MWP

Chapter 15 Schedule of Mitigation Measures

Carrownagowan 110kV Grid Connection

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15. Schedule of Mitigation Measures

15.1 Introduction

This Schedule of Environmental Mitigation summarises and sets out an implementation programme for all environmental mitigation measures recommended in the Environmental Impact Assessment Report (EIAR) for the proposed 25km long 110kV underground grid cable connection at Ardnacrusha, County Clare. The full project description is provided in Chapter 2 Description of the Proposed Development.

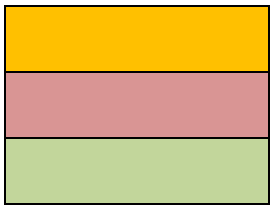
15.2 Format of the Mitigation Schedule

The schedule on the following pages is structured in accordance with the following project phases:

Prior to Commencement of Construction

During Construction Phase

Post Construction/ Operational Phase



The schedule is presented in a Table format which outlines, for each of the project phases:

i. The environmental aspect or resource for which mitigation is required;

ii. The required or proposed mitigation measure to undertake/implemented;

iii. The persons responsible for implementing the recommenced mitigation; and

iv. The relevant actions, procedures and plans relating to implementation of the mitigation.

15.2.1 Pre-construction mitigation

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
Pre- Construction	Material Assets	A final Traffic Management Plan (TMP) and Construction Environmental Management Plan (CEMP) will be prepared by the Principal Contractor. It will take account of the measures specified in the TMP and CEMP submitted with the planning application, and any measures agreed with the relevant authorities.

15.2.2 Construction mitigation

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
During Construction	Population and Health	The potential for significant effects on the human environment will principally arise during the construction phase from traffic, noise and dust effects. Mitigation in relation to these issues are outlined in their respective Chapters (Chapter 9, 11, and 12) of this EIAR. No additional mitigation is proposed for those particular aspects.
	Biodiversity	**Water Quality** The main potential for water quality impacts is during the construction phase during excavation of trenches, where loose and exposed soils are at risk of being transported to watercourses during wet periods. While site management controls will reduce the potential for water pollution, additional measures will be deployed to minimise erosion and runoff from excavated areas. This will be achieved as follows: • Prior to commencing work on each 100-200m stretch, observe the slopes for any potential problems and preferential pathways. Notice where there could be affected areas adjacent to the site and plan accordingly - it may be necessary to install silt fencing or straw wattles to slow water and catch sediment where there is potential for site runoff to nearby watercourses. • Disturb as little area as possible and excavate only one section of the site at a time where feasible. • All excavated material from the trenches and joint bay excavations site will be removed immediately to the licensed facility, so there will be no potential for erosion of overburden from this excavated material. • Undertake road cleaning at the end of each day at a minimum and more frequently if necessary. • Once excavation of an area is complete along roads/tracks, completion the final surface dressing or dense bituminous macadam (DBM) as soon as possible. During directional drilling, any spoil collected at either end of the bore will be within a dedicated sump. All excavated material containing bentonite will be removed from site and brought to an authorised waste facility. **Habitats** Specific mitigation measures relating to the potential impacts identified include: • The area of degraded upland blanket bog that will be directly impacted (lost) at the northern extent of the Proposed Development site will be minimised by marking out the area where works area to take place with stakes and fencing to prevent access beyond this area. • Spoil from excavations will not be deposited on peatland. It will be managed as outlined in Chapter 2. • There is potential for loss of treeline habitat turning north at chainage 17500m for a maximum for 30 m. Where there is scope for the Proposed Development to avoid mature trees within treeline habitat such opportunities will be taken.

