plan

This ISMP has the following structure:

- Section 2: Methodology;
- Section 3: Results;
- Section 4: General Measures to Control and Prevent the Spread of Non-Native Invasive Species; and
- Section 5: Assessment of Management Options for Third Schedule Non-Native Invasive Species.

2. Methodology

2.1 Relevant Legislation, Policy and Guidelines

2.1.1 Legislative Context

The Birds and Natural Habitats Regulations contain specific provisions that govern control of listed invasive species. It is an offence to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise species listed on the Third Schedule of the Birds and Natural Habitats Regulations without a Licence. The two regulations that deal specifically with this scheduled list of species are:

- Regulation 49: Prohibition of introduction and dispersal of certain species; and
- Regulation 50: Prohibition on dealing in and keeping certain species.

The following activities are strictly prohibited:

- Dumping invasive species cuttings anywhere other than in facilities licensed to accept them;
- Planting or otherwise causing invasives to grow in the wild. Hence the landowner (in respect of the Proposed Development this being the Electricity Supply Board (ESB) and the appointed contractor) will be careful not to cause further spread);
- Disposing of invasive species at a landfill site without first informing the landfill site (that is licensed under Number 10 of 1996 Waste Management Act, 1996 (as amended) (hereafter referred to as the Waste Management Act) to take such Third Schedule material (plant or soil) that the waste contains invasive species material (this action requires an appropriate licence);
- Moving soil which contains Third Schedule-specific non-native invasive species in the Republic of Ireland, unless under licence from the National Parks and Wildlife Service (NPWS) (this licence is a separate from and does not discharge any person being in receipt of other necessary waste permits / licences etc.); and
- Regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (hereafter referred to as the IAS Regulation) lists specific 'Species of Union Concern', some of which overlap with the Third Schedule species.

The IAS Regulation conveys the rules to prevent, minimise and mitigate the adverse impacts of the introduction and spread (both with and without intention) of IAS on biodiversity and the related ecosystem services, as well as other adverse impacts on human health or the economy. Ireland's 4th National Biodiversity Action Plan 2023-2030 (National Parks and Wildlife Service (NPWS) 2023) requires that:

"by 2023, invasive alien species are controlled, managed and where possible, eradicated".

A target of Ireland's 4th National Biodiversity Action Plan 2023-2030 is to "reduce alien species by at least 50%".

2.1.1.1 Limitations

It should be noted that any decision on efficacy of chemical treatments will only be provided by a registered pesticides advisor. A suitably qualified specialist will be appointed by the appointed contractor to monitor the treatment of non-native invasive species. This ISMP will be updated as necessary by the specialist.

2.1.2 Guidance

The ISMP and the mitigation strategies that are discussed relating to invasive plant species have been prepared with regard to the following guidance documents, where relevant:

- Transport Infrastructure Ireland's (TII) The Management of Invasive Alien Plant Species on National Roads Technical Guidance (TII 2020a);
- The Management of Invasive Alien Plant Species on National Roads Standard (TII 2020b);
- Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (TII 2010);
- National Road Authority's (NRA) Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA 2010);
- Ireland's 4th National Biodiversity Action Plan 2023-2030 (NPWS 2023);
- The Environment Agency (EA) Managing Japanese knotweed on development sites the Knotweed Code of Practice (Version 3, amended in 2013, withdrawn from online publication in 2016) (EA 2013). (This document, although no longer supported by the EA, is nonetheless a practical document in determining the approach and control mechanisms for Japanese knotweed);
- Managing Invasive Non-Native Plants in or near Freshwater (EA 2010);
- Invasive Species Ireland (ISI) Best Practice Management Guidelines for Japanese knotweed (ISI 2008a);
- Best Practice Management Guidelines for Himalayan balsam (ISI 2008b);
- Best Practice Management Guidelines for Giant hogweed (ISI 2008c);
- Non-Native Species Secretariat (NNSS) Allium triquetrum (Three-cornered leek) Great Britain Non-Native Organism Risk Assessment Scheme (NNSS 2011); and
- Countryside Management Publications, Giant hogweed (Department of Agriculture and Rural Development (Northern Ireland) (2016).

2.1.3 Surveys

Following on from a desk-based study review of the National Biodiversity Data Centre (NBDC) records, nonnative invasive species surveys were undertaken for the Proposed Development from January 2023 to August 2023, within the appropriate botanical season (April to September) when species are readily observable and identifiable.

Non-native invasive species listed on the Third Schedule of the Birds and Natural Habitats Regulations were searched for within and adjacent to the Proposed Development. Surveys were carried out by the EIAR ecologists, and all Third Schedule non-native invasive species recorded were mapped (See Figure 10.9 in Volume 4 of the EIAR). This data fed into the EIAR. Full details of the surveys are included in Chapter 10 (Biodiversity) in Volume 2 of the EIAR.

3. Results

There were five non-native invasive plant species listed on the Third Schedule of the Birds and Natural Habitats Regulations identified as occurring at various locations within the Proposed Development Planning Application Boundary during the habitat surveys, namely three-cornered leek *Allium triquetrum*, Spanish bluebell *Hyacinthoides hispanica*, Giant hogweed *Heracleum mantegazzianum*, Japanese knotweed *Reynoutria japonica* and rhododendron *Rhododendron ponticum*. In total there were 10 locations where these non-native invasive plant species were located, some of which occur in proximity to each other.

