

Construction and Environmental Management Plan

Burkeway Bearna Strategic
Housing Development



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1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been developed by McCarthy Keville O’ Sullivan Ltd. (MKO) on behalf of Burkeway Homes Limited, in respect of a proposed Strategic Housing Development [SHD] located in the townlands of Trusky East, Trusky West, Freepport and Ahaglugger, approximately 6km to the west of Galway City. The CEMP has been prepared in conjunction with the Environmental Impact Assessment Report (EIAR). The CEMP will be finalised subsequent to any permission granted by An Bord Pleanála and will be updated prior to construction to include, inter alia, any additional requirements pursuant to relevant planning conditions imposed and in order to identify, assess and satisfy the contract performance criteria. The developer will ensure that the content of the finalised CEMP will be implemented by the appointed contractor.

This report provides the environmental management framework to be adhered to during the pre-commencement, construction and operational phases of the proposed development and it incorporates the mitigating principles to ensure that the proposed works are carried out in a way that minimises the potential for any environmental impacts to occur. This document outlines also the procedures for the management of waste which will be generated during each phase of the project in accordance with the European waste hierarchy and relevant waste legislation.

This CEMP identifies the key planning and environmental considerations that must be adhered to and delivered during site construction. This report is intended as a single, amalgamated document that can be used during the future phases of the project, as a single consolidated point of reference relating to all construction, environmental and drainage requirements.

1.1 Scope of Construction and Environmental Management Plan

This report is presented as a document for the management of construction and demolition activities and waste materials generated during the works and following completion. It outlines clearly the mitigation measures that are required to be adhered to in order to manage activities and waste materials in an appropriate manner. The report is divided into six sections, as outlined below.

Section 1 provides a brief introduction as to the scope of the report.

Section 2 outlines the site and project details and an overview of the proposed works along with detailing the targets and objectives of this plan.

Section 3 sets out details of the environmental management plan for the site as well as the environmental controls on site in particular noise and dust controls and the protection of water quality. A construction and demolition waste management plan is also provided.

Section 4 sets out a fully detailed implementation plan for the environmental management of the proposed project outlining the roles and responsibilities of the project team as well as an emergency response procedure in terms of site health and safety and environmental protection.

Section 5 & 6 consists of a summary table of all mitigation and monitoring proposals to be adhered to during the implementation of the proposed project, categorised into two separate headings, 1) pre-commencement measures; 2) construction-phase measures.

Section 7 provides details of the compliance review process to ensure all commitments set out in this document are being adhered to by means of audit and inspection.

2. SITE AND PROJECT DETAILS

2.1 Site Location

The site area comprises approximately 6.19ha of land located within the townlands of Trusky East, Trusky West, Freeport and Ahaglugger, approximately 6km to the west of Galway City [I.G. Ref.: M 23388 23615]. The site is bounded by improved agricultural grassland to the north and east and residential housing to the west and south. The site is accessed via an existing residential development at Trusky East called Cnoc Fraoigh, off the Bearna Road. A site location map is presented in Figure 2-1 with the site location highlighted in red. A site layout map is presented in Figure 2-2.

2.2 Description of the Proposed Development

Planning permission is sought by Burkeway Homes Limited for a 5-year permission for development on a site which extends to 5.38ha in the townlands of Trusky East, Trusky West, Freeport and Ahaglugger, Bearna, County Galway.

The proposed development will consist of the following:

- Demolition of existing outbuildings
- Construction of 121 no. residential units comprising
 - 52 no. houses (37 no. three-beds, 15 no. four-beds)
 - 4 no. duplex units in Duplex Block D1 (2 no. two-beds (ground floor units) and 2 no. 3 beds (2 storey units))
 - 8 no. duplex units in Duplex Block D2 (4 no. two-beds (ground floor units) and 4 no. 3 beds (2 storey units))
 - 6 no. duplex units in Duplex Block D3 (3 no. two-beds (ground floor units) and 3 no. 3 beds (2 storey units))
 - 14 no. duplex units in Duplex Block D4 (7 no. two-beds (ground floor units) and 7 no. 3 beds (2 storey units))
 - 4 no. duplex units in Terrace Block T5 (2 no. two-beds (ground floor units) and 2 no. 3 beds (2 storey units))
 - 14 no. Apartments in Apartment Block A1 (5 no. one-beds, 9 no. two-beds)
 - 13 no. Apartments in Apartment Block A2 (4 no. one-beds, 9 no. two-beds and a Multipurpose Room)
 - 2 no. Apartments in Apartment Block A3 (2 no. two-beds)
 - 4 no. Apartments in Apartment Block A4 (4 no. two-beds)
- Development of a crèche facility (224.80 sqm) associated outdoor play areas and parking
- Provision of a footpath connectivity link along the L1321
- Provision of shared communal and private open space, car and bicycle parking, site landscaping and public lighting, services, access from the L-1321 via the Cnoc Fraoigh development and all associated site development works
- Provision of a public linear park along the Trusky Stream

2.3 Targets and Objectives

The key site targets are as follows;

- Ensure construction works and activities are completed in accordance with mitigation and best practice approach as presented in the EIAR, Natura Impact Statement (NIS) and associated planning documentation;

- Ensure construction works and activities are completed in accordance with all planning conditions for the development;
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community;
- Ensure construction works and activities have minimal impact on the natural environment; Adopt a sustainable approach to construction; and,
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows;

- Using recycled materials if possible, e.g. excavated soil, stone and clean inert material;
- Ensure sustainable sources for materials supply where possible;
- Avoidance of any pollution incident as a result of working around or close to existing watercourses and having emergency measures in place;
- Avoidance of vandalism;
- Keeping all watercourses free from obstruction and debris;
- Keep impact of construction to a minimum on the local environment, watercourses and wildlife;
- Correct fuel storage and refuelling procedures to be followed;
- Good waste management and house-keeping to be implemented;
- Air and noise pollution prevention to be implemented; and,
- Monitoring of the works and any adverse effects that it may have on the environment.
- Construction Methods and designs will be altered where it is found there is an adverse effect on the environment;
- Comply with all relevant water quality legislation;
- Ensure a properly designed, constructed and maintained drainage system appropriate to the requirements of the site is kept in place at all times.

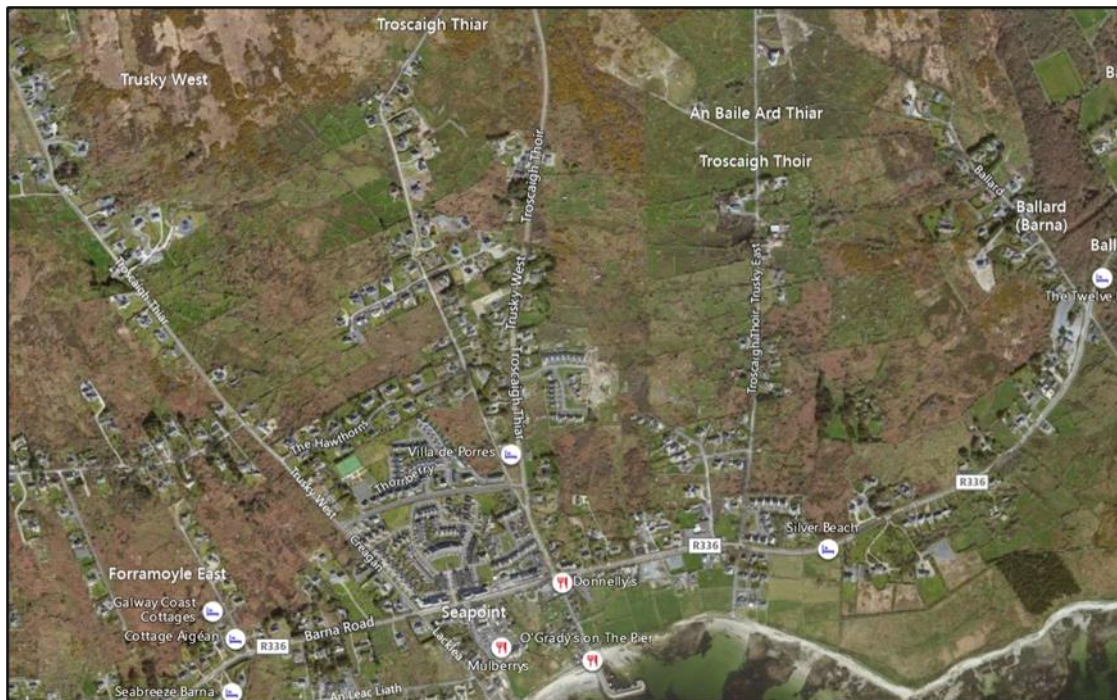


Figure 2-1 Site Location Map Aerial (Source – Bing Maps). Application Site outlined in Red (Indicative only)



Figure 2-2 Proposed Site Layout

2.4 Construction Methodology Overview

2.4.1 Introduction

The works will be completed in accordance with this CEMP and any modifications made to this document. An overview of the proposed Construction Methodologies is provided below under the following main headings:

- Site Enabling Works
- Temporary Site Compound
- Perimeter Hoarding
- Demolition of existing structures
- Site Excavation
- Site Roads
- Services and Utilities
- House Construction
- Landscaping Works

2.4.2 Site Enabling Works

The site will be accessed from the west of the site via a road that runs through Cnoc Fraoigh residential estate road. Prior to the commencement of any construction, this site entrance will need to be fully established with security gates. A parking area for construction worker's vehicles will be provided within the confines of the site. There will be no parking permitted for any vehicles associated with the project on the public road during the construction phase of the development.