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
		Invasive Species Two Invasive alien species (IAS) listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011, (as amended) were recorded within the study area: Japanese Knotweed (Fallopia japonica) and Rhododendron. One stand of Giant Rhubarb (Gunnera tinctoria) was observed in the proximity of the Proposed Development and two stands of Himalayan Knotweed, but both of these are outside of the study area. Cherry laurel (Prunus laurocerasus) was recorded at a single location within the study area. Where IAS occur at one side of the road along the Proposed Development, the cable will be installed at the roadside opposite the IAS. The management of Rhododendron, Cherry laurel and the Japanese Knotweed will be subject to containment measures as outlined in the Invasive Alien Species Management Plan (IASMP) in Appendix 6-3, Volume III
	Water	**Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters** • Temporary silt fencing/silt trap arrangements will be placed within existing roadside/field drainage features along the grid connection to remove any suspended sediments from the works area. The trapped sediment will be removed and disposed at an appropriate licenced facility. The bare ground re-seeded/reinstated immediately and silt fencing temporally left in place if necessary. • Any excavated topsoil/subsoil associated with the trench and access tracks in off road sections of the Proposed Development that isn't removed off-site to a licenced facility will be temporarily stored near the excavations and reused for reinstatement works. **Potential Impacts on Groundwater Levels and Local Well Supplies During Excavation works** No groundwater level impacts will occur from the construction of the underground cabling trench due to the shallow nature of the excavation (i.e. ~1.2m) and temporary nature of the proposed works, therefore mitigation measures are not required. **Potential Release of Hydrocarbons during Construction** *Mitigation By Avoidance* Mitigation measures proposed to avoid release of hydrocarbons at the Proposed Development site are as follows: • Due to the ease of access along the grid connection route, it is unlikely that any refuelling on site will be necessary. Nevertheless, if required, storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; • The plant used during construction will be regularly inspected for leaks and fitness for purpose; • Spill kits will be available to deal with any accidental spillage from plant or equipment; and • An emergency plan for the construction phase to deal with accidental spillages is included within the CEMP (refer to Appendix 2-2, Volume III). Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area.

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
		Release of Cement-Based Products *Mitigation By Avoidance* The following mitigation measures are proposed: • No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; • Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds; • Weather forecasting will be used to plan dry days for pouring concrete; and, • The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event. **Potential Hydrological Effects from Directional Drilling Works** *Mitigation by Design* The following mitigation measures are proposed: • For directional drilling the area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages. • Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized skip before been taken off-site; • The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used); • The drilling process / pressure will be constantly monitored to avoid any possible leaks or breakouts into the surrounding geology or local watercourse; • This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped; • Any frac-out material will be contained and removed off-site.

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
		Morphological Changes to Surface Watercourses & Drainage Patterns by Watercourse Crossings *Mitigation by Avoidance* General Best Practice Pollution Prevention Measures will also include: • Protection of the riparian zone watercourses by implementing a constraints zone around stream crossings, in which construction activity will be limited to the minimum, i.e. works solely in connection with duct laying at the stream crossing; • No stockpiling of construction materials will take place within the constraints zone; • No concrete truck chute cleaning is permitted in this area; • Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast; • Plant will travel slowly across bare ground at a maximum of 5km/hr. Bog mats will be employed to protect tracked areas as necessary; • Machinery deliveries shall be arranged using existing structures along the public road; • All machinery operations shall take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or will occur; • Any excess construction material shall be immediately removed from the area and taken to an appropriately licensed facility; • No stockpiling of materials will be permitted in the constraint zones; • Spill kits shall be available in each item of plant required to complete the stream crossing; and, • Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required. Mitigation Measures relating to the use and storage of fuels and chemicals in terms of groundwater protection: • The plant used will be regularly inspected for leaks and fitness for purpose; and, • Spill kits will be available to deal with accidental spillage. **Potential Hydrological Impacts on Designated Sites** *Mitigation Measures* The proposed mitigation measures outlined in the above sections which include drainage control measures, sediment control measures and mitigation measures related to spills/chemical releases will ensure that the quality of runoff from along the grid route during construction will be of 'Good' status. In addition: • No significant dewatering is proposed during construction. Any pumping required will be temporary and at a very shallow depth.