A further five non-native invasive species not listed on the Third Schedule were also recorded during the survey. However, populations of these are not known to pose risk of impact to protected, notable or rare species of conservation concern. These included:

- Winter heliotrope *Petasites pyrenaicus*;
- Buddleia Buddleja spp.;
- Snowberry Symphoricarpos albus;
- Sycamore Acer pseudoplatanus; and
- Cherry laurel *Prunus laurocerasus*.

Table 3.1 summarises the locations of non-native invasive plant species confirmed adjacent to the boundary of the Proposed Development.

Invasive Species	Location	Description
Three-cornered Leek Allium triquetrum	In road verge on cable route	Three-cornered leek (<i>Allium triquetrum</i>) was present along the route of the Proposed Development at Chainage 5,400 (coordinate reference N 95657 44458). The stand was located on the road verge and is located just outside of the Proposed Development's Planning Application Boundary.
Spanish Bluebell Hyacinthoides hispanica	c. 260m from cable route along road c. 38m from cable route along road	Spanish bluebell (<i>Hyacinthoides hispanica</i>) was present in two locations along the Proposed Development. One stand was located approximately 38m from the proposed cable route on a road verge between Chainage 28,650 and 28,700 (coordinate reference O 13454 44629) and is outside the Planning Application Boundary. Another stand was located approximately 260m from the proposed cable route at Chainage 13,400 on a road verge (coordinate O 01451 44549).
Giant Hogweed Heracleum mantegazzianum	c. 1m from the cable route c. 86m from the cable route	Giant hogweed (<i>Heracleum mantegazzianum</i>) was present in two locations along the Proposed Development. One stand of possible Giant hogweed was present less than 1m away from the Proposed Development between Chainage 12,550 and 12,600 (coordinate reference O 01639 44009). The second stand was approximately 86m from the Proposed Development and outside of the Planning Application Boundary at Chainage 15,900 (coordinate reference O 03724 45107).
Japanese Knotweed <i>Reynoutria japonica</i>	c. 90m from the cable route along the road c. 114m from the cable route along the road c. 488m from the cable route along the road c. 92m from the cable route	Japanese knotweed (<i>Reynoutria japonica</i>) was present in four locations along the Proposed Development. One stand was recorded approximately 90m from the proposed cable route between Chainage 35,500 and 35,550 and was located outside of the Planning Application

Table 3.1: Summary of Third Schedule Species Recorded Adjacent to the Proposed Developm

East Meath - North Dublin Grid Upgrade Construction Environmental Management Plan – Appendix E

Invasive Species	Location	Description
		Boundary along a road verge (coordinate reference O 18925 43146). A second stand was located nearby, approximately 114m from the proposed cable route between Chainage 35,500 and 35,550 and was located outside of the Planning Application Boundary along a road verge (coordinate reference O 18894 43144, County Dublin). A third stand was located approximately 488m from the proposed cable route, south-east of Chainage 12,600 (coordinate reference O 02051 43691) along a road verge. This stand had been signposted by the County Meath. A fourth stand was located approximately 92m from the proposed cable route outside of the Planning Application Boundary within an area of scrub north of Chainage 31,600 (coordinate reference 0 16230 44547).
Rhododendron Rhododendron ponticum	c. 6m from cable route on the banks of a watercourse near the cable crossing point	Rhododendron (<i>Rhododendron ponticum</i>) was present in one location along the Proposed Development. The stand was located approximately 6m from the proposed cable route at Chainage 18,200 and was located within the Planning Application Boundary (coordinate reference 0 05654 45437).

Records were returned for one further non-native invasive species, Giant rhubarb *Gunnera tinctoria*, during the desk-based study which is listed on the Birds and Habitats Regulations. However, this is considered likely absent from the study area and outside of the zone of influence based on the collective desk study and field survey results. For full details of the desk-based study, refer to Chapter 10 (Biodiversity) in Volume 2 of the EIAR (included in the planning application pack).

Giant hogweed, Japanese knotweed, and rhododendron are considered highly invasive in accordance with the risk assessments undertaken for Invasive Species Ireland (Invasive Species Ireland 2024), whereas threecornered leak and Spanish bluebell are considered a medium impact species, which can be more readily managed. Further details on the ecology of these species are provided in Section 5.

Based on these findings, Section 5 of this ISMP provides a high-level analysis of these five species and outlines the practical control / eradication measures that can be used to ensure no spread of non-native invasive plant species into the wider area. Particularly sensitive habitats may include European designated sites comprising Qualifying Interest (QI) habitats and species and Special Conservation Interest (SCI) species.

Species such as Japanese knotweed can quickly become established and spread in suitable urban areas, including gaps in the built environment such as the sides of old buildings, pavements, and on derelict ground. Where large populations occur, it may be a requirement of the local authorities that they be managed to ensure no excessive spread (e.g. Meath County Council (MCC) and Fingal County Council (FCC)), as well as those responsible for new linear infrastructure projects. The implementation of the general measures provided in Section 4 will minimise the risk of any spread of these species as a result of the construction of the Proposed Development.

It is recognised that other non-native invasive species not listed in the Third Schedule, such as noxious weeds, occur within the Planning Application Boundary and within the zone of influence. These are not ordinarily dealt with in non-native invasive species management plans, and there is separate legislation and guidance for the control of noxious weeds (e.g. Number 38 of 1936 Noxious Weeds Act, 1936 and S.I. No. 103 of 1937 Noxious Weeds (Thistle, Ragwort, and Dock) Order, 1937).