2.4.3 Temporary Site Compound

A temporary construction compound is proposed for the construction phase of the proposed development, located inside the development footprint. The proposed temporary compound area incorporates temporary site offices, staff facilities and car-parking areas.

A dedicated waste management area will be located within the compound, with waste to be sorted and collected from site by permitted collectors. It is intended to utilise two temporary construction for the proposed phasing of construction works in both the north and south of the site the locations of which are identified in Figure 2-3



Figure 2-3 Proposed Site Compound Locations

Temporary toilets located at the site offices and welfare facilities will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. Power will be supplied by a diesel generator, located within the compound or via a temporary power supply if available. The construction compound will be used for temporary storage of some construction materials, prior to their delivery to the required area of the site.

2.4.4 Perimeter Hoarding

Perimeter hoarding will be provided around the site to provide a barrier against unauthorised access from the public areas. A controlled access point in the form of a gated main site entrance will be kept locked outside of normal working hours.

The hoarding will be well maintained and painted or covered with graphics portraying project information. Due to the nature of the works and the construction traffic using the site entrance, appropriate signage will be provided along the footpath and site entrance to alert pedestrians to the traffic exiting/entering the site. Likewise, appropriate signage will be installed within and outside the site to alert drivers of the pedestrians crossing ahead.

2.4.5 Demolition of Existing Structures

There are a total of three existing structures on the proposed site comprising two agricultural sheds and a portacabin, all of which are in various stages of disrepair.

Standard best practice construction methodologies will be adhered to during the demolition process. All buildings will be demolished by means of mechanical excavator. Where possible, any stone or rubble from the buildings will be reused on-site for infilling and landscaping works. The management of waste materials generated during the demolition phase is detailed in Section 3 of this document. All buildings to be demolished are detailed in Drawing no. 924-MDO-XX-XX-DR-A-00201

2.4.6 Site Excavation

Soil stripping and temporary stockpiling of soils and subsoils will be required around the site as the proposed development progresses. Where these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Gas Networks Ireland, Eir, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to strip the topsoil, and a dumper will be used to move the excavated materials to the temporary stockpile location.
- All excavated material will be reused for future landscaping works or for backfill of excavations.
- All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.

2.4.7 Site Roads

The construction methodology for the proposed access road is outlined as follows:

- Excavation will take place until a competent stratum is reached.
- The competent stratum will be overlain with up to 500mm of granular fill.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final hard surface layer will be placed over the excavated road to provide a road profile to accommodate construction traffic.
- Prior to completion of the construction works on site, the finished asphalt road surface will be applied.

2.4.8 Services and Utilities

The proposed on-site foul sewers will discharge to the existing gravity wastewater network at the existing adjacent Cnoc Fraoigh residential estate prior to it exiting the estate.

The surface water drainage system will consist of a gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge at controlled flow rates to the Trusky stream. Discharge will be limited to the greenfield equivalent, QBARRURAL, runoff rate. This will be achieved using a Hydro-Brake flow restrictor prior to discharging to the Trusky

stream. Temporary underground attenuation will also be provided at two separate locations in the form of underground cellular storage units. Silt traps will be provided for upstream of the attenuation tanks. Surface water will pass through petrol interceptors prior to discharging from the site. The site drainage details are included in Appendix 4-1 of the EIAR.

To construct the surface water outfalls, the installation of two small precast concrete headwalls will be required along the Trusky stream. Non-return valves will be positioned at the outfalls. The following best practice construction measures will be followed to ensure that there are no significant effects on the Trusky Stream as a result of the proposed works:

- Prior to the outset of these works, small defined works areas will be fenced off at the location of each of the storm water outfalls (between the main construction site and the Trusky Stream). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Trusky Stream.
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Trusky Stream will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Short sections of the Trusky Stream will be temporarily dammed with sandbags at times of low water. One dam will be constructed immediately downstream of the outfall point and the other, immediately upstream.
- A submersible pump will be used to overpump any flow within the stream from upstream to downstream of the dammed area.
- Any remaining surface water within the dammed area will be pumped to a discharge point over 30m from the Trusky Stream and within the main construction site. It will pass through a silt bag before discharge to ground.
- Machinery will not enter the water and the construction of the outfall will only occur after the dry working area is created.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt.
- Following this the dams will be removed.
- Each surface water discharge point is likely to take less than one day to install.

Sondes will be put in place in the Trusky Stream upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified.

The installation of services and connections to the residential units will be carried out as follows:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Gas Networks Ireland, Eir, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- A traffic management plan will be produced if required for connection works to the existing service network.
- A road opening licence will be obtained where required for connection to existing services.
- All plant operators and general operatives will be inducted and informed as to the location of any services.

- A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions.
- All excavated material will be removed to an authorised waste recovery facility or, if suitable, stock piled and reused for backfilling and landscaping where appropriate.
- Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification.
- Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.
- The as built location of the ducting/pipework will be surveyed using a total station/GPS.
- Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench.
- The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths.
- The surface will be reinstated as per original specification or to the requirements of the site layout/Local Authority as appropriate.

Further details on the proposed drainage for the site is included in the Engineering Services Report included as Appendix 4-3 of the EIAR

2.4.9 Existing Underground Services

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

2.4.10 House Construction

The housing units will be constructed by the following methodology:

- The area where excavations are foundations are to be installed will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Gas Networks Ireland, Eir, Galway County Council etc. will be contacted and all drawings for all existing services sought.
- The area of each building will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby storage area for later use in landscaping.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the area down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it;
- The block work walls will be built up from the foundation (including a Damp-proof Course (DPC) and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the buildings for this operation;
- Any concrete flooring slabs will be lifted into position using an adequately sized mobile crane;
- The timber roof trusses will then be lifted into position using a teleporter or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.

- Windows, electrics, plumbing and all other building components and services will be installed in as timely a manner as is possible.
- Each building will be inspected and certified by the project design engineer at the appropriate stages of construction.

2.4.11 Landscaping Works

Landscaping works will be carried out as part of site reinstatement and completion of the works. The landscaping finishes include areas of amenity grassland and tree planting. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. Solid barriers will be erected around the site boundary for the duration of the construction works.

2.4.12 Construction Works Sequence

The sequencing of construction phase works has is summarised Table 2-1. This provides a schedule of the expected sequence of operations for the works to be completed during the construction phase.

Table 2-1 Sequence of Operations for the Construction Phase

No.	Operations
1	Foundations excavation and formation level establishment
2.	Foundations: formwork and steel reinforcement installation
3.	Masonry Blockwork: including insulation installation
4.	Carpentry 1 st fix: timber roof structure and coverings
5.	Window/Door installation
6.	Plastering (external)
7.	Painting (external)
8.	Internal services (electrical and plumbing)
9.	Plastering (internal)
10.	Floor: Sand and cement screed
11.	Services connection: electrical, sewage, telecoms.
12.	Painting (internal)
13.	Tiling: Floors, walls etc.
14.	Carpentry 2 nd fix: doors, flooring etc.
15.	Landscaping
16.	Road finishes: Tarmacadam roads and parking areas

3. ENVIRONMENTAL MANAGEMENT

3.1 Site Drainage

Prior to the commencement of any construction activities, mitigation measures will be put in place to ensure the protection of surface water during the works. Surface waters will be managed, allowing water to percolate naturally to ground.

Particular emphasis will also be placed on preventing any hazardous materials entering the surface water management system as well as spills or leaks of fuel oils. Section 4 provides an Emergency Response Plan for dealing with spillages which, if they occurred, could result in adverse environmental effects.

The excavation phase of the development has the potential to encounter sub-surface and ground water during the works. The following measures will be put in place to prevent the transportation of silt laden water or pollutants from entering the wider environments including downstream watercourses.

- A solid boundary fence will be constructed around the construction footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and the Trusky stream and its associated riparian habitat. No works will be undertaken outside the confines of this fence with the exception of the installation of the two surface water outfalls, which will be undertaken as a separate element of the development that is described below.
- A silt fence will also be attached to this boundary fence. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will be buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and,
- Good construction practices such as wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk.

In general, the site is quite steeply graded from the north (+24.0m AOD) to the southeast (+14.5m AOD), with levels along the western boundary typically +22.5m AOD to +15.1m AOD. The Trusky stream is immediately east of the site's boundary, which is similarly steeply graded, from north to south. There is no available existing surface water drainage infrastructure in the vicinity of the proposed development. However, the Trusky East Stream aligns the eastern boundary of the proposed development. All surface water runoff, on the existing site, currently infiltrates to the natural ground or

discharges to the Trusky East Stream, which in turn discharges to sea at Galway Bay, approximately 500m south from the proposed development.

For the operational phase, the surface water drainage system has been designed using Sustainable Drainage Systems (SuDS) principles. The proposed development has been divided into two catchments as shown in the Drainage Layout Drawing, Appendix 4-1 (of the EIAR), each discharging attenuated flows to the Trusky stream. The surface water drainage system will consist of a gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge at controlled flow rates to the Trusky stream. Discharge will be limited to the greenfield equivalent, QBARRURAL, runoff rate. This will be achieved using a Hydro-Brake flow restrictor prior to discharging to the Trusky stream. Temporary underground attenuation will also be provided at two separate locations in the form of underground cellular storage units (refer to Drainage Layout Drawing Appendix 4-1). Silt traps will be provided for upstream of the attenuation tanks. Surface water will pass through hydrocarbon interceptors prior to discharging from the site.

