

River Crossing Between Kildavin and Clonegal

Construction & Environmental Management Plan

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1 Works Proposals

This preliminary Construction & Environmental Management Plan is for the works associated with the construction of a pedestrian cycle route that will connect the Leinster Way to the Wicklow Way. This route also includes the construction of a new pedestrian bridge over the River Derry, a tributary of the River Slaney. Further detail on the proposed works is provided on the Construction Methodology Report and Drawings submitted with this application.

The construction management issues addressed within this plan include the following:

- General issues
- Traffic Management
- Stripping of Topsoil and Excavation of Subsoil
- Erosion and Sediment Control
- Accidental Spills and Leaks
- Biodiversity
- Waste Management
- Noise and Vibration
- Air, Dust & Climatic Factors
- Landscape and Visual Impact
- Archaeology
- Site Compound Facilities and Parking

This Construction & Environmental Management Plan shall be referenced in all tender and contract documentation for the proposed works and is to be read in conjunction with all relevant documentation.

All works must be carried out in accordance with the mitigation measures outlined in this document.

2 Project Responsibilities

The Contractor appointed to undertake the construction works, will be responsible for developing, and managing, the project specific Construction Environmental Management Plan (CEMP) incorporating the preliminary methodologies described in this plan. The plan will be developed in consultation with Carlow County Council. The proposed methodologies described in this report are industry best practice. Logistical issues, such as traffic restrictions and available space for storage, manoeuvres etc. may necessitate certain revisions.

The Contractor's Project Manager will be responsible for the overall implementation of the plan and associated procedures. The Project Manager will ensure that reporting and recording requirements are met and all necessary resources are in place to support the implementation of the plan.

To ensure the construction stage CEMP remains 'fit for purpose' for the duration of the project it will be reviewed and updated by the Project Manager during the life of the project to ensure that it remains suitable to facilitate efficient and effective delivery of the project environmental commitments. The environmental review will consider past performance from inspections, audit report and monitoring data, and plan actions required to mitigate forthcoming risks.

In the event of finding any contaminated materials, the Contractor shall employ the services of an approved Specialist Waste Management Sub-Contractor to assist with the safe management and disposal of contaminated waste materials. They shall specialise in the investigation of such material, the carrying out of sampling and testing of hazardous material and the preparation of treatment and disposal methodologies.

A report and method statement will be prepared by the Contractor, in consultation with their approved Waste Management Specialist Sub-Contractor, for the safe removal and disposal of the identified hazardous materials. This must be agreed with the Employers Representative prior to commencement of any excavation activities.

Reporting

The Site Manager / Project Manager is responsible for collating and maintaining all reporting. This would include all environmental and compliance documentation.

Environmental Targets and Objectives

Targets:

- Zero pollution incidents;
- Segregation of site waste to include timber, general waste and other materials;
- Completion of environmental checklists as required;
- Fuel spill kit to be present on each site at all times; and
- Maintain all waste licences and waste transfer notes for all waste movements including contractors.

Reporting Specific Objectives:

- Environmental incidences to be reported to Site Manager without delay.

The following documentation will be reported to Carlow County Council on a 4 weekly basis:

- Environmental incidents and non-conformances raised, including nature, status, corrective and preventive actions and potential for statutory intervention;
 - Key environmental issues raised by others;
 - Significant environmental incidents;
 - Complaints and the current status of those complaints; and
 - Actions or interventions undertaken by enforcement organisations.

Site Specific Objectives:

- Reduce waste, water and energy use on the project including within all of the site offices;
- Ensure that everyone comply with the environmental requirements in the contract;
- Seek ways to incorporate environmental protection opportunities within the design;
- Seek ways to reduce the carbon footprint of the contract;
- Reduce the amount of construction waste and excavated material generated which goes to landfill;
- Zero pollution incidents onsite;
- Recycle construction waste where possible;
- Maximise beneficial reuse of the materials: and

- Ensure that all waste documentation (waste transfer docket, permits etc.) is available for inspection at the site office / in head office.