4. General Measures to Control and Prevent the Spread of Non-Native Invasive Plant Species

4.1 Ecological Clerk of Works

An on-site Ecological Clerk of Works (ECoW) will be appointed by the appointed contractor to carry out preconstruction surveys to ensure that the ecological baseline remains current and, where required, will implement the appropriate mitigation measures needed. Where sensitive habitats or species have the potential to be impacted, the ECoW will be on-site to implement all mitigation measures, as described below. The ECoW will have sufficient experience to carry out the task(s) at hand and will be a member of a professional body such as the Chartered Institute of Ecology and Environmental management (CIEEM) / the Institute of Environmental Management and Assessment (IEMA), or similar.

An ECoW must be present during any excavation (as outlined in Section 5) and will ensure that the specific ISMP measures are followed. A toolbox talk will be provided prior to the commencement of works to ensure the role and authority of the ECoW is understood by everyone working on the construction site.

4.2 **Pre-Construction Survey**

During the time elapsed between the completion of initial non-native species surveys and the commencement of works, it is possible that the existing stands of Third Schedule non-native invasive species may have changed. Non-native invasive species may have expanded (if unmanaged) or decreased (if there is an active management regime in place), or newly established Third Schedule non-native species may have become established within the footprint of the Proposed Development.

Pre-construction surveys will be undertaken by a suitably qualified specialist, to confirm the absence, presence and / or extent of all Third Schedule non-native invasive species within Planning Application Boundary. Where the presence of invasive species is confirmed within the Planning Application Boundary, this will require the implementation of the ISMP.

Data collected as part of the pre-construction invasive species survey will include a detailed description of the population(s) including the approximate coverage of respective colonies (recorded in m² (metres squared)). Where feasible, records will include the total number of stems, pattern of growth and information on other vegetation present. This information will enable calculations of volumes of infested soils to be excavated, where necessary, as part of the measures outlined below.

Following on from the pre-construction invasive species survey, the ISMP will be updated, as advised by a suitably qualified specialist, with regard to the Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII 2020a) and Standard (TII 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary. The updated ISMP will detail the strategy that will be adopted during the Construction (and Operational) Phase in order to manage and prevent the spread of invasive non-native plant species, and where Third Schedule non-native invasive species are encountered directly in the works area, the method of treatment / eradication.

4.2.1 Invasive Species Management Plan (ISMP)

Following on from the pre-construction invasive species survey, the ISMP will be updated to detail the exact measures for any non-native invasive species population present within the Planning Application Boundary. Depending on the extent and nature of the works, a number of approaches / treatments may be approved, all following on from the measures in the ISMP.

The appointed contractor will ensure that all control measures specified in the ISMP will be implemented by a suitably qualified and licensed specialist, prior to the Construction Phase of the Proposed Development, to control the spread of newly established non-native invasive species within the Planning Application Boundary. Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Development. The site will be monitored by the appointed contractor after control measures have been implemented. Any regrowth of invasive non-native species will be subsequently treated.

All measures that are prescribed in the ISMP will be equally applicable to advance works as to construction works. In the Operational Phase, relevant landowners will be responsible for the continued control and management of invasive species as per their plans and procedures, and responsibilities under the Birds and Natural Habitats Regulations.

4.3 General Measures to Avoid the Spread of Non-Native Invasive Species

The unintentional spread of non-native invasive species during construction works (within a construction site or unwittingly from outside of a site, such as through the importation of materials or poor biosecurity practices regarding plant and machinery) can be a significant issue, and if not managed properly, can result in the spread of non-native invasive species to other areas (within or adjacent to works areas). This would increase the future cost and effort required to control the species and could pose further public health and safety risks (Japanese knotweed can cause damage to weaknesses in the built environment, whilst Giant hogweed is an environmental public health hazard).

The most common ways that invasive species can be spread is:

- Site and vegetation clearance, mowing, hedge-cutting or other landscaping activities;
- Spread of seeds or plant fragments during the movement or transport of soil;
- Spread of seeds or plant fragments through the local surface water and drainage network;
- Contamination of vehicles or equipment with seeds or plant fragments which are then transported to other areas;
- Importation of soil from off site sources contaminated with invasive species plant material; and
- Leaving riparian corridors bare of vegetation thus allowing establishment of seed material from outside the site.

4.3.1 Site Establishment

During advance works and prior to the commencement of construction, any areas where Third Schedule nonnative invasive species have been recorded by the pre-construction surveys must be clearly fenced off prior to and during construction (in order to avoid spreading seeds or plant fragments around or off the construction site) until such time that the mitigation measures are implemented and treatment has been completed, or that works in these areas are monitored in accordance with the requirements of the ISMP.

This includes the Temporary Construction Compounds, Horizontal Directional Drilling (HDD) Compounds and the entirety of the works within the Proposed Development Planning Application Boundary. Earthworks or machinery movement must be avoided in any areas where non-native invasive species have been identified during the pre-construction surveys, until the relevant stands have been eradicated.

4.3.2 Biosecurity and Site Hygiene

It is important to ensure that the spread of non-native invasive species, where present, is curtailed. It is also necessary to ensure that in areas where non-native invasive species are not present, that they are not unintentionally spread (e.g. through the importation of contaminated material being brought onto the site).