Water supply to the site will be via connection to the adjacent public (Irish Water) watermain.

Wastewater from the development will discharge to the existing gravity wastewater network at the existing adjacent Cnoc Fraoigh residential estate prior to it exiting the estate (refer to Drainage Layout Drawing, Appendix 4-1).

3.2 Cement Based Products Control Measures

The complete washing out of concrete trucks will not be permitted at the site. However, a washout area for chute cleaning will be provided at various locations in close proximity to the concrete pour locations.

The following mitigation measures will be implemented to avoid release of cement leachate from the site:

- 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 possible pre-cast elements for culverts and concrete works will be used;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

3.3 Refuelling, Fuel and Hazardous Materials Storage

The following measures are proposed to avoid release of hydrocarbons at the site:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site.
- Off-site refuelling will occur at a controlled fuelling station;
- On-site refuelling will take place by direct refuelling from the delivery truck or using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built

refuelling trailer will be re-filled off site and will be towed around the site as required. The fuel bowser will be parked on a level area in the construction compound when not in use. Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.

- Fuels volumes stored on site will be minimised. Any fuel storage areas will be bunded appropriately for the volume of fuel stored. volume for the time period of the construction.
- The bunded area will be roofed to prevent the ingress of rainwater;
- The plant used will be regularly inspected for leaks and fitness for purpose; and,
- Spill kits will be available to deal with and accidental spillage in and outside the refuelling area. Spill control measures are outlined in the section that follows.

3.4 Spill Control Measures

Large volumes of oils/fuels will not be stored for the purpose of refuelling on the site. A bunded fuel tank will be stored at the temporary construction compound which will be used for smaller plant and equipment i.e. site dumpers and teleporters. This will be stored on an impermeable surface and will be equipped with spill kit. Onsite plant (excavator) will be refuelled by an external contractor who will call to site as required. Road vehicles will not be refuelled at the site.

In the event of minor spills and leaks from road vehicles and the onsite excavator the following steps provide the procedure to be followed in the event of any significant spill or leak.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- Cover or bund off any vulnerable areas where appropriate such as drains or watercourses.
- Clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the relevant authorities immediately giving information on the location, type and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.
- External consultants will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.

3.5 Dust Control

Construction dust can be generated from many on-site activities such as excavation and backfilling. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. soil, sand, etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction and Demolition traffic movements also have the potential to generate dust as they travel along the haul route. In this regard it is not intended to undertake scientific dust monitoring during the construction phase. The Environmental Manager will be responsible for the daily monitoring and checks on dust originating from the site as well as the implementation of the mitigation measures to control dust which include:

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by Site Management for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;
- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph;
- Daily inspection of construction sites to examine dust measures and their effectiveness.
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and,
- All vehicles leaving the construction areas of the site will pass through a wheel cleansing area prior to entering the local road network.

3.6

Noise & Vibration Control

The operation of plant and machinery, including construction vehicles, is a source of potential noise impacts. During the works, any plant introduced to the site will not be excessively noisy. Exhaust and silencer systems on plant will be maintained in a satisfactory condition and operating correctly at all times. Defective silencers will be immediately replaced. In this regard it is not intended to undertake scientific noise monitoring during the construction phase. The Environmental Manager will be responsible for the daily monitoring and checks on noise levels emanating from the site as well as the implementation of the mitigation measures to control noise levels which include:

Measures to control noise include:

- Diesel generators will be enclosed in sound proofed containers to minimise the potential for noise impacts;
- Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All construction plant and equipment to be used on-site will be modern equipment and will comply with applicable legislation regulating permissible noise levels;
- Plant with the potential of generating noise or vibration will be placed as far away from sensitive properties as permitted by site constraints.
- Regular maintenance of plant will be carried out in order to minimise noise emissions. Particular attention will be paid to the lubrication of bearings and the integrity of silencers;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works;
- Compressors will be of the “sound reduced” 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;
- Machines, which are used intermittently, will be shut down during those periods when they are not in use;
- Training will be provided by the Site Management to drivers to ensure smooth machinery operation/driving, and to minimise unnecessary noise generation; and,
- Local areas of the haul route will be condition monitored and maintained if necessary.

- It is recommended that drivers of heavy goods vehicles (HGVs) associated with the development extend due care and courtesy to other road users. Excessive use of and unnecessary engine racing will be avoided.

The proposed construction working hours are as follows:

08:00 – 19:00 Monday to Friday

08:00 – 14:00 Saturday

Closed Sunday and Public Holidays

3.7 Invasive Species Management

A baseline invasive species survey will be carried out at the site to identify the presence and location of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011)) by a suitably qualified ecologist prior to the commencement of construction. In the event Invasive Species are discovered, an Invasive Species Management Plan will be prepared.

3.8 Traffic Management Proposals

3.8.1 Construction Traffic Access and Management

The following is a list of the proposed traffic management measures to be adopted during the construction works:

- Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access locations;
- Construction and delivery vehicles will be instructed to use only the approved and agreed means of access; and movement of construction vehicles will be restricted to these designated routes;
- Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on HGVs carrying dust producing material;
- Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds;
- No vehicle will be allowed to stop or park on the access road to the proposed development site.
- Ample parking will be provided within the site to cater for the staff and visitors during the construction phases of the proposed development.
- On site wheel washing will be undertaken for construction vehicles to remove any debris prior to leaving the site, to remove any potential debris on the local roads if it is deemed necessary;
- All vehicles will be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. All scheduled maintenance will not be carried out on the public highway; and
- Minimal impact on the surrounding road network will be ensured.

Further details on traffic management proposals are included in the Design Process Traffic Management Plan included as Appendix 4-4 of the EIAR.

3.9 Construction & Demolition Waste Management Plan

This section of the CEMP provides a Construction and Demolition Waste Management Plan (CDWMP) which outlines the best practice procedures during the demolition of the existing building on site and the construction phase of the project. The CDWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage. Disposal of waste will be seen as a last resort.

3.9.1 Legislation

The Waste Management Act 1996, as amended, and regulations provide for measures in relation to waste management, recycling and recovery and provide a regulatory framework for attaining the objectives of EU and Irish law.

The Act requires that anyone carrying out a waste activity must have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the site of the proposed development to ensure that all contractors hired to remove waste from the site have valid Waste Collection Permits and that waste is delivered to a licensed or permitted waste facility.

3.9.2 Guidance

The Department of the Environment provides a document entitled, ‘Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects’.

These Department of the Environment guidelines which been considered in the preparation of this CDWMP state that, at the design stage of the project, only a preliminary Waste Management Plan (WMP) is required,

“Formal production and presentation of the Plan may be at a later stage but a clear ‘waste management philosophy’ needs to be adopted...at the initial conceptual stage of the Project...”

This WMP – which will incorporate all the measures set out in this document will be finalised subsequent to any permission granted by An Bord Pleanála and will be updated prior to construction to include, inter alia, any additional requirements pursuant to relevant planning conditions imposed – has a number of key objectives as outlined below:

- To set out management prescriptions that adhere to a waste management hierarchy
- To outline the roles and responsibilities of the Waste Manager
- Prevention and minimisation of waste at the construction stage of the development.

3.9.3 Waste Management Hierarchy

The waste management hierarchy sets out the most efficient way of managing waste in the following order:

Prevention and Minimisation:

The primary aim of the WMP is to prevent and thereby reduce the amount of waste generated at each stage of the project.

Reuse of Waste:

Reusing as much of the waste generated on site as possible will reduce the quantities of waste that will have to be transported off site.

Recycling of Waste:

There are a number of established markets available for the beneficial use of Construction waste such as using waste concrete as fill for new roads.

At all times during the implementation of the WMP, disposal of waste to an appropriately licenced facility will be considered only as a last resort.

3.9.4 Demolition Waste Management

The demolition phase of the proposed development will involve the removal of three existing structures from within the site comprising two agricultural sheds and a portacabin.

Prior to the commencement of any demolition, excavation or construction works at the site works at the site a full audit of waste that will be generated on site will be carried out. For the purposes of this CEMP a list of expected waste types that may be generated has been drawn up and the European Waste Catalogue Codes pertaining to each waste type is included in Table 3-1. The lists have been prepared following a visit to the proposed development site and inspection of the existing buildings but do not constitute a full waste audit.

Prior to any demolition works, a detailed asbestos survey will be carried out, if deemed necessary. If any Asbestos Containing Material is identified, it will be removed and disposed by an appointed specialist asbestos management company.

Table 3-1 Expected waste types arising from the Demolition Phase

Materials Type	Example	EW Code
Soil & Stones	Overburden, soil, subsoil	17 05 04
Concrete	Surfacing, flooring material	17 01 01
Mixture of inert material	Sand, stones, plaster, rock	17 01 07
Metals	Agricultural Shed Components	17 04 07

3.9.4.1 Waste Arising from Demolition Activities

The majority of the waste generated by the demolition phase will consist of concrete rubble from the shed’s foundations and metals from the shed’s walls and roofing. The remaining volume of waste material will be segregated according to type into individual skips pending removal by authorised waste collection contractors. The actual waste categories that will be subject to segregation during the demolition phase will be determined by the expected volumes of specific waste categories which will be assessed by the Waste Manager prior to any demolition works. Where a category of waste forms a smaller quantity, this will be disposed of in a general waste skip along with other categories of waste the volume of which does not warrant individual segregation This general waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be further sorted into individual waste streams for recycling, recovery or disposal.