Environmental Complaints and Incidents

The site manager will develop and implement an appropriate queries / complaints procedure. Records will include full details of the concerns expressed and ensure that a formal assessment is commenced of the reported concern. The site manager will also discuss complaints with the Project Manager and oversee an initial response to the person who has submitted the complaint/concern confirming its receipt.

An investigation to assess the issue of concern will be carried out and decisions made to see what corrective and/or preventive action, or further investigation is necessary. With overall responsibility for complaints, the site manager will respond within a reasonable timescale and maintain records of all correspondence and actions taken. If significant corrective action and external stakeholder involvement is required, the site manager / project manager will oversee all elements of the process.

Any complaints received will be logged, assessed and appropriate action taken as soon as practical. The construction company will be actively seeking liaison with all parties throughout the construction periods. It will be critical to the success of the project that key issues are properly addressed from the outset to create a good working relationship and an integrated team approach to identifying and resolving potential issues before they may cause environmental impacts.

The project team appreciates that occasionally incidents arise whereby it is impossible or impractical to comply with all the requirements. In these emergency situations, as much notice as possible about the works will be given to Carlow County Council.

In the event of spillages, or other incident, steps will be taken to prevent environmental pollution, for example through protection of watercourses by use of barriers, use absorbent granules following oil / chemical spill and turning off equipment or other sources of noise or dust. Once the situation has been rectified, full details about the incident and remedial actions undertaken will be provided to the relevant authorities and recorded in the site environmental register. Feedback will be provided to all CEMP implementation personnel where required.

3 General

The following general measures are to be implemented during the construction phase in order to minimise overall environmental impacts:

- In order to minimise the volume of material being exported off-site, excavated material will be reused on-site (e.g. as fill material) where feasible.
- Hydrocarbons, solvents, and other such hazardous substances will be stored in secure, bunded hardstanding areas, preferably off site.
- Re-fuelling and servicing of construction plant and machinery will only be permitted at suitably located, designated hardstanding areas, preferably off site, or as a minimum required to take place at least 50m away from the river. All plant will be refuelled over drip trays.
- Spill kits will be present on-site at all times.
- The proposed construction phase working hours are as follows, subject to conditions of the planning authority:
 - Monday – Friday: 07:00 – 18:00
 - Saturday: 08:00 – 14:00
 - Sundays and Bank Holidays: No works

Any works proposed outside of these hours, will be subject to prior approval by Carlow County Council.

- Prior to works commencing on-site, a Construction Traffic Management Plan will be prepared by the appointed contractor in accordance with the following guidance documents:
 - Department of Transport, Tourism and Sport (DTTS) (2019). Chapter 8: Temporary Traffic Measures and Signs for Roadworks, in Traffic Signs Manual.
 - DTTS (2013). Design Manual for Urban Roads & Streets ('DMURS').
 - Department of Transport (2010). Guidance for the Control and Management of Traffic at Road Works (Second Edition).
 - NRA (2015). Design Manual for Roads and Bridges ('DMRB').

4 Traffic And Transportation

A Temporary Traffic Management Plan (TTMP) will be prepared for the works in accordance with the principles outlined below and shall comply at all times with the requirements of:

- Department of Transport Traffic Signs Manual 2019 – Chapter 8 Temporary Traffic Measures and Signs for Roadworks
- Department of Transport Guidance for the Control and Management of Traffic at Road Works (2010)
- Any additional requirements detailed in the Design Manual for Roads and Bridges (DMRB) & Design Manual for Urban Roads & Streets (DMURS)

In general, the impact of the construction period will be temporary in nature and less significant than the operational stage of the proposed development (HGV vehicle movements not expected to exceed 2 vehicles per hour during the busiest period of construction works).

The site will be accessed from the north and south by way of existing field accesses from public roads. The proposed routes are detailed below.