Unwashed construction equipment, plant, vehicles, and footwear can provide a vector for the spread of nonnative invasive species within the Proposed Development Planning Application Boundary and from areas outside of the Proposed Development Planning Application Boundary, where infestation is present or where vector material potentially containing seed / root material is attached to plant. The following hygiene measures will be implemented for the Proposed Development:

- Known stands of invasive non-native species or potentially affected areas within the working
 area of the Proposed Development will be clearly fenced off in advance of works. Access in
 these areas will be restricted until such time that treatment has commenced and / or
 construction works are monitored in accordance with the ISMP in the area. In relation to
 Japanese knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all
 directions (within the works area and 3m vertically underground);
- Erection of clear signage at the Temporary Construction Compounds / HDD Compounds etc. and inclusion of details during toolbox talks or similar (environmental induction) for construction staff in respect of the management of Third Schedule non-native invasive species. The signage and notification will be easily understood so that users are aware of the measures to be taken for known non-native invasive species, or what they should do in the case of suspected non-native invasive species identified. In particular, the potential health risks posed by Giant hogweed and its location within or adjacent to the Proposed Development will be clearly notified to personnel;
- Identify dedicated access points into and out of fenced off areas. These will not be breached until such time that eradication / removal of non-native invasive species is confirmed or monitoring of the treatment / eradication process is commenced;
- Where possible, the locations of dedicated footwear and wheel wash facilities will be identified in the ISMP. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed contractor will ensure that no excavated loose material is allowed offsite from within an exclusion zone. Similarly, where plant is used to excavate soils, it will be visually checked for loose soil before movement to another part of the site (as far as practicable, the movements of tracked machinery will be restricted within the non-native invasive species exclusion zone). Loose soil will be scraped off and disposed of, and a solution of Virkon[©] (or similar approved disinfectant) will be applied to machinery to ensure that no obscured seed / root material remains viable;
- Vehicular movements within the exclusion area will be minimised as far as is practical;
- Machinery which has been used for the transport and / or excavation of contaminated vector material (or material suspected to be contaminated) will be thoroughly washed down, and the washings captured for disposal. All such machinery / plant will not be permitted to commence work elsewhere on-site or offsite until written confirmation of the above measures has been documented;
- Dedicated wash down and solution capture will be set up in the Temporary Construction Compounds / HDD Compounds. All washings will be stored in a quarantined bunded container that is rated for such storage until such time that they are removed offsite for disposal and transferred to a facility that is authorised to accept such waste;
- Except in very particular circumstances, under the guidance of the specialist, there will be no temporary storage of contaminated soils (or soils suspected to be contaminated) on-site. These must be removed from site as per the guidance in Section 2.1.2; and

 Where small volumes (e.g. volumes capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil) occur, it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the Temporary Construction Compounds / HDD Compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated infected soil.

4.3.3 Soil Excavation

No excavations within a clearly demarcated and fenced off buffer zone will be permitted. For Japanese knotweed, guidance recommends a horizontal distance of up to 7m from the outside of the stand. This can include land underneath built ground, should suitable areas of weakness or uncompacted ground be encountered by the plants' rhizomes. For other species there will be different buffer zones as guided by the specialist.

Where the excavation of soil containing Third Schedule non-native invasive species (vector material) is the preferred option, the operation will be monitored for its entirety by the appointed ECoW until the risk of spread of Third Schedule non-native invasive species is negated.

There will be no temporary storage on-site of bulk excavated infected material. Where the ISMP calls for shallow / deep burial, this material will be removed from the excavated area and transported immediately to an approved receptor area on-site. Furthermore, the temporary storage of uninfected material will not occur within a European or national designated site, nor within 10m of any watercourse and any land within an identified flood zone. Where temporary stockpiles of infected material cannot for practical limitations be situated away from a potential flood risk area, the appointed contractor will be required to include a flood response plan within the Environmental Incident Response Plan (EIRP) (see Appendix A (EIRP) of the CEMP) to ensure that any inundation of Temporary Construction Compounds / HDD Compounds does not result in a pollution event to nearby water bodies.

Plant and machinery used in the control, excavation and transport of invasive materials will also be subject to the recommendations described in Section 4.3.2.

The installation of industry-rated non-native invasive species-proof membrane before infilling construction of road / paths surface may be required. All waste arising out of this process which has been in contact with the excavated ground will be treated as infected waste and disposed of at a facility that is authorised to accept such waste (see Section 4.3.4). Where the movement of any Third Schedule non-native invasive species is required offsite, a licence will be required from the NPWS in advance of any movement to a site / facility licensed to accept such waste, as per the Birds and Natural Habitats Regulation. This licence is separate to and does not negate the need for licences / permits / authorisations required under waste legislation.

4.3.4 Disposal of Material

Where any non-native invasive plant material is collected (e.g. by hand-pulling or mowing), it is important that its disposal does not result in a risk of further spread. The movement of invasive plant material offsite requires a licence from the NPWS, as per the Birds and Natural Habitats Regulations. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation (e.g. Waste Management Act, Section 4 of Number 6 of 1987 – Air Pollution Act, 1987, relevant local authority byelaws and any other relevant legislation). All disposals must be carried out in accordance with the relevant waste management legislation, as per the guidance in the Guidelines for the Management of Waste from National Road Construction Projects (TII 2017).

It should be noted that some invasive species plant material or soil (vector material) containing residual herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the

Waste Management Act, and both categories may require special disposal procedures or permissions. Advice will be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.

4.3.5 Measures to be Implemented During the Application of Herbicides

Some of the control options may require the use of herbicides, which can pose a risk to human health, to nontarget plants or to wildlife. In order to ensure the safety of herbicide applicators and of other public users of the site, a suitably qualified pesticides advisor, registered with the Department of Agriculture, Food and the Marine (DAFM) must be employed.