3.9.5 Excavated Materials Management Plan

The excavation phase of the proposed development will require the removal and management of the materials from the foundation excavations. It is anticipated that some of the material will be re-used on site for landscaping, backfilling and general restoration of excavated areas.

All excavated material which is not required for future landscaping works or for backfill of excavations will be removed to an authorised waste recovery facility. This will also apply to material which is not suitable for reuse on site.

3.9.6 Construction Phase Waste Management Plan

The first significant quantity of waste to be generated during the construction phase of the project will be the excavation for the associated foundations. This will generate a significant quantity of soil and subsoil material as a result of the excavation. Although a quantity of this material will be used for landscaping, backfilling and general restoration of excavated areas, it is anticipated that a quantity of this material will be exported off site by a licenced haulier to an authorised waste facility.

Waste generated post excavation on site will be managed in the Waste Storage Area (WSA) where the various waste components will be segregated into a number of waste categories in accordance with a general waste segregation policy and placed into individual skips. The categories for segregation will include, timber, metal, cardboard and plastics. This material will be removed by authorised waste collection contractors for recycling and recovery at various licensed facilities. The remaining volume of waste material which cannot be allocated to any of these four waste streams will be disposed of in a general waste skip. This waste material will be transferred to a Materials Recovery Facility by a fully licensed waste contractor where the waste will be further sorted into individual waste streams for recycling, recovery or disposal. This general waste will be subject to constant monitoring by site management to ensure that potential reusable and recyclable material is not being disposed of therein. The on-site canteen will include waste receptacles for dry recyclables and food waste which will eliminate the potential of any waste produced within the canteen being sent to landfill. The expected wastes arising from the works including the individual European Waste Catalogue (EWC) codes are outlined in Table 3-2.

Table 3-2 Expected waste types arising during the Construction Phase

Materials type	Example	EWC Code
Cables	Electrical wiring	17 04 11
Concrete	Surfacing, flooring material	17 01 01
Insulation	Cavity & Floor Insulation	17 06 04
Tiles and ceramics	Wall and floor tiles	17 02 03
Bituminous materials	Tarmacadam	17 03 01
Metals	Rebar, reinforced steel joists, lead	17 04 07
Mixture of inert material	Sand, stones, plaster, rock	17 01 07
Plastic	PVC frames, electrical fittings	17 02 03
Soil & Stones	Overburden, soil, subsoil	17 05 04

Materials type	Example	EWC Code
Gypsum materials	Roof tiles/slabs	17 08 02
Wood	Frames and doors,	17 02 01
Canteen Waste	Miscellaneous waste from site staff	20 01 08

The potential for re-use of materials on the site during the works will be minimal however clean inert concrete, rubble and stones may have a re-use potential for landscaping and site restoration. However, considering the major excavation works on the site have been completed, the quantity of such material being generated will be minimal and is likely to be reused locally.

3.9.6.1 Waste Arisings and Proposals for Minimisation, Reuse and Recycling of Construction Waste

Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste.

Appropriate measures will be taken to ensure excess waste is not generated during construction, including;

- Ordering of materials will be on an ‘as needed’ basis to prevent over supply to site.
- Purchase of materials pre-cut to length to avoid excess scrap waste generated on site.
- Require suppliers to use least amount of packaging possible on materials delivered to the site.
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal
- Ensuring correct sequencing of operations.
- Use reclaimed materials in the construction works.

Hazardous waste will be kept separate from all other construction waste to prevent contamination and removed to an appropriately licenced appropriately. In addition to fuel as outlined above, the potentially hazardous wastes that may be generated at the site during the construction include;

- Paints including all associated by products
- Glues and solvents
- Asphalt materials from roofing products and external paving finishes
- Asbestos (if identified prior to demolition works as summarised above)

3.9.7 Waste Arising from Construction Activities

The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation or a dedicated waste storage area. Wastes will generally comprise soils and subsoils which will be removed by truck to an appropriately licenced facility.

3.9.7.1 Reuse

Many construction materials can be reused a number of times before they have to be disposed of:

- Concrete can be reused as aggregate for roads backfilling material.
- Plastic packaging etc. can be used to cover materials on site or reused for the delivery of other materials.

3.9.7.2 Recycling

If a certain type of construction material cannot be reused on site, then recycling is the most suitable option.

All waste that is produced during the construction phase including dry recyclables will be sent directly for subsequent segregation at a remote facility. The low volume of such material that is anticipated to be generated at the proposed development is the justification for adopting this method of waste management.

3.9.8 Wastewater

The removal and disposal of wastewater from site welfare facilities, will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the Waste Management (Collection Permit) Regulations 2007, as amended. Information on the appointed permitted contractor and evidence of a maintenance will be retained on site and available for inspection on request.

3.9.9 Implementation

3.9.9.1 Roles and Responsibilities for Waste Management

Prior to the commencement of the proposed development a Waste Manager will be appointed by the project team. The role of Waste Manager is likely to be fulfilled by the Site Manager given the scale of the development and will be responsible for the implementation of the objectives of this plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated will have sufficient authority so that they can ensure everyone working on the proposed development adheres to the management plan. The Waste Manager will also be required to conduct regular waste audits in the WSA and throughout the site to ensure that the waste management plan is operating effectively.

3.9.9.2 Training

The Construction Waste Manager will communicate effectively with colleagues in relation to the aims and objectives of the WMP. All employees working on site during the construction phases of the project will be trained in materials management and thereby, will be able to:

- Distinguish reusable materials from those suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on the best locations for stockpiling reusable materials;
- Separate materials for recovery; and
- Identify and liaise with waste contractors and waste facility operators.

3.9.9.3 Record Keeping

The implementation of the WMP will ensure that all arisings, movements and treatments of construction waste to be recorded. This system will enable records the quantity of waste being generated to be maintained. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The WMP can then be adapted with changes that are seen through record keeping.

The fully licensed waste contractor employed to remove waste from the site will be required to provide documented records for all waste dispatches leaving the site of the proposed development. Each record will contain the following:

- > Consignment Reference Number
- > Material Type(s) and EWC Code(s)
- > Company Name and Address of Site of Origin
- > Trade Name and Collection Permit Ref. of Waste Carrier
- > Trade Name and Licence Ref. of Destination Facility
- > Date and Time of Waste Dispatch
- > Registration no. of Waste Carrier vehicle
- > Weight of Material
- > Signature of Confirmation of Dispatch detail
- > Date and Time of Waste Arrival at Destination
- > Weight of Material
- > Site Address of Destination Facility

3.9.10 **Waste Management Plan Conclusion**

The WMP will be adhered to by all staff involved in the project which will be outlined within the induction process for all site personnel. The waste hierarchy will always be employed when designing the plan to ensure that the least possible amount of waste is produced during the construction phase. Reuse of certain types of construction wastes will cut down on the cost and requirement of raw materials therefore further minimising waste levels.

4. ENVIRONMENTAL MANAGEMENT IMPLEMENTATION

4.1 Roles and Responsibilities

4.1.1 Construction Manager/Site Supervisor

The Construction Manager/Site Supervisor will have overall responsibility for the organisation and execution of all related environmental activities as appropriate, in accordance with regulatory and project environmental requirements. The duties and responsibilities of the Site Supervisor/Construction Manager will include:

- Ensure that all works are completed safely and with minimal environmental risk;
- Implement the CEMP and supporting environmental documentation, and ensure that all environmental standards are achieved during the construction phase of the project;
- Take advice from the Site Environmental Manager on legislation, codes of practice, guidance notes and good environmental working practice relevant to their work;
- Ensure compliance through audits and management site visits;
- Ensure timely notification of environmental incidents; and,
- Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

4.1.2 Environmental Manager

The required level of supervision on site will be provided by an Environmental Manager who will also fulfil the role of Waste Manager. Due to the scale of activity proposed for the site, this role can be adopted by a Site Manager/Foreman as part of their duties. In general, this Environmental Manager will maintain responsibility for monitoring the works from an environmental perspective. The Environmental Manager will act as the regulatory interface on environmental matters by reporting directly to the client and liaising with Galway County Council and other statutory bodies as required. The Site Environmental Manager will report to the Site Supervisor/Construction Manager. The duties of the appointed Environmental Manager are summarised as follows:

- Maintain and update as required the Construction Phase CEMP and supporting environmental documentation and review/approval of method statements;
- Undertake inspections and reviews to ensure the works are carried out in compliance with the CEMP;
- Monitor the implementation of the CEMP, particularly all proposed/required Environmental Monitoring;
- Generate environmental reports as required to show environmental data trends and incidents and ensure environmental records are maintained throughout the construction period;
- Advise site management/contractor/sub-contractors on:
 - Prevention of environmental pollution and improvement to existing working methods;
 - Changes in legislation and legal requirements affecting the environment;
 - Suitability and use of plant, equipment and materials to prevent pollution;
 - Environmentally sound methods of working and systems to identify environmental hazards;
- Ensure the mitigation measures are effectively implemented during the construction phase;

- Liaise with Project Team and present the findings of site audits/inspections that are completed;
- Ensure adequate arrangements are in place for site personnel to identify potential environmental incidents;
- Ensure that details of environmental incidents are communicated in a timely manner to the relevant regulatory authorities, initially by phone and followed up as soon as is practicable by email;
- Support the investigation of incidents of significant, potential or actual environmental damage, and ensure corrective actions are carried out, recommend means to prevent recurrence and communicate incident findings to relevant parties;
- Identify environmental training requirements and arrange relevant training for all levels of site-based staff/workers; and
- Fulfil the role of Waste Manager and implement the objectives of the Waste Management Plan as set out in Section 3 above.
- Coordinate the Emergency Response in terms of site health and safety and environmental protection as outlined in the section below

4.2 Monitoring

The surface water quality monitoring programme combines the use of laboratory analysis, water quality monitoring instrumentation and visual inspection to develop a comprehensive schedule of monitoring of all watercourse that exist both at the site and the surrounding area. This provides an inspection and maintenance plan for the on-site drainage systems and mitigation measures will be prepared in advance of commencement of any works and for the duration of construction. Regular inspections of all installed drainage systems and controls will be undertaken daily, to check that the integrity of silt fencing, for example, is intact. Daily visual checks of the stream will also be carried out.