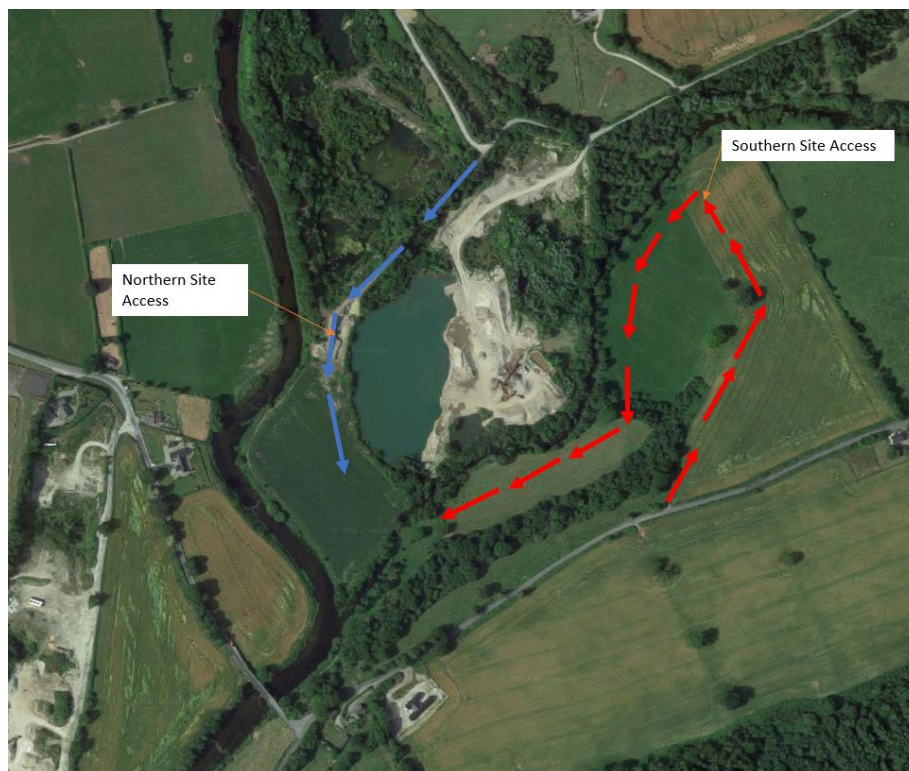


Figure 1: Proposed Access Routes

Construction traffic is likely to consist of the following categories:

- Private vehicles owned and driven by site staff and management.
- Construction vehicles e.g. excavation plant, dump trucks and material delivery vehicles, involved in site development works.

On-site employees will generally arrive before 08:00, thus avoiding morning peak hour traffic. These employees will generally depart after 16:00. It should be noted that a large proportion of construction workers would arrive in shared transport. Locations for parking are to be agreed with Carlow County Council.

The design proposes minimal excavated arisings and the majority of material will be reused as part of the site development works to minimise truck movements to and from the site.

5 Soils, Geology & Hydrogeology

Site development works will include stripping of topsoil and minimal excavation of subsoil layers. These activities have potential to expose the soils and geological environment to pollution.

The contractor shall obtain approval of their proposed erosion and sediment control measures from Carlow County Council's Environment Section prior to commencing works on site.

The following measures are to be implemented in order to mitigate against such risks.

Stripping of Topsoil

- Stripping of topsoil shall be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) shall be limited to the immediate vicinity of active work areas.
- Topsoil stockpiles shall be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains.
- Topsoil stockpiles shall also be located so as not to necessitate double handling.

Excavation of Subsoil Layers (Minimal)

- The duration that subsoil layers are exposed to the effects of weather shall be minimised. Disturbed subsoil layers will be stabilised as soon as practicable (e.g. backfill of service trenches, construction of foundation layers, construction of structural foundations and completion of landscaping).
- Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material shall be protected for the duration of the works. Stockpiles of subsoil material shall be located separately from topsoil stockpiles. These stockpiles will be monitored throughout the construction phase. Monitoring of ground conditions and stability of excavations will be monitored on an on-going basis.
- Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).