The appointed contractor will be required to refer to the appropriate guidance documents, including but not limited to those listed in Section 2.1.2, which provide detailed recommendations for the control of invasive species and noxious weeds.

These documents include measures to aid the identification of relevant species, with details for the timing, chemicals and methodology for chemical control (if applicable), and for measures to avoid environmental damage during the use of herbicides. The appointed contractor (or the specialist as appropriate) will update the ISMP in accordance with the relevant guidelines before commencing works.

It should be noted that where a chemical treatment is to be used, there is a risk of contaminating a watercourse. The choice of herbicide is typically limited to formulations of Glyphosate or 2,4-D amine that are approved for use near water. Full details of any chemical used, where required and as advised by a registered pesticides advisor, will be included in the ISMP prepared in advance of the Construction Phase of the Proposed Development.

4.3.6 Importation of Soil and Other Material

The bulk importation of material from offsite has the potential to result in the accidental spread of Third Schedule non-native invasive species, as it is uncertain if these site(s) are free from non-native invasive species. This is likely less of an issue for road building material. However, in terms of landscaping, if soil is imported to the site for landscaping, infilling or embankments, the appointed contractor will seek documentation from suppliers confirming that the material is free from invasive species.

4.4 Post-Construction Monitoring

Following the construction of the Proposed Development, there may be ongoing treatment programmes which extend for a number of years into the Operational Phase. In the Operational Phase, relevant landowners will be responsible for the continued control and management of as per their plans and procedures, and responsibilities under the Birds and Natural Habitats Regulations.

The above measures are important for all Third Schedule non-native invasive species, and in particular Japanese knotweed, where it occurs, as maintenance works associated with landscaping, such as mowing and hedge cutting have the potential to spread this plant via the dispersal of very small amounts of shredded plant material. If invasive plants are found, they will be treated as per the measures outlined in the ISMP and any species-specific guidelines.

5. Assessment of Management Options for Third Schedule Non-Native Invasive Species

The general measures included in Section 4 are required to ensure good on-site practices in respect of known or potential Third Schedule non-native invasive species.

Section 5.1 to Section 5.6 further identify practical management controls. The colour scheme shown is a qualitative tool intended to assist the reader to focus on the most likely practical solutions. It is acknowledged that more than one potential control measure exists and that a single or combination of measures may be required. The recommendations presented in this ISMP provide the minimum requirements for the likely control measures, and these measures will be developed (with further detail on methodology used at each location, timing, practical management, etc.) by the appointed contractor (or the specialist as appropriate).

The use of chemical treatments is recognised as a potential treatment option. However, the services of a registered pesticide advisor must be employed in the specifying of named chemicals including those rated for use adjacent to aquatic environments (where required), treatment type, dosage, and timing, etc., and / or use of pesticides in the management of potential Third Schedule non-native invasive species within the Planning Application Boundary. The selected management control to be defined for each non-native invasive species stand within the Planning Application Boundary will depend on:

- Results of the pre-construction survey; and
- Construction requirements timing of works at specific locations, level of infestation and practical considerations such as reducing disturbance to road users / homeowners.

The ISMP, which will be updated following on from the pre-construction surveys, may require the utilisation of a number of controls that are described in Section 5.1.

5.1 Control Methods

There are three main types of invasive species control methods, including:

- Mechanical / Physical Control;
- Chemical Control; and
- Biological Control.

Selecting the correct form of control will depend on the target species. Often, invasive species are managed using a combination of different control and treatment types. Integrating multiple forms of control can offer a more effective, economic and sustainable way of managing invasive species.

5.1.1 Mechanical / Physical Control

Mechanical or physical control entails damaging or removing the plant by physical action. Different techniques could be used (e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping). This control option is only feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive and could cause severe soil disturbance and erosion. For sites with no existing dense stands of non-native invasive plant species, hand-pulling or manual removal using hand tools will be the most appropriate methods.

5.1.2 Chemical Control

Chemical control should only be used as a last resort, since it is hazardous for natural vegetation. It should not be necessary if regular monitoring is undertaken, which should be effective for controlling invasive non-native plants. Chemical control involves the use of registered herbicides to kill the target weed. Managers and herbicide operators must have a basic understanding of how herbicides function. The use of inappropriate herbicides and the incorrect use of the appropriate herbicides are wasteful and expensive practices and often do more harm than good, especially when working close to watercourses. Some herbicides can quickly contaminate fresh water and / or be transported downstream where they may remain active in the ecosystem.

Herbicides are either classified as selective or non-selective. Selective herbicides are usually specific to a particular group of plants (e.g. those specified for use on broadleaved plants but should not kill other plants such as grasses). Non-selective herbicides can kill any plant that they come into contact with and are therefore not suitable for use in areas where native vegetation is present.

Chemical application techniques can include foliar (leaf) application, stem applications (basal stem, total frill, stem injections) and stump applications (cut stump, total stump, scrape and paint).

5.1.3 Biological Control

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of a non-native invasive plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plant's reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

5.2 Three-Cornered Leek (Allium triquetrum)

Three-cornered leek is a perennial that grows from small white bulbs resembling cloves of garlic. It is a member of the onion family and the whole plant has a faint smell of garlic. It is for this reason that it is often referred to as three-cornered garlic. Its leaves emerge in mid-winter, and it flowers in April and May.

A medium impact, rhizomatous species, three-cornered leek is often planted and can become established in natural and semi-natural habitats, where it is reported to spread by ant-dispersed seed and division of clumps. It can readily establish in suitable ground resulting in it posing a threat to biodiversity where the plant forms early season dense monocultural masses, particularly at protected sites.