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
		• All building and trenching works are proposed at or very near existing ground levels with minimal ground disturbance proposed. • No deep foundations are required or are proposed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site.
	Land and Soils	**Excavations** • Use of the existing road network where possible to reduce subsoil excavation volumes; • The road surface and underlying subsoils excavated along the grid cable connection will be exported from the Proposed Development site to a licenced waste facility. Any excavated topsoil/subsoil associated with the trench and access tracks in off road sections of the Proposed Development that isn't removed off-site to a licenced facility will be temporarily stored near the excavations and reused for reinstatement works. The peat and subsoil which will be removed during the construction phase will be localised to the Proposed Development infrastructure; • The peat and subsoil which will be removed during the construction phase will be localised to the Proposed Development infrastructure; and • A minimal volume of spoil and subsoil will be removed to allow for infrastructural work to take place. **Contamination of soil through leakage/spillages** • Due to the ease of access along the grid connection route, it is unlikely that any refuelling on site will be necessary. Nevertheless, if required, storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; • The plant used during construction will be regularly inspected for leaks and fitness for purpose; • All waste tar material arising from the chipping and resurfacing of the roads will be removed off-site and taken to licenced waste facility (refer to Section 2.3.8.1, Chapter 2); and • An emergency plan for the construction phase to deal with accidental spillages is contained within the CEMP (Appendix 2-2, Volume III). Spill kits will be available to deal with any accidental spillage.
	Noise and Vibration	Best practice in the form of BS5228 –1&2:2009 + A1 2014, *Code of Practice for the Control of Noise and Vibration on Construction and Open Sites* will be adopted during the construction phase in order to minimise the noise generated by construction activities and nuisance to neighbours including the following: • A pre-construction commitment to managing nuisance noise will be agreed through notification and consultation with affected parties, if deemed necessary. • Working hours at the site during the construction phase will be limited to Standard working hours for construction will be 8.00am to 8.00pm Monday to Friday and 8.00am to 6.00pm on Saturday (if required) (subject to planning consent and local authority stipulated conditions) , with no works on Sundays or Bank Holidays except in exceptional circumstances or in the event of an emergency. Any deviations to these times will be agreed in advance with Clare County Council.

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
		• Construction contractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations, 1988 as amended in 1990 and 1996 (S.I. No. 320 of 1988, S.I. No. 297 of 1990 and S.I. No. 359 of 1996), and the Safety, Health, and Welfare at Work (Control of Noise at Work) Regulations, 2006 (S.I. No. 371 of 2006). The main control measures will be control of noise at source using the following methods in line with Clause 8 'Control of noise' of BS 5228-1:2009+A1:2014: • Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery (Clause 8.2.1 General). • Use of appropriate plant and equipment where possible with low noise level generation where possible (Clause 8.2.2 Specification and substitution). • All construction plant to be used on site should have effective well-maintained silencers and mufflers (in the case of pneumatic drill) (Clause 8.2.3 Modification of existing plant and equipment). • Noise generating equipment will be located as far as possible away from local noise sensitive areas identified (Clause 8.2.5 Use and siting of equipment); and • Regular and effective maintenance of site machinery including a full maintenance schedule to ensure that all pieces of equipment are in good working order. With efficient use of well-maintained mobile equipment, considerably lower noise levels than those predicted can be attained (clause 8.2.6 Maintenance). In addition, the following best practice measures are proposed: • Training of site staff in the proper use and maintenance of tools and equipment. • Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment. • Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum. • Plant start-up will be sequential rather than all together. • Internal access tracks to be well maintained. • Plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise-sensitive locations and • Drop heights for materials such as gravels will be minimised whenever practicable
	Cultural Heritage and Archaeology	All excavations within the Zone of Notification for monuments AH03, AH07, AH10, AH11, AH12, AH13 and AH14 will be monitored by a suitably qualified archaeologist. All excavations across previously undisturbed greenfields will also be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works the Department of Housing, Local Government and Heritage will be informed immediately and further mitigation will be required, such as preservation in-situ or by record. Any further mitigation will require the approval of the Department of Housing, Local Government and Heritage.