Weather Conditions

- Typical seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations with an objective of minimising soil erosion and silt generation. The approach of extreme weather events will be monitored to inform near-term operational activities.

Surface Water Runoff

- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds/ stilling tanks where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate. Monitoring of these sediment control measures will be undertaken throughout the construction phase.
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds/ stilling tanks.
- On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.
- Concrete batching will take place off site, wash down and wash out of concrete trucks will take place off site and any excess concrete is not to be disposed on site

Water Pumped from Excavations

- Surface or ground water pumped from excavations is to be directed to on-site settlement ponds or tanks.
- On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion. Monitoring of same will be undertaken.

Construction Traffic

- Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site.
- Vehicle wheel wash facilities will be installed in the vicinity of any site entrances and road sweeping implemented as necessary in order to maintain the road network in the immediate vicinity of the site.
- Dust suppression measures (e.g. dampening down) will be implemented as necessary during dry periods.
- A construction traffic management plan will be prepared by the contractor prior to any works commencing on site.

Accidental Spills and Leaks

- All oils, fuels, paints and other chemicals shall be stored in a secure bunded hardstand area with sufficient capacity to retain spills. Any such hazardous containers must be kept at least 50m from the river per Natura Impact Statement.
- Refuelling and servicing of construction machinery shall take place in a designated hardstand area which is also remote from any surface water inlets (when not possible to carry out such activities off site). This is required to take place at least 50m away from the river. Plant will be refuelled over drip trays.
- A response procedure shall be put in place to deal with any accidental pollution events and spillage kits shall be available and construction staff will be familiar with the emergency procedures and use of the equipment.
- Monitoring of all fuel / oil storage areas will be undertaken, and spill kits will be available on site.
- While in operation, diesel pumps, generators or other similar equipment will be placed on drip trays to catch any leaks.
- Bridge abutments will be constructed several metres from the riverbank. To prevent pollutants being washed from land to river, silt fences will be installed between abutments and riverbank on both sides, at least 10m in length. The fence will curve away from the riverbank to ensure the overland flow is captured and cannot flow around the sides. The base of the fence will be buried underground and held upright by supports.

Management of Concrete and Cement:

These products are composed of highly alkaline, corrosive fine sediments and are thus highly toxic to fauna, particularly fish and other aquatic / marine species.

On-site pouring and/or mixing of concrete or cement will be required during the construction of the bridge support abutments and infill works, so the following measures will be implemented to prevent any cement-based materials reaching the watercourse:

- Concrete pouring / mixing will only take place in dry weather conditions. It will be suspended if high-intensity local rainfall events are forecast (e.g. >10 mm/hr, >25 mm in a 24 hour period or high winds)
- If any on-site mixing of concrete is required, it will be carried out at least 50m away from the river.
- If any cement-based products are to be stored on-site, they will be kept in a sheltered area at least 50m away from the river, and will be covered (e.g. with a thick plastic membrane) to prevent spread by wind.
- Ready-mix lorries and larger plant will not be cleaned on-site; they will be taken to an appropriate off-site facility with capacity to capture and treat contaminated wash waters.
- If any on-site cleaning of tools or concrete-batching plant is required, it will take place at least 50m away from the river. Wash waters will be discharged to an on-site soakaway area or holding tank.

6 Water: Water Supply, Drainage & Utilities

The following measures are to be implemented during the construction phase in order to mitigate risks to the water supply, drainage and utilities.

- Surface water runoff from areas stripped of topsoil and surface water collected in excavations shall be directed to on-site settlement ponds or tanks where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Foul drainage discharge from the construction compound will be held in tanks and taken off site by tanker.
- The construction compound's potable water supply shall be located where it is protected from contamination by any construction activities or materials.