Management of this species is relatively straightforward, although there is a requirement that it be visible above ground so as to delineate its likely extent and ensure efficacy of management. Infestations can be managed through chemical or physical-based options or a combination of both. However, given the possibility of some underground bulbs / seedbank remaining within the ground post-treatment, eradication may require a number of repeat treatments over a number of years to ensure effective treatment of all bulbs.

Three-cornered leek is considered an invasive species because it spreads very rapidly and forms dense infestations that exclude native flora.

Table 5.1 presents an assessment of potential treatment options available for the treatment of threecornered leek. The various methods are analysed and described in further detail, as necessary.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Hand dig	Hand-dig when small population present, ensuring that all biomass including bulbs collected. May also require a number of years of mechanical cutting to exhaust seed / bulb bank in wider subsurface environment. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site.	Likely.
	Mechanical Excavation	For larger areas of infestation only, soil can be screened, and bulbs removed. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site.	Unlikely given the nature and size of the identified populations.
Chemical	Spray	Chemical treatment can be made in the spring (when above ground vegetation visible) but before flowering. Multiple applications may be required due to persistence of bulbs and soil seed bank.	Possible – Where ground is to be excavated, may require physical control also.

Table 5.1: Assessment of Management Method for Three-Cornered Leek

Physical and / or chemical control must be implemented in March or April when plants have fully formed leaves. Control may be ineffective and is not recommended if plants have finished flowering.

5.2.1 Temporary Storage of Collected Material

Given the nature and relative sizes of infestations of three-cornered leek, bulbs and vegetative material, where not disposed of immediately to authorised facilities, will be double bagged and placed in dedicated quarantine areas to decompose before disposal with similar non-native invasive species waste at authorised facilities.

5.2.2 Reseeding Following Eradication

For any area of ground that is cleared of three-cornered leek, and is not constructed upon, a follow-on mechanical hand-pulling / cutting regime and / or chemical treatment may be required post construction to ensure full exhaustion of the bulb / seed bank.

5.3 Spanish Bluebell (*Hyacinthoides hispanica*)

Spanish bluebell is a spring-flowering bulbous perennial native to the Iberian Peninsula. Most of its life cycle occurs in winter and spring, with leaves first appearing in December, and flowers emerging in April and May. Leaves die back in later summer, but dry fruiting stems remain for most of the year. It spreads primarily by seeds, although bulbs can also regrow if moved elsewhere.

Spanish bluebell is considered an invasive species because it readily hybridises with the Irish native bluebell (*Hyacinthoides non-scripta*). This poses a threat to the long-term genetic health of the native species.

Table 5.2 presents an assessment of potential treatment options available for the treatment of Spanish bluebell. The various methods are analysed and described in further detail, as necessary.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Hand dig	Hand-dig when small population present, ensuring that all biomass including bulbs collected. May also require a number of years of mechanical cutting to exhaust seed / bulb bank in wider subsurface environment. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non- native invasive species offsite.	Likely.
	Mechanical excavation	For larger areas of infestation only, soil can be screened, and bulbs removed. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Unlikely given the nature and size of the identified populations.
Chemical	Spray	Chemical treatment can be made in the spring (when above ground vegetation visible) but before flowering. Multiple applications may be required due to persistence of bulbs and soil seed bank. The use of herbicide is not considered an effective measure of Spanish Bluebell.	Possible -where ground is to be excavated, may require physical control also.

Table 5.2: Assessment of Management Methods for Spanish Bluebell

Physical and / or chemical control must be implemented in March or April when plants have fully formed leaves. Control may be ineffective and is not recommended if plants have finished flowering.

5.3.1 Temporary Storage of Collected Material

Given the nature and relative sizes of infestations of Spanish bluebell, bulbs and vegetative material, where not disposed of immediately to authorised facilities, should be double bagged and placed in dedicated quarantine areas to decompose before disposal with similar non-native invasive species waste at authorised facilities.

5.3.2 Reseeding Following Eradication

For any area of ground that is cleared of Spanish bluebell, and is not constructed upon, a follow-on mechanical hand-pulling / cutting regime and / or chemical treatment may be required post construction to ensure full exhaustion of the bulb / seed bank.

5.4 Giant Hogweed (*Heracleum mantegazzianum*)

Giant hogweed is a high-risk invasive species, that is also a biohazard, in that it can pose a threat to humans. The chemistry of its sap is such that skin contact exposure can result in prolonged photosensitising reactions with blistering. Thus, a clearly demarcated exclusion buffer, in excess of 4m, is recommend for any individual / populations of this species before commencing works.

Giant hogweed can form dense colonies which suppress the growth of native plants including grasses, displacing species and negatively impacting ecologically sensitive and vulnerable habitats.

It spreads via seeds which can easily be transported by water. Hence, it is often found along river corridors. While the plant favours riverbanks, it is known to be found on waste / derelict ground as well as railway lines for instance. Its presence can impact local biodiversity and undermine bankside integrity. The seedling stage is the most vulnerable. Mortality of seedlings is comparable to many other plants and its seed bank is

considered to be persistent for a short number of years only. Since Giant hogweed can only reproduce via seed, control measures applied before flowering and fruit set will limit subsequent generations (and even then, only with favourable conditions). The ideal time to control Giant hogweed via chemical treatment is April, with follow on monthly applications targeting regrowth, although for this treatment option, it can require up to five years before successful eradication.