4.2.1 Pre-Construction Drainage Inspection and Monitoring

There is an existing drainage network across the site and runoff drains relatively freely to local watercourses. This existing drainage system will continue to function as it is during the pre-construction phase.

However, prior to commencement of works, inspections will be completed to ensure watercourses are free from debris and blockages that may impede drainage.

Monthly Laboratory Analysis Sampling: Baseline laboratory analysis for the parameters listed below with relevant regulatory limits and Environmental Quality Standards (EQSs) will be undertaken.

4.2.2 Construction Phase Drainage Inspection and Monitoring:

Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations and the laboratory analysis sampling points. Inspection points will depend on works being completed. Visual inspections will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period and data including photographs will be collected by visual inspections completed by the Environmental Manager.

The following periodic inspection regime will be implemented:

- Daily general visual inspections of site operations and inspections of all watercourses within the site and in the surrounding area by the Environmental Manager or a suitably qualified and competent person as delegated;

- Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter should be noted and corrective action should be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;
- Event based inspections by the ECoW as follows:
 - >10 mm/hr (i.e. high intensity localised rainfall event);
 - >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
 - Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week)

During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will continue for the adjacent Truskey stream.

Field chemistry measurements of unstable parameters, (pH, conductivity, dissolved oxygen, temperature) will be taken at the two surface water monitoring locations on the Truskey stream, subject to agreement with Galway County Council. In-situ field monitoring will be completed on a monthly basis.

Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken prior to construction at two locations on the Truskey stream.

The analytical determinants of the monitoring programme will be as set out below and carried out quarterly.

- pH (field measured)
- Electrical Conductivity (field measured)
- Temperature (field measured)
- Dissolved Oxygen (field measured)
- Total Suspended Solids
- Total Phosphorus
- Chloride
- Nitrate
- Nitrite
- Total Nitrogen
- Ortho-Phosphate
- Ammonia N
- Biochemical Oxygen Demand

4.2.3 Surface Water Monitoring Reporting

Visual inspection and laboratory analysis results of water quality monitoring shall assist in determining requirements for any necessary improvements in drainage controls and pollution prevention measures implemented on site.

It will be the responsibility of the Environmental Manager to present the ongoing results of water quality and weather monitoring at or in advance of regular site meetings.

Reports on water quality will consider all field monitoring and visual inspections, and results of laboratory analysis completed for that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality that has been observed and whether any effects are

attributable to construction activities and what remedial measures or corrective actions have been implemented.

All water monitoring reports will be available to Galway County Council on request at any stage during the construction phase

4.3 Emergency Response

The Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection. The site ERP includes details on the response required and the responsibilities of all personnel in the event of an emergency. The ERP will require finalisation upon receipt of submissions from the PSCS and suppliers as the proposed project progresses. Where sub-contractors that are contracted on site are governed by their own emergency response procedure an arrangement will be adopted to allow for inclusion of the sub-contractor's ERP within this document (which shall be a "live" document).

4.3.1 Roles and Responsibilities

The chain of command during an emergency response sets out who is responsible for coordinating the response. The Site Manager will lead the emergency response which makes him responsible for activating and coordinating the emergency response procedure. The other site personnel who can be identified at this time who will be delegated responsibilities during the emergency response are presented in Figure 4-1. In a situation where the Site Manager is unavailable or incapable of coordinating the emergency response, the responsibility will be transferred to the next person in the chain of command outlined in Figure 4-1. This will be updated throughout the various stages of the project.

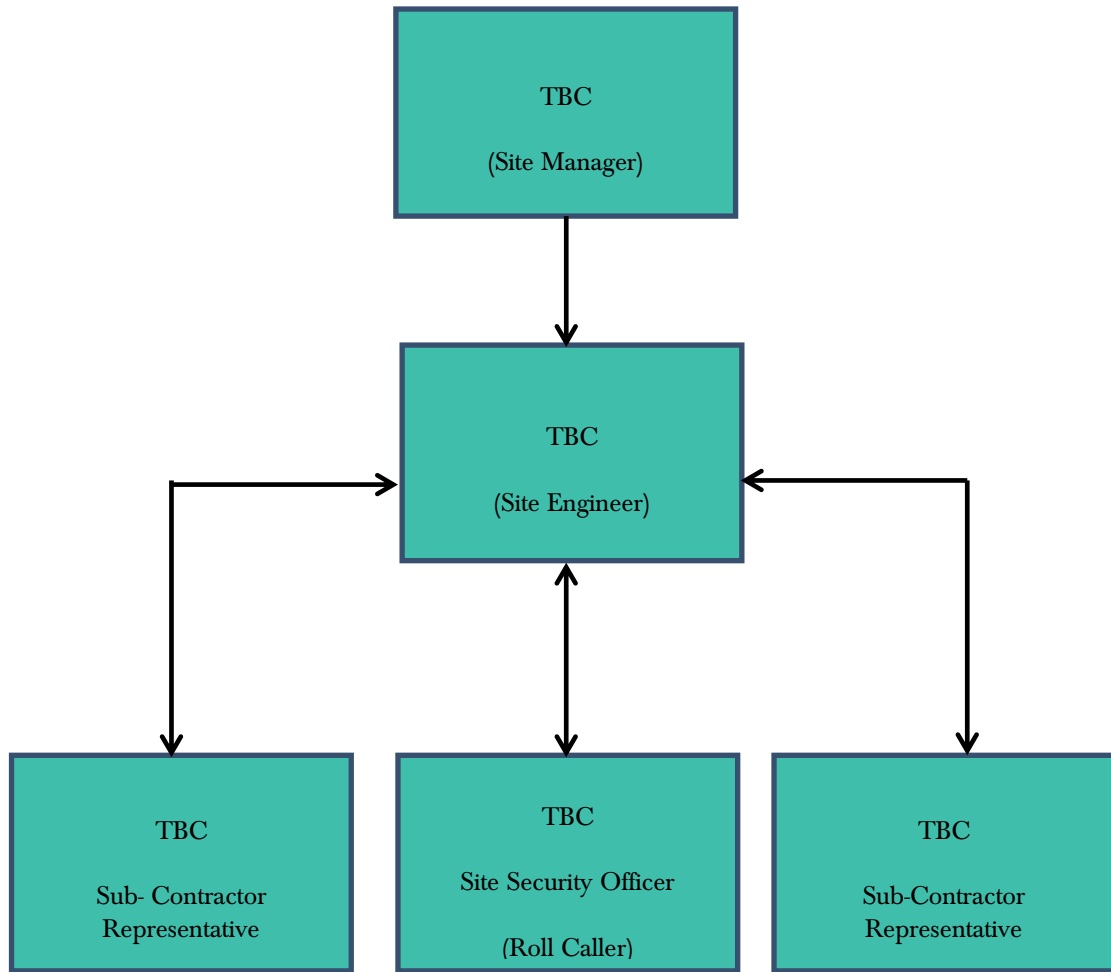


Figure 4-1 Emergency Response Procedure Chain of Command

4.3.2 Initial Steps

In order to establish the type and scale of potential emergencies that may occur, the following hazards have been identified as being potential situations that may require an emergency response in the event of an occurrence.

Table 4-1 Hazards associated with potential emergency situations

Hazard	Emergency Situation
Construction Vehicles: Dump trucks, tractors, excavators, cranes etc.	Collision or overturn which has resulted in operator or third-party injury.
Abrasive wheels/Portable Tools.	Entanglement, amputation or electrical shock associated with portable tools.
Contact with services.	Electrical shock or gas leak associated with an accidental breach of underground services.
Fire	Injury to operative through exposure to fire.
Sickness	Illness unrelated to site activities of an operative e.g. heart attack, loss of consciousness, seizure.

In the event of an emergency situation associated with, but not restricted to, the hazards outlined in Table 4-1 the Site Manager will carry out the following:

- Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury.
- Where necessary, sound the emergency siren/fog horn that activates an emergency evacuation on the site.
- Make safe the area if possible and ensure that there no identifiable risk exists with regard to dealing with the situation e.g. if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone if he is unable to do so. If delegating the task, ensure that they follow the procedures for contacting the emergency services as set out in Section 4.4.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g. cordon off an area where an incident associated with electrical issues has occurred.
- Contact any regulatory body or service provider as required e.g. ESB Networks the numbers for which as provided in Section 4.4.2.
- Contact the next of kin of any injured personnel where appropriate. The procedure for this is outlined in Section 4.4.3.