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
	Air Quality and Climate	The Proposed Development will be developed in accordance with the control measures outlined below. It is recommended that best practice is adhered to during the construction phase in order to minimise fugitive dust emissions in particular. Outlined below is a series of mitigation measures and good working practices to ensure that any potential impacts during the construction phase are minimised and to ensure there will be no adverse impact on the receiving environment. The mitigation measures have been sourced from National and International best practice guidance documents for the implementation of dust management plans such as; • 'Control of Dust from Construction and Demolition Activities', UK British Research Establishment (BRE). • 'Environmental Good Practice on Site', Construction Industry Research and Information Association (CIRA). • 'Environmental Management Plans', Institute of Environmental Management and Assessment (IEMA). • 'Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan' National Roads Authority of Ireland (NRA). **Dust Generation** Construction phase generated dust will be minimised by the following measures: • The use of water as a dust suppressant, e.g. a water bowser to spray access tracks and crane hardstanding areas during any extended dry periods when fugitive dust emissions could potentially arise; • Public roads will be inspected regularly for cleanliness and cleaned as necessary; • All loads entering and leaving the site will be covered during dry periods if dust becomes a nuisance on site; • Control of vehicle speeds passing over access roads and crane hardstanding areas within the site; • Wheel wash facilities will be implemented at the site entrance from the public road to facilitate removal of any material collected by vehicles entering or leaving the site and preventing its deposition on public roads; • Daily site inspections will take place to examine dust measures and their effectiveness. **Construction Traffic Emissions** Construction traffic emissions will be reduced using the following measures: • Ensure regular maintenance of plant and equipment. Carry out periodic technical inspection of vehicles to ensure they perform most efficiently; • Implementation of the Traffic Management Plan (Appendix 2-3, Volume III) to minimise congestion; and • All site vehicles and machinery will be switched off when not in use - no idling.
	Material Assets	**Traffic and Transport**

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
		The following best practice measures are proposed to ensure a safe and regulated traffic management system is enforced and are outlined within the TMP (Appendix 2-3, Volume III). • All signage relating to the proposed construction traffic routes for construction traffic will be agreed with Clare County Council; • Well planned and executed materials delivery programme avoiding peak traffic on typical days will be ensured (i.e. local school start and finish times); • Adequate parking will be provided on site for employees to ensure parking will not occur on the public road; and • A road sweeping vehicle will be provided as required to remove any mud that is deposited on the local road in the vicinity of the site access. **Built services Infrastructure** Although it has been determined that the significance of effects on the existing built services network will likely be not significant, the following best practice measures will be implemented during the construction phase: • All relevant bodies i.e. ESB Networks, EirGrid, Gas Networks Ireland, Eir, Clare County Council etc. will be re-contacted and drawings for all existing underground services along the Proposed Development sought prior to the commencement of the Proposed Development. • Any underground services encountered will initially be surveyed for levels in order to determine if there is adequate cover available for ducting to pass over these services. A minimum clearance of 300mm is required from the bottom of the ducting to the top of any underground service as per ESB Networks requirements. If this clearance cannot be achieved, the ducting will pass below the service with a minimum 300mm clearance maintained from the top of the ducting to the bottom of the service. • If the required separation distances cannot be achieved by either going above or below the underground service, then a number of alternative construction options are available (crossing in flat formation, HDD). All excavations will be kept within the public roadway boundaries i.e. in road or grass margins. • Works during the construction phase, including service diversions and realignment will be carried out in accordance with relevant guidance documents, including Gas Networks Ireland's publication 'Safety advice for working in the vicinity of natural gas pipelines'; the ESB's Code of Practice for Avoiding Danger from Overhead Electricity Lines', 2008 and the HSA 'Code of Practice for Avoiding Danger from Underground Services', 2010; • The Contractor will be obliged to put measures in place to ensure that there are no significant interruptions to existing services and all services and built services are maintained unless this has been agreed in advance with the relevant service provider; and • Any construction works in the vicinity of utility networks will be carried out in accordance with the utility providers method statement and service providers Codes of Practice, as well as best practice in accordance with the CEMP submitted in Appendix 2-2, Volume III.