7 Biodiversity

The following mitigation measures are to be implemented during the construction phase:

- The removal of vegetation, where necessary, will not take place between 1st March and 31st August as per section 40 of the Wildlife Act. Where this cannot be avoided, vegetation must first be inspected by a suitably qualified ecologist for signs of nesting. Where no nesting is observed, vegetation can be removed within 48 hours. Where nesting is underway, vegetation cannot be removed unless under licence from the NPWS.
- The contractor will engage an Ecological Clerk of Works (ECoW) to assist with the implementation of the CEMP mitigation strategies. The ECoW will liaise with the contractor to ensure that the mitigation strategy is represented in the contractor's Construction Management Plan and method statements. The ECoW will attend the site prior to the construction of the bridge, to provide a toolbox talk to the contractor's employees regarding the sensitivity of the river, and to review the setup of the construction site. The ECoW will also visit the site during the bridge installation works to ensure that measures are being implemented effectively.
- For the avoidance of doubt, it is important to state that the primary responsibility for the protection of the SAC lies with the contractor. The ECoW will assist with the understanding of the mitigation strategy, and will advise on its successful implementation. However, the ECoW will not be continuously present on site, so they cannot be responsible for failures in the implementation of the mitigation strategy. Liability for any pollution incidents will be assigned to the Contractor's site management team.
- Desilting and petrochemical interception (if required) of all waters should be carried out prior to discharging any waters to drains, ditches or sewers (subject to CCC approval).
- Nocturnal mammals are impacted by lighting. Therefore, it is important that temporary lighting installed within the proposed development site is completed with sensitivity for local wildlife while still providing the necessary lighting for human usage. The following principals should be followed:
 - Temporary lighting design should be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting, as detailed below, should be used within a proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas.

- Dark buffer zones can be used as a good way to separate habitats or features from lighting by forming a dark perimeter around them. This could be used for habitat features noted as foraging areas for bats.
- Buffer zones can be used to protect dark buffer zones and rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided into zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected.
- Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).
 - All luminaires used should lack UV/IR elements to reduce impact.
 - LED luminaires should be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
 - A warm white spectrum (<2700 Kelvins is recommended to reduce the blue light component of the LED spectrum).
 - Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
 - The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.
 - Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
 - Only luminaires with an upward light ratio of 0% and with good optical control should be used.
 - Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
 - Any external security lighting should be set on motion-sensors and short (1min) timers.

- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.
- The following recommendations from Inland Fisheries Ireland '*Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*' (2016) should be considered:
 - When cast-in-place concrete is required, all works must be done in the dry and effectively isolated from any flowing water (or water that may enter streams and rivers) for a period sufficient to ensure no leachate from concrete.
 - No direct discharges be made to waters where there is potential for cement or residues in discharge.
 - The pH of any and all discharges made from and during construction works shall be in the range of 6.0 – 9.0 units and not alter the pH of any receiving fisheries waters by more than +/- 0.5 pH units.
 - The level of suspended solids in any discharges to fisheries waters as a consequence of construction works shall not exceed 25 mg/l, nor result in the deposition of silts on gravels or any element of the aquatic flora or fauna.
 - All oils and fuels shall be stored in secure bunded areas at least 50m from the river and care and attention taken during refuelling and maintenance operations, also to take place at least 50m from the river with drip trays to catch leaks.
 - There shall be no visible oil film in any discharges from construction works to waters.
 - Water abstraction for dust suppression shall not take place from any water body containing or suspected to contain aquatic invasive species.
 - Abstraction for dust suppression is confined to only those larger waters identified and agreed as being of sufficient size and volume so as to allow abstraction without adverse impact.
 - Abstraction points shall be screened so as to ensure that fish and aquatic plants are not removed from waters in the abstraction process.
 - Excavation works will be suspended if high intensity local rainfall events are forecast (e.g. >10 mm/hr, >25 mm in a 24 hour period, or high winds).
 - If any excavations need to be dewatered, the contaminated water will be collected and pumped into a settlement tank / pond (or similar feature), left undisturbed until

sediments have settled, and then discharged via a buffered outflow to a soakaway that is at least 50m away from the river.