4.3.3 Spill Control Measures

Every effort will be made to prevent an environmental incident during the construction and operational phase of the proposed project. Oil/Fuel spillages are one of the main environmental risks that will exist on the proposed site which will require an emergency response procedure. The importance of a swift and effective response in the event of such an incident occurring is essential. The following steps provide the procedure to be followed in the event of such an incident.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- Cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats.
- Clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the Environmental Manager immediately giving information on the location, type and extent of the spill so that they can take appropriate action.
- The Environmental Manager will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The Environmental Manager will notify the appropriate regulatory body such as Galway County Council, The Department of Communications, Climate Action and Environment and the Department of Housing, Planning and Local Government , if deemed necessary.

Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be investigated in accordance with the following steps.

- The Environmental Manager must be immediately notified.

- The Environmental Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures used to follow the incident. The form will also include any recommendations made to avoid reoccurrence of the incident.
- If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated natural conservation site, the Environmental Manager will liaise with a Project Ecologist.
- If the incident has impacted on a sensitive receptor such as an archaeological feature the Environmental Manager will liaise with a Project Archaeologist.
- A record of all environmental incidents will be kept on file by the Environmental Manager. These records will be made available to the relevant authorities such as Galway County Council, as required.

The Environmental Manager will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling.

4.4 Contacting the Emergency Services

4.4.1 Emergency Communications Procedure

A list of emergency contacts is presented in Table 4-2. A copy of these contacts will be included in the Site Safety Manual and in the site offices and the various site welfare facilities.

Table 4-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Barna Medical Centre	091 596 510
Hospital –University Hospital, Galway	091 524 222
ESB Emergency Services	1850 372 999
Gas Networks Ireland	1850 20 50 50
Gardaí – Salthill Garda Station	091 514 720
Health and Safety Coordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Project Supervisor Construction Stage (PSCS): TBC	TBC
Client – Burkeway Homes Ltd	TBC

4.4.2 Procedure for Personnel Tracking

All operatives on site without any exception will have to undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.

In the event of a site operative becoming involved in an emergency situation where serious injury has occurred, and hospitalisation has taken place, it will be the responsibility of the Site Manager or next in command if unavailable to contact the next of kin to inform them of the situation that exists.

4.4.3 Induction Checklist

Table 4-3 provides a list of items highlighted in this ERP which must be included or obtained during the mandatory site induction of all personnel that will work on the site. This will be updated throughout the various stages of the project.

Table 4-3 Emergency Response Plan Items Applicable to the Site Induction process

ERP Items to be included in Site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction.	
Due to the location of the site it may be necessary to liaise with and assist the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This will form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	
All operatives on site without any exception will have undergone a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.	

5.

MITIGATION MEASURES

The Mitigation Measures which will be implemented are presented in this section of the CEMP. The CEMP will be finalised subsequent to any permission granted by An Bord Pleanála and will be updated prior to construction to include, inter alia, any additional requirements pursuant to relevant planning conditions imposed.

By presenting the mitigation proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the project.