Table 5.3 presents an assessment of potential treatment options available for the treatment of Giant hogweed. The various methods are analysed and described in further detail as necessary.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Hand Pulling	Hand pulling is only suitable for small / immature plants (and with suitable Personal Protective Equipment (PPE) to protect exposure of bare skin by the sap) and is limited small areas / infestations. Potential remains for tap root to remain underground and regenerate.	Unlikely for mature plants. Requires specialist equipment to enable working alongside the biohazardous small / immature plants.
	Root Cutting	Individual plants may be killed by cutting at a 45- degree angle 15cm below ground level with a spade in April or May. Can be laborious unless small / isolated stands. Can be effective if combined with chemical treatment over four to five years repeat treatment.	Given the nature of the project, could be used to remove biohazard plant and thereafter allow for chemical control against any regrowth. Requires specialist equipment to enable working alongside the biohazardous plant.
	Mowing	Repeated mowing depletes the energy reserves in the taproot and it eventually dies. This approach will take several years and should only be used where long-term treatment is acceptable. Trimmers, strimmers or weed whackers, should never be used on Giant Hogweed as they can result in the airborne spray of pulverised plant material	This is long-term solution would require commitment from relevant bodies to undertake.
	Grazing	Grazing should begin when early foliage appears in April and should continue until early autumn when re-sprouting stops. Eradication can take between 5-10 years so that seed bank and root stock is fully depleted of resources. Avoids herbicide use.	Possible, but unlikely given this would require a change in land management and commitment from relevant bodies to undertake.
	Ploughing	Can provide total control where seedlings and young plants encroach onto agricultural land. Chemical treatment required over 3-5 years.	Unlikely given the locations that Giant hogweed is often found in.
	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. Given the phytotoxic nature of the plant, it should not be buried onsite nor disposed of with general C&D waste. In addition to waste permits / authorisations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Possible – location dependent.
Chemical	Spot treatment/ Spray	Effective method. Applications must be repeated annually over 3-5 years to eradicate new plants growing. Chemical treatments for infestations near water should be rated for use near aquatic locations	Most widely used method. Long-term commitment of treatment. Possible but unlikely owing to nature and size of population recorded on the Proposed Development.

Table 5.3: Assessmen	t of Management M	lethods for Giant	Hoaweed
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Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
	Stem Injection	Can only be carried out on young stems. Due to difficulties with the timing of application and the potential safety risk of contact with the large leaves this method requires specialist safety equipment.	Possible, requires specialist equipment to enable working alongside the biohazardous plant

5.4.1 Temporary Storage of Collected Material

Given the phytotoxic nature of Giant hogweed, cut material will not be discarded. Ideally, it will be disposed of immediately with similar non-native invasive species waste to a facility authorised to accept such waste.

However, given the nature and relative sizes of Giant hogweed infestations, it may be suitable to collect cut biomass (where not disposed of immediately to a facility authorised to accept such waste), and to double bag it for transport to a dedicated quarantine area (location to be approved as part of the ISMP) to decompose before disposal with similar non-native invasive species waste in a facility authorised to accept such waste.

The locations where Giant hogweed has been eradicated will be notified to the local authority or relevant landowner, so that any future public health issue involving similar symptoms can be tracked.

5.4.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Giant hogweed seedlings in the following spring and retard its establishment.

5.5 Japanese Knotweed (*Reynoutria Japonica*)

Japanese knotweed is classified as a high impact non-native invasive species that is particularly effective at colonising disturbed ground (e.g. construction sites) and can spread by the regrowth of cut fragments or root material, so if it is not appropriately controlled during site clearance or other earthworks, it can readily regrow in new areas to which soil is moved. Japanese knotweed readily reproduces asexually (in Ireland, at least, as only female plants have been recorded) and regrowth can occur from plant material weighing as little as 0.7g (grams) of viable material. It is acknowledged to be very difficult to effectively control and an even more difficult weed to fully eradicate.

Given the nature of Japanese knotweed, chemical treatments are often preferred over physical methods as they can, if implemented properly, reduce the disturbance of the plant / population, thus reducing the chances of its spread. If herbicide is applied as the treatment option, it will need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective, or monitored for a minimum of two years during which no regrowth is recorded.

Table 5.4 presents an assessment of potential treatment options available for the treatment of Japanese knotweed. The various methods are analysed and described in further detail as necessary. It should be noted that where it might occur within the Proposed Development, that a number of the measures described below may be applicable, depending on the nature of works, the timing etc. These will be fully detailed in the ISMP after the recommended pre-construction survey of the Proposed Development.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Dig and dispose offsite, under licence	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. In addition to waste permits / authorizations, a wildlife licence issued by NPWS is required for the transport of Third Schedule non-native invasive species off site.	Likely – given the nature of the Proposed Development, there may be a need to excavate soil and plant material to enable construction works to go ahead in timely manner.
	Below ground removal	Japanese knotweed can extend over 7m below ground, although there are reports of certain types of soil, such as heavy clays, that it does not penetrate. Excavations should also be to 3m below the surface if removing Japanese knotweed from a site. Wherever possible, the amount of Japanese knotweed excavated should be kept to a minimum and focus should be directed to treating the Japanese knotweed in its original location.	Possible – location dependent. Large amount of space required to accommodate extensive removal.
	Cutting and / or strimming	Not recommended and does not apparently diminish vigour of plants over time. Largely cosmetic and can result in considerable spread of viable vegetative material that can readily regenerate on suitable conditions.	Not Recommended.
Chemical	Spot /Spray	Spot and Spray methods ae used for isolated plants s or large populations using knapsack or weep sprayers. In accessible areas including along riverbanks, lance sprayers can be used. Chemical treatments for infestations near water should be rated for use at or near aquatic locations.	Chemical treatments are often a preferred option for treating Japanese knotweed, but the process can take between 3 to 5 years before eradication can be guaranteed and requires at least 2-year post implementation monitoring. However, given the nature of the Proposed Development, the use of chemical treatment alone is unlikely to be adequate unless treatment regime begins a number of years before construction commencement.
	Stem Injection	Stem Injection is very effective, if the injection is timed appropriately for growth phase. However, it is labour-intensive (sometimes) requiring some cutting) and is usually only carried out on small/isolated populations.	Possible requires specialist equipment to enable working alongside the biohazardous plant. – Despite some advantages over other conventional chemical treatments e.g. reduces drift, not weather dependent.