- Stockpiles of mud, sand or other fine sediments will be stored at least 50m away from the river. Stockpiles will be levelled and compacted, and will be covered with thick plastic membranes in order to limit wind/rainwater erosion
- Dust suppression and road cleaning measures will be implemented, as outlined in Section 8 of the IFI guidelines.
- To prevent pollutants being washed from land to river during the construction of the bridge sub structure and abutments, silt fences will be installed between abutments and riverbank on both sides, at least 10m in length. The fence will curve away from the riverbank to ensure the overland flow is captured and cannot flow around the sides. The base of the fence will be buried underground and held upright by supports.

8 Waste Management

The principle of 'Duty of Care' in Waste Management Act 1996-2008 states that the waste producer is responsible for waste from the time it is generated through to its legal disposal (including its method of disposal). Waste materials generated by earthworks, demolition and construction activities will be managed according to the *Best Practice Guidelines for the preparation of resource & waste management plans for construction & demolition projects* (EPA, 2021).

This project is currently at planning stage and as such input from the contractor has not been incorporated into this document. On appointment of a contractor a detailed Resource & Waste Management Plan (RWMP) shall be prepared. The detailed RWMP shall incorporate the requirements of *Best Practice Guidelines for the preparation of resource & waste management plans for construction & demolition projects* (EPA, 2021).

The following measures are to be implemented during the construction phase in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle waste in such a manner as to minimise the effect on the environment:

- Copies of final Resource & Waste Management Plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed on the objectives of the Construction Waste Management Plan and informed of their responsibilities.
- The nominated Construction Waste Manager responsible for implementation of this Construction Waste Management Plan will be identified prior to construction commencement and will arrange for a waste audit of the project once construction has fully commenced on site (and of any facilities to which waste from the project is delivered as required).
- Building materials should be chosen with an aim to 'design out waste'.
- On-site segregation of non-hazardous waste materials into appropriate categories. All waste material will be stored in skips or other suitable receptacles in a designated area of the site.
- On-site segregation of hazardous waste materials into appropriate categories. Hazardous waste will be separately stored in appropriate lockable containers prior to removal from site by an appropriate waste collection licence holder.
- All wastes segregated at source where possible.
- Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain including photographs as appropriate.

- The site will be maintained to prevent litter and regular picking will take place throughout the site.
- Materials will be ordered on a 'just-in-time' basis to prevent over supply and site congestion (i.e. to minimise materials stored on site).
- Materials will be correctly stored and handled to minimise the generation of damaged materials
- All waste material will be correctly stored in skips or other suitable receptacles in a designated area of the site.
- Left over materials (e.g. timber off-cuts) shall be re-used on site where possible.
- All waste leaving the site will be recycled, recovered or reused where possible.
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

9 Noise and Vibration

Noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise;
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- All site access roads will be kept even to mitigate the potential for noise and vibration from lorries.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Noise and vibration during the construction phase will be controlled with reference to the best practice control measures within BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2. The contractor will ensure that all best practice noise and vibration control methods will be used as necessary in order to ensure impacts to nearby residential noise sensitive locations are not significant. This will be particularly important during site preparation works and piling works.
- Limiting the hours during which site activities which are likely to create high levels of noise or vibration are permitted;
- Monitoring levels of noise and vibration during critical periods and at sensitive locations;
- Establishing channels of communication between the contractor, Carlow County Council and residents so that receptors are aware of the likely duration of activities likely to generate higher noise or vibration, and;
- The Contractor appointed Site Environmental Manager (SEM) responsible for matters relating to noise and vibration.

Noise Limits

Carlow County Council recommends the usage of TII guidelines in relation to the noise levels from construction sites. In this instance, appropriate criteria relating to permissible construction noise levels are taken from section 4.3 of Carlow County Council's *Noise Action Plan 2018* (in line with TII recommendations). Table shown below:

Day	Working Hours	Level (dB L _{Aeq})	Maximum (dB L _{Amax})
Monday-Friday	07:00 - 18:00	70	80
Saturday	08:00 - 14:00	65	75

Table 1: TII Maximum Recommended Noise Levels at Façade of Nearby Dwellings during Construction.