Table 5-1 Mitigation Measures

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
Pre-Commencement Phase			
1	All measures identified in this Construction Environmental Management Plan, which will be finalised subsequent to any permission granted by An Bord Pleanála and updated prior to construction will include all mitigation measures identified to be adhered to during the pre-commencement, construction and operational phases of the proposed development.		
2	Construction Manager engaged who will also fulfil the role of Environmental Manager (EM), and to monitor all site works and to ensure that methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment.		
3	Prior to the commencement of any excavation or construction activities, the works area will be clearly demarcated with fencing and no works will take place outside the fences. Where potential for run off from the site is identified (i.e. along the stream to the east) a silt fence will be attached to the fencing and buried beneath the ground to filter any runoff that may occur as a result of the proposed works.		
4	The compound for the site will be of adequate size to accommodate site staff parking appropriate to the level of site activity anticipated for a site of this scale.		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
Construction Phase			
Construction Management			
5	A site-specific Health and Safety Plan will be in place for the proposed facility. In the event that Covid-19 restrictions are in place at the commencement of the construction phase, the Health and Safety Plan will include provisions regarding compliance with relevant Covid-19 restrictions. All site staff will be made aware of and adhere to the Health and Safety Plan		
6	A Site Induction Process for all site staff will be maintained which will also ensure all staff will have current 'Safe Pass' cards		
7	Only appropriately qualified and trained personnel will be permitted to operate machinery onsite.		
8	The proposed development site will not be accessible to members of the public. Appropriate barriers and signage will be used. The site will also be secured to prevent the risk of trespass through signage and provision of barriers.		
9	Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. No batching of wet-cement products will occur on site.		
10	No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;		
11	Whilst significant inundation of surface or ground water is not anticipated, any such water arisings that require pumping out during construction will be discharged to ground		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	within the site through a silt bag at a distance of over 30m from the Trusky Stream. There will be no direct discharge of construction waters to any watercourse.		
Drainage and Surface Water Quality			
12	<ul style="list-style-type: none"> ➤ All plant and machinery will be serviced before being mobilised to site. ➤ No refuelling of machinery or overnight parking of machinery is permitted in areas adjacent to watercourses or on-site drainage infrastructure. ➤ On-site refuelling will only take place at distances greater than 50 metres from nearest water courses or site drainage infrastructure. ➤ On-site refuelling of machinery will be carried out using an oil company vehicle sourced from a local supplier. Only dedicated trained and competent personnel will carry out refuelling operations. A spill kit and drip tray shall be on site at all times and available for all refuelling operations. Equipment shall not be left unattended during refuelling. ➤ Spill kits shall be available in each item of plant required. ➤ Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals. The plant refuelling procedures described above shall be detailed in the method statements. 		
13	<ul style="list-style-type: none"> ➤ A solid boundary fence will be constructed around the construction footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and the Trusky stream and its associated riparian habitat. No works will be undertaken outside the confines of this fence with the exception of the installation of the two surface water outfalls, which will be undertaken as a separate element of the development that is described below. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ A silt fence will also be attached to this boundary fence. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities. ➤ The silt fence will comprise a geotextile membrane that will be buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated. ➤ As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground; ➤ Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing; ➤ Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present; ➤ Daily monitoring and inspections of site drainage during construction will be completed; ➤ Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and, ➤ Good construction practices such as wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. 		
14	<p>The following best practice construction measures will be followed to ensure that there are no significant effects on the Trusky Stream as a result of the proposed works:</p> <ul style="list-style-type: none"> ➤ Prior to the outset of these works, small defined works areas will be fenced off at the location of each of the storm water outfalls (between the main 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>construction site and the Trusky Stream). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Trusky Stream.</p> <ul style="list-style-type: none"> ➤ The necessary pipelaying works will be undertaken within this defined area. ➤ Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Trusky Stream will be removed to facilitate the construction of the outfall. ➤ No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. ➤ Short sections of the Trusky Stream will be temporarily dammed with sandbags at times of low water. One dam will be constructed immediately downstream of the outfall point and the other, immediately upstream. ➤ A submersible pump will be used to overpump any flow within the stream from upstream to downstream of the dammed area. ➤ Any remaining surface water within the dammed area will be pumped to a discharge point over 30m from the Trusky Stream and within the main construction site. It will pass through a silt bag before discharge to ground. ➤ Machinery will not enter the water, the construction of the outfall will only occur after the dry working area is created. ➤ The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included). ➤ The banks and channel bed will be reinstated to avoid erosion or run off of silt. ➤ Following this the dams will be removed. ➤ Each surface water discharge point is likely to take less than one day to install. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>Biosecurity measures will be strictly adhered to throughout the proposed works. Measures will be in accordance with IFI (2010) Biosecurity Protocol for Field Survey Work. Where staff are working instream, staff footwear and PPE will be inspected on daily completion of the works and vegetation or debris removed. Footwear will be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkron Aquatic or another proprietary disinfection product) and thoroughly dried afterwards. Sand bags placed instream will not be re-used in other watercourses.</p>		
15	<p>Gross pollutants, sediments, hydrocarbons, and other impurities, will be removed at source with the following provisions:</p> <ul style="list-style-type: none"> ➤ Permeable Paving to all in-curtilage car parking areas; ➤ Intensive landscaping, where practicable; ➤ Silt-traps prior to attenuation storage area. ➤ All road gullies are to be trapped; ➤ Fuel separator prior to discharge from the development. 		
16	<p>Attenuation storage is to be provided for the 100-year return period rainfall event (including an increased 20% rainfall intensity; to allow for climate change). Discharge from site is to be achieved through the use of a vortex flow control device (e.g. Hydro-Brake Optimum, by Hydro-International, or similar approved), which will reduce the risk of blockage present with other flow devices.</p>		
17	<p>To mitigate for the potential disturbance of fauna during construction the applicable mitigation measures set out in the CEMP, including the following measures, will be implemented:</p> <ul style="list-style-type: none"> ➤ Plant and machinery will be turned off when not in use. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crepuscular or nocturnal species including bat species. ➤ Vegetation removal will be conducted in line with the provision of the Wildlife Act to avoid nesting songbirds ➤ The Trusky Stream will be fenced off during construction (with the exception of short term works associated with the construction of the surface water outfalls) with no disturbance to the stream or the riparian area. 		
18	<ul style="list-style-type: none"> ➤ Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast; ➤ Machinery deliveries shall be arranged using existing structures along the existing road; ➤ Any excess construction material shall be immediately removed from the area and sent to an authorized waste recovery facility; ➤ Spill kits shall be available in each item of plant required; ➤ Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing; ➤ Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present 		
19	<ul style="list-style-type: none"> ➤ No instream/bankside works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. ➤ Works associated with the headwalls construction will be supervised by an ecologist. ➤ The headwalls will be installed in the dry, either by damming the stream upstream and downstream of the headwall locations and over pumping from upstream to 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>downstream, or by using sand-bags to create a dry area where works can occur, whilst still allowing the stream to flow.</p> <ul style="list-style-type: none"> ➤ Any remaining surface water within the bunded area will be pumped from within the bund using a suitably sized de-watering pump. A screen will be placed on the suction end of the pump to prevent coarse material/sediment being pumped. The pumped water will be discharged to ground at a location over 30m from the watercourse and will be filtered through a silt bag prior to discharge. ➤ Machinery will not enter the water, the minor excavations will be undertaken from the bank and the pre-cast concrete headwalls will be placed into the stream bank. 		
20	Surface and/or ground water generated from the works during construction will be discharged to ground on the site through a silt bag. There will be no direct discharge of construction waters to any watercourse.		
21	<p>Management of excavation seepages and subsequent treatment prior to discharge into the site drainage network will be undertaken as follows:</p> <ul style="list-style-type: none"> ➤ Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required; ➤ If required, pumping of excavation inflows will prevent build-up of water in the excavation; ➤ The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from the Trusky Stream. ➤ There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
22	<ul style="list-style-type: none"> ➤ A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and, ➤ No wastewater will be discharged on-site during either the construction or operational phase. 		
23	<ul style="list-style-type: none"> ➤ 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; ➤ No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; ➤ Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. 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 is to be tanked and removed from the site to a suitable, non-polluting, discharge location; ➤ Use weather forecasting to plan dry days for pouring concrete; and, ➤ Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event. 		
24	<ul style="list-style-type: none"> ➤ Excavated (existing) overburden material will be reused on site, where possible; ➤ A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and, ➤ Construction of service trenching, and surface water attenuation features will generate excess material, and all excess material will be used locally within the site for achieving building formation levels and landscaping. 		
25	<ul style="list-style-type: none"> ➤ All plant and machinery will be serviced before being mobilised to site; 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed; ➤ Refuelling will be completed in a controlled manner using drip trays at all times; ➤ Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water; ➤ Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores; ➤ Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored; ➤ Ancillary equipment such as hoses and pipes will be contained within the bund; ➤ Taps, nozzles or valves will be fitted with a lock system; ➤ Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage; ➤ Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills; ➤ Only designated trained operators will be authorised to refuel plant on site; ➤ Procedures and contingency plans will be set up to deal with emergency accidents or spills; and, ➤ An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment. 		
26	Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps.		
27	The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage and gravity sewer network, and by using underground attenuation tanks for drainage management which will control discharge to the Trusky Stream at pre-development greenfield rates.		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
28	<p>The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Trusky Stream via silt traps, attenuation tanks and petrol/oil interceptors as described above. It is also proposed to retain and enhance the existing riparian zone which will act as a buffer between the development and that stream.</p> <p>Waste water will be directed to an EPA regulated waste water treatment plant.</p>		
29	<p>During the operational phase all surface water arising on site will drain to attenuation tanks and a Hydro-Brake flow restrictor and hydrocarbon interceptor prior to discharging to the Trusky Stream. Groundwater quality risks are reduced during the operational phase by use of paved areas as well as the hydrocarbon interceptors, attenuation tanks and silt traps prior to discharge.</p>		
30	<p>The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.</p> <p>Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining its drainage properties. This will be relevant along the proposed linear park and landscaped areas of the site.</p>		
Biodiversity			
31	<p>The proposed development has been designed to maintain connectivity through the site and along the Trusky Stream with no works proposed within over 10 metres of it (with the exception of the construction of two surface water outfalls and some minor landscaping works.</p>		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
32	A landscape plan has been prepared for the development. The landscape plan allows for the planting of woodland, treeline, hedgerow and wildflower meadows consisting of a mix of native and naturalised species, as well as pollinator friendly species. A hedgerow consisting of a mix of native and naturalised species will be planted along the southern and eastern boundaries of the site, separating the development from the Trusky stream.		
33	The lanscape plan also provides for the creation of additional green spaces including herbaceous lawns, which will contribute to reduce the ecological footprint of the development.		
34	Trees within private gardens adjacent to the development site will be protected in accordance with BS: 5837 (Trees in relation to Construction).		
35	If stone or topsoil is imported onto the site, the source material will be screened by a suitably qualified ecologist to verify it is free from any Third Schedule invasive species before transportation to the site.		
36	<ul style="list-style-type: none"> > All machinery will be thoroughly cleaned, dried and disinfected prior to arrival on site and before removal from site post-works using Virkon 1% biocide and departure from the site to prevent the spread of invasive species such as Asian Clam, Zebra Mussel, Crayfish plague. > Where staff are working instream (only for the installation of the stormwater outfalls), staff footwear and PPE will be inspected on daily completion of the works and vegetation or debris removed. Footwear will be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkron Aquatic or another proprietary disinfection product) and thoroughly dried afterwards. Machinery that has been working within the channel and other equipment used in channel including PPE will be wiped down with 1% solution of Virkron Aquatic or another proprietary disinfection product. This will be carried out daily on completion of the works 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>and/or prior to staff and machinery moving off site. Sand bags placed instream will not be re-used in other watercourses.</p> <ul style="list-style-type: none"> ➤ Good construction site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (e.g. Rhododendron, Japanese Knotweed, Giant Rhubarb etc.) by thoroughly washing vehicles prior to entering the site. ➤ Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present. 		
37	<p>To mitigate for any potential disturbance during the operational phase, the site lighting has been designed to limit the environmental impact of artificial lighting on existing flora and fauna in the area.</p> <p>The luminaire specified is an LED pole mounted luminaire with NEMA socket and photocell, this fitting was selected for the following reasons:</p> <ul style="list-style-type: none"> ➤ Low level lighting ➤ Minimal upward light spill ➤ Low voltage LED light will be in use to reduce impacts on fauna 		
38	<p>As part of the landscape plan, the introduction of a wildflower meadow to encourage biodiversity and create a micro-climate atmosphere is proposed. The landscape plan also outlines that the proposed development will encourage the use of native, naturalised and indigenous species throughout much of the landscaped areas. Landscape mitigation measures arising from the proposed development outlined in the landscape plan, will create a positive natural aesthetic quality to the area.</p>		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
Air Quality and Dust Control			
40	On-road vehicles to comply to set emission standards. All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and be regularly serviced.		
41	Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site		
42	<ul style="list-style-type: none"> ➤ The Contractor shall ensure that adequate provision is made to damp down areas where activities are likely to create dust. Measures shall include the spraying by pressure hoses to suppress dust and also the provision of bowsers and suction road sweepers where appropriate. ➤ Plant shall be sited and screened where necessary to minimise dust emission to adjoining areas. ➤ All stockpiles shall be covered to prevent the generation of dust. ➤ The Contractor shall ensure that off-site observations and monitoring of dust takes place to confirm that steps are successful in minimising dust release from site. ➤ The Contractor shall take all measures necessary to prevent spillage onto public roads adjoining the Site and all roads forming part of the Site. ➤ The Contractor shall, using wheel washing equipment or other methods as approved by the Employer's Representative, prevent mud from the site being carried onto any surface or facilities in use by the public. In the event of mud or site material being deposited on a public road surface, the Contractor shall take all necessary steps to ensure the roads are cleaned immediately using road vacuum sweepers, or similar methods to be approved by the Employer's Representative, without adversely affecting public traffic. ➤ The Contractor shall clean the public gullies in the vicinity of the site before the works commence, at regular intervals during the works, and upon completion of the 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	works. That Contractor shall also undertake to replace road markings in the immediate vicinity of the site as and when the need for such replacement arises.		
43	<p>The following measures will be enforced to ensure that dust nuisance during the construction phase beyond the site boundary is minimised:</p> <ul style="list-style-type: none"> ➤ If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g. wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed. ➤ Overburden will be progressively removed from the working area in advance of construction. ➤ Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist. ➤ Site road ways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust. ➤ Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways. ➤ Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne. ➤ Deploy Road Sweeper as required on External Roads. <p>The above mitigation measures relating to dust and air quality will be implemented to minimise potential impacts on Human Health during the construction phase</p>		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
44	<ul style="list-style-type: none"> ➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. ➤ Machinery were switched off when not in use. <p>Aggregate materials for the construction infrastructure will be sourced onsite from the proposed cut areas, where possible, which further reduced potential emissions.</p>		
45	<ul style="list-style-type: none"> ➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. ➤ Overburden will be progressively removed from the working area in advance of construction. ➤ Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of the site boundary where residential properties exist. ➤ Site roadways will be maintained in a stoned hard core condition not allowing soil to accumulate which when dry can create dust. ➤ Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways. ➤ Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne. ➤ Deploy Road Sweeper as required on External Roads. ➤ Dust levels will be monitored visually, on a daily basis by the project Environmental Manager. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g. wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed. ➤ 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
Noise			
46	All vehicles to switch off engines when not in use – no idling vehicles		
47	<p>Best practice measures for noise control will be adhered to onsite during the construction phase of the proposed development. The measures include:</p> <ul style="list-style-type: none"> ➤ Construction operations will in general be confined to the period Monday-Friday 0800-1900 h, and Saturday 0800-1600 h. ➤ Where it is proposed to operate plant during the period 0700-0800 h, standard ‘beeper’ reversing alarms will be replaced with flat spectrum alarms. ➤ Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times. ➤ Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced. ➤ Queuing of trucks outside the site entrance will be prohibited. ➤ A site representative will be appointed as a liaison officer with the local community. Prior to commencement of construction, contact details for the officer will be circulated to all local residents. The officer will notify local residents of upcoming works phases and likely noise sources. ➤ All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance. ➤ Guidance set out in BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase. ➤ Throughout the construction phase, vehicles accessing the site will be subjected to a low speed restriction through Cnoc Fraoigh in order to reduce traffic noise. <p>The above mitigation measures relating to noise will be implemented to minimise potential impacts on Human Health during the construction phase</p>		
48	<ul style="list-style-type: none"> ➤ Diesel generators will be enclosed in sound proofed containers to minimise the potential for noise impacts. ➤ Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All construction plant and equipment to be used on-site will be modern equipment and will comply with the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1998, and any subsequent amendments. ➤ Regular maintenance of plant will be carried out in order to minimise noise emissions. ➤ All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works. ➤ Compressors will be of the “sound reduced” 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. ➤ Machines, which are used intermittently, will be shut down during those periods when they are not in use. <p>Training will be provided by the site management to drivers to ensure smooth machinery operation/driving, and to minimise unnecessary noise generation.</p>		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
49	<ul style="list-style-type: none"> ➤ All vehicles and mechanical equipment shall be maintained in good and efficient working order and shall be fitted with effective exhaust silencers; ➤ All compressors shall be “sound reduced” models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers; ➤ Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum. Generators, or any other plant, shall not be left running / operational after hours unless in an emergency, and agreed with the Employer’s Representative; ➤ Where practicable, plant with directional noise characteristics shall be positioned to minimise noise at adjacent properties; ➤ Static machines shall be sited as far away as practicable from inhabited buildings; ➤ Where it is necessary to provide power for the running of traffic signals, pumps etc., at any time outside normal working hours, then the sources of such power shall be from mains electricity except if the Employer’s Representative agrees in writing that alternative plant may be used, after consultation with Galway County Council; ➤ Good relations with people living and working in the vicinity of the roadworks are important. People who are likely to be affected by the noise shall be informed, by letter drop or other appropriate means, of any works to be carried out outside normal working hours. Notification of the public shall take place at least one week prior to the commencement of Site works; ➤ The Contractor shall organise his operations with regard to the positioning of plant and the location of haul routes etc., so that it minimises construction noise to adjacent properties; ➤ The period referred to as ‘night’ for the purposes of the Contract shall be from 18:00 hours to 08:00 hours. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
Material Assets			
50	All construction activities will be managed and directed by a Traffic Management Plan (TMP). The details of the TMP will be agreed with the roads department of the Local Authority in advance of construction activities commencing on-site.		
51	<ul style="list-style-type: none"> ➤ Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access; ➤ Construction and delivery vehicles will be instructed to use only the approved routes for access and movement; ➤ Appropriate vehicles and equipment will be used to minimise environmental impacts from transporting construction material; ➤ Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds within and adjacent the site; ➤ Parking of site vehicles will be managed, and will not be permitted on public roads, unless otherwise agreed with the Local Authority subject to traffic management measures; ➤ A road sweeper will be employed to clean the public roads adjacent to the site of any residual debris that may be deposited on the public road leading away from the construction site; ➤ On site wheel washing will be undertaken for construction trucks and vehicles to remove any debris prior to leaving the site, to remove any potential debris on the local roads; ➤ All vehicles will be suitably serviced and maintained to avoid leaks or spillage of oil, petrol or diesel; ➤ Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footway. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<p>and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users and mobility impaired persons.</p>		
52	<p>The following provisions shall be made in terms of traffic management at construction access points:</p> <ul style="list-style-type: none"> ➤ Advance warning signage of construction access points shall be adequately signed on the L1321, ➤ including local side roads and the existing residential access road, i.e. “Caution site entrance ahead”; ➤ Construction access gates shall remain closed when not in use; ➤ A site safety notice shall be erected at construction access points; ➤ Temporary traffic management measures deployed during the hours of darkness shall serve to highlight ➤ the precise location of the construction access. Such measures could include additional traffic cones, road danger lamps and/or reflectorized signage; ➤ Routine inspection shall be carried out to ensure that signage and visibility splays are not obstructed; ➤ The road network immediately outside the site access shall be regularly inspected for cleanliness and cleaned as necessary. Any damage to the L1321 or residential roads caused by construction traffic shall be repaired as necessary; and ➤ Within the site, sufficient space shall be allocated to allow vehicles to turn around safely on-site. 		
53	<ul style="list-style-type: none"> ➤ The proposed development incorporates extensive site permeability with high quality footpaths and streets appropriate for mixed traffic cycling, with high quality cycle parking and car parking all in line with the County Development Plan and national standards and best practice. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ The internal roads layout is designed to ensure vehicular speeds are low. The road alignment consists of smooth horizontal curves which are complemented with raised tables at specific locations to ensure that speeds are self-regulated below 30kph. Internal junctions operate under priority control and generally consist of small radius curves to encourage slow approach speeds. ➤ The development incorporates upgrades to the local road network, namely the L1321 creating a high quality direct pedestrian and cyclist link towards the town centre of Bearna and ensuring integration with existing walking, cycling, public transport provisions and local amenities. ➤ Demand Management is also underpinned by the co-location of residential, childcare and leisure and amenity facilities. ➤ The propensity for car ownership and car use is managed through measures that include reduced residential parking provision and increased cycle parking provision in line with the County Development Plan and national standards and best practice ➤ The development contains the required infrastructure to provide electric charging to all car parking spaces. 		
54	<ul style="list-style-type: none"> ➤ Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works. ➤ Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. ➤ Excavation permits will be completed and all plant operators and general operatives will be inducted and informed as to the location of any services. 		
55	<ul style="list-style-type: none"> ➤ The Cnoc Fraoigh wastewater network will be connected to the completed wastewater network of the proposed development via a new pumping system, and from there to the public sewer system, in advance of the decommissioning of the existing wastewater treatment plant. 		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	<ul style="list-style-type: none"> ➤ This will ensure continuity of wastewater service for the residents of Cnoc Fraoigh. <p>This proposed wastewater pumping system will be a Type 3 system (greater than 20nr. houses), which will be designed and installed in accordance with Irish Water’s Code of Practice for Wastewater Infrastructure, and is to serve the existing 21nr. residential units along with the proposed single residential unit nr. 121.</p> <p>The pumping system is to be sited at a distance greater than 15m from any residential property, as noted on the design drawings, and in accordance with Irish Water’s requirements.</p>		
Cultural Heritage			
56	<ul style="list-style-type: none"> ➤ All cultural heritage items which are to be removed to facilitate the Proposed Development will be recorded by means of photographs, written descriptions and scale drawings if necessary prior to removal. ➤ Groundworks at all locations shall be monitored and any sub-surface traces of the cultural heritage items shall be recorded by means of photographs, written descriptions and scale drawings if necessary. 		
Environmental Management			
57	Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes		
58	The machinery used to install the outfalls to the Trusky Stream will be thoroughly cleaned, dried and disinfected prior to arrival on site and before relocating to another site post-works using Virkon 1% biocide and departure from the site to prevent the		