Table 5.4: Assessment of Management Methods for Japanese Knotweed

5.5.1 Root Barrier Membrane

Following on from the excavation of Japanese knotweed, there may be a need to install a root barrier membrane. These are specialised products that can provide protection to structures / services etc. from regrowth from within or outside a site, if suitably rated and properly installed. Thereafter, any small adjacent infestation can be more readily treated with chemical treatment for example.

5.5.2 Reseeding Following Excavation

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post-control management of affected sites. A grass sward established in autumn will compete with germinating Japanese knotweed seedlings in the following spring.

5.6 Rhododendron (*Rhododendron ponticum*)

Rhododendron is classified as a high impact invasive species. This is an evergreen plant that can grow to 8m in height forming very dense thickets and out-compete native species for space and light. It is spread by seed dispersal and from small plant fragments.

Rhododendron can also regenerate from small rhizome fragments and stem layering. Seeds are produced when the plant reaches maturity (approximately 10 to 12 years).

Table 5.5 presents an assessment of potential treatment options available for the treatment of rhododendron. The various methods are analysed and described in further detail, as necessary.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Development
Physical	Hand dig/ Mechanical	Physical removal of Rhododendron can be achieved by uprooting the plant by hand or chainsaw if the stand is small or recent, or uprooting larger plants/stands by winching (either hand operated or tractor mounted). The plant should be cut as close to the ground as possible. For small shrubs or seedlings hand-pulling is effective however for larger stands the removal of above ground growth will not prevent re-growth, as plants can regenerate from cut stems and stumps. Total eradication by targeting the underground Rhizome is the most effective method.	Likely.
	Cutting	The plant may be cut down to the stump, as low to the ground as possible and the stump treated with herbicide.	This is long-term solution would require commitment from relevant bodies to undertake.
Chemical	Spray	This can be undertaken throughout the year during suitable weather conditions i.e. dry weather. The direct treatment of stumps means that there is no standing dead re- growth to deal with. This treatment also results in a lower volume of herbicide being applied, compared with foliar treatments.	Possible -where ground is to be excavated, may require physical control also.

Table 5.5: Assessment of Management Methods for Rhododendron

5.6.1 Temporary Storage of Collected Material

If these non-native invasive species are encountered, all material, where not disposed of immediately to authorised facilities, will be double bagged and placed in dedicated quarantine areas (away from watercourses) to decompose before disposal with similar non-native invasive species waste at authorised facilities.

5.6.2 Reseeding following Eradication

For any area of ground that is cleared of rhododendron, and is not constructed upon, a follow-on mechanical hand-pulling / cutting regime and / or chemical treatment may be required post construction to ensure full exhaustion of the bulb / seed bank.

6. References

Department of Agriculture and Rural Development (2016) Countryside Management Publications, Giant hogweed (Northern Ireland)

EA (2013) Managing Japanese knotweed on development sites - the Knotweed Code of Practice (Version 3, amended in 2013, withdrawn from online publication in 2016)

EA (2010) Managing Invasive Non-Native Plants in or near Freshwater

IFI (2010). Biosecurity Protocol for Field Survey Work

ISI (2008a). Best Practice Management Guidelines for Japanese knotweed.

ISI (2008b). Best Practice Management Guidelines for Himalayan balsam.

ISI (2008c). Best Practice Management Guidelines for Giant hogweed.

Invasive alien species in Ireland (2024). Invasive alien species in Ireland [online]. Available from Ireland's invasive species - Invasives.ie. [Accessed January 2024]

NNSS (2011). Allium triquetrum (Three-cornered garlic) Great Britain Non-Native Organism Risk Assessment Scheme.

NPWS (2023). Ireland's 4th National Biodiversity Action Plan 2023-2030

NRA (2010) Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads

TII (2020a). The Management of Invasive Alien Plant Species on National Roads – Technical Guidance.

TII (2020b). The Management of Invasive Alien Plant Species on National Roads – Standard.

TII (2017). The Management of Waste from National Road Construction Projects.

TII (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads

Directives and Legislation

No. 38 of 1936 - Noxious Weeds Act, 1936

No. 6 of 1987 - Air Pollution Act, 1987

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

Regulation (EU) No. 1143 of 2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

S.I. No. 103 of 1937 Noxious Weeds (Thistle, Ragwort, and Dock) Order, 1937

S.I. No. 477 of 2011 - European Communities (Birds and Natural Habitats) Regulations 2011

S.I. No. 293 / 2021 – European Communities (Birds and Natural Habitats) (Amendment) Regulations 2021