The TII document suggests absolute construction noise limits depending on the receiving environment. The documents states:

- "Noise from construction and demolition sites should not exceed the level at which conversations in the nearest building would be difficult with windows shut... Noise levels between 07:00 and 19:00hrs, outside the nearest window of the occupied room closest to the site boundary should not exceed:
- 70dB in rural, suburban, and urban areas away from main road traffic and industrial noise.
- 75dB in urban areas near main roads in heavy industrial areas".

Given the rural location of the site, a limit value of 70dB L_{Aeq,T} during daytime periods for construction is considered to be reasonable. Construction machinery should be kept a minimum of 25m from noise sensitive areas when practicable to minimise noise to existing residents.

This limit value is also in agreement with those set by Transport Infrastructure Ireland (TII) for construction projects. Their 2014 document *Good Practice Guidance for the Treatment of Noise during the planning of National Road Schemes* recommends the following construction noise limit values.

Vibration Limits

Guidance relevant to acceptable vibration within buildings during construction works is contained in the following documents:

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- British Standard BS 5228: 2009: Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15mm/s at low frequencies rising to 20mm/s at 15Hz and 50mm/s at 40Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero. It is therefore common, on a cautious basis to use this lower value. Where continuous vibration is such as to give rise to dynamic magnification due to resonance, the guide values may need to be reduced by up to 50%.

Both standards note that important buildings that are difficult to repair might require special consideration on a case by case basis but building of historical importance should not (unless it is structurally unsound) be assumed to be more sensitive. If a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance. Taking the above into consideration the vibration criteria in Table 9.2 is recommended as the maximum allowable vibration.

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:-		
Less than 15Hz	15 to 40Hz	40Hz and above
12 mm/s	20 mm/s	50 mm/s

Table 2: Maximum Allowable Vibration Criteria during Construction Phase

10 Air, Dust & Climate Factors

The proactive control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation, and ongoing monitoring of a dust management plan. The key aspects of controlling dust are listed below.

- Any unsurfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On unsurfaced site roads, this will be 20 kph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Impacts to climate during the construction stage are predicted to be imperceptible. However, best practice measures will be implemented to ensure potential impacts are minimised. These include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

Proposed monitoring measures are summarised below:

- Dust monitoring can be conducted as appropriate using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119.

11 Landscape and Visual

Proposed construction phase mitigation measures are summarised below:

- Follow appropriate site management procedures, including control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking etc.
- To protect trees to be retained, fell adjacent trees to be removed and grind out stumps in accordance with BS5837:2012.
- An arboriculturist will be consulted during the construction phase of the project. Protective fencing, radius of construction exclusion zone, ground protection etc will be as per the advice of the arboriculturist.

12 Archaeology & Cultural Heritage

According to the Historic Environment Viewer of the Department of Arts, Heritage, Regional, Rural and Gaeltacht affairs, there is no recorded National Monument or Architectural Heritage within the subject site. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG.

13 Site Compound Facilities and Parking

The precise location of the site compound is to be agreed prior to the commencement of works by the Contractor. Following the Natura Impact Statement, it was stipulated that to avoid impacts on the River Derry, the site compound was to be at least 50m away from the river.

- The construction compounds will include adequate welfare facilities such as washrooms, drying rooms, canteen and first aid room as well as foul drainage and potable water supply.
- Foul drainage from the construction compounds will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off site to a licensed facility.
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.
- The construction compounds will be enclosed by a security fence.
- Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure.
- Permeable hardstanding area's will be provided for staff car parking.
- Separate permeable hardstanding area's will be provided for construction machinery and plant.
- The construction compounds will include designated construction material recycling areas.
- A series of way finding signage will be provided to direct staff, visitors and deliveries as required.
- All construction materials, debris, temporary hardstands etc. in the vicinity of the site compounds will be removed off-site on completion of the works.

Low level lighting will be provided for both construction compounds and motion detectors will be used where appropriate for lighting to ensure the impact on fauna is minimised.



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