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		Waste Management The following best practice measures will be implemented: • Waste is to be managed in accordance with the waste hierarchy in Council Directive 98/2008/EC on waste and section 21A of the Waste Management Act 1996, as amended, as follows: (a)Prevention; (b)re-use; (c)Recycling; (d)Other recovery (including energy recovery); and (e) Disposal; • All waste to be removed from site is to be undertaken by authorised waste contractors and transported to an authorised facility in accordance with best practice; • All measures included in the EMP 6: Construction Waste Management Plan in Section 6 of CEMP which is included in Appendix 2-2, Volume III, will be adhered to ensure effective waste management and minimisation, reuse, recycling and disposal of waste material generated during the construction phase of the Proposed Development.
	Landscape and Visual	• Care will be taken to avoid any damage to vegetation and walls, especially those of built or cultural heritage value, where the proposed works are located to the edge of the carriageway, or within the verge adjacent to the road. • In relation to trees and tree roots, there is potential for some damage to tree roots and roots of hedgerow vegetation during construction, and though the majority of the roads should not have tree roots within them. The advice of a qualified Arboriculturist be available to the construction team during the detailed design/construction phase. • Areas which are disturbed will be allowed to re-vegetate naturally. • As set out in Chapter 6, the area of degraded upland blanket bog that will be directly impacted (lost) at the northern extent of the Proposed Development site will be minimised by marking out the area where works will take place with stakes and fencing to prevent access beyond this area.

15.2.3 Operational Mitigation

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
During operation	Population and Human Health	No mitigation measures are proposed for the operational phase.
	Biodiversity	No mitigation is required during the operational phase. Mitigation as outlined for construction phase will apply for any maintenance activities. Protocols as set out in the CEMP prepared for construction activities will also be followed.
	Water	Minor maintenance works may be performed along the Proposed Development in which case the mitigation measures as described in the table above for the construction phase of the Proposed Development will be implemented. Maintenance works will be temporary and short in duration. The proposed mitigation measures which will include drainage control measures, sediment control measures and mitigation measures related to spills/chemical releases will ensure that the quality of runoff from along the grid route during maintenance will be good.
	Land and Soil	**Land and Land Use** All work and land take will have occurred during the construction phase, so no additional land take or land change will occur during the operational phase. **Excavations** None required, unless repair works are undertaken, then mitigation will include: • Use of temporary excavations over the shortest distances possible; • All excavated material will stored and reused during reinstatement; • The works are likely to be completed over short periods of 1 to 2 days. • Fuels stored on site will be minimised. Due to the ease of access along the grid connection route, it is unlikely that any refuelling on site will be necessary. Nevertheless, if required, storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; and, • Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station. **Contamination of soil through leakage/spillages** None required, unless minor repair works are undertaken, and refuelling of plant and machinery is then also required during minor repair works. If such a scenario occurs, then the same mitigation for refuelling as outlined for the construction stage will be implemented during the operation phase.

Time Frame / Schedule	Aspect / Resource	Environmental Mitigation / Recommendation
	Noise and Vibration	No mitigation measures are required for the operational phase.
	Cultural Heritage	No mitigation is deemed necessary during the operational phase.
	Air Quality and Climate	No mitigation measures are required for the operational phase.
	Material Assets	No mitigation measures are required during the operational phase.
	Landscape and Visual	No mitigation measures are required during the operational phase.