Mitigation Measure	Mitigation Measure	Audit Result	Action Required
	spread of invasive species such as Asian Clam, Zebra Mussel, Crayfish plague. This process will be detailed in the method statement.		
59	All operatives working on the site will be made fully aware of the environmental responsibilities, conditions and requirements along with a full description of the methods to be employed. This information will be imparted at a dedicated site induction prior to commencing work on the site.		

6. **MONITORING PROPOSALS**

The Monitoring Proposals which will be implemented are presented in this section of the CEMP. The CEMP will be finalised subsequent to any permission granted by An Bord Pleanála and will be updated prior to construction to include, inter alia, any additional requirements pursuant to relevant planning conditions imposed.

By presenting the monitoring proposals in the below format, it is intended to provide a checklist of all the required monitoring that can be tracked, reviewed and reported as it is implemented throughout the project.

Table 6-1 Monitoring Measures

Ref. No.	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Commencement Phase				
1	Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken prior to construction at two locations on the Truskey stream.			
2	An environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to will be assigned to the project.			
Construction Phase				
3	During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for the adjacent Truskey stream			
4	<ul style="list-style-type: none"> ➤ Daily general visual inspections of site operations and inspections of all watercourses within the site and in the surrounding area by the Environmental Manager or a suitably qualified and competent person as delegated; ➤ Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter should be noted and corrective action should be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement; 			

Ref. No.	Monitoring Measure	Frequency	Reporting Period	Responsibility
	<p>➤ Event based inspections by the ECoW as follows:</p> <ul style="list-style-type: none"> ○ >10 mm/hr (i.e. high intensity localised rainfall event); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). 			
5	Sondes will be put in place in the Trusky Stream upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified			
6	Archaeological monitoring of groundworks during construction will take place. A report on the results of monitoring shall be compiled and submitted to the relevant authorities on completion of the project. If any sites are detected during the pre-construction monitoring, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.			
7	A checklist will be filled in on a weekly basis to show how the measures above have been complied with. Any environmental incidents or non-compliance issues will immediately be reported to the project team.			
8	The construction management team will be regularly monitoring the works and will be fully briefed and aware of the environmental constraints and protection measures to be employed.			
9	The works will be supervised by a suitably qualified ecologist (ECoW) on a regular basis. An audit of the works will be undertaken during the visits and it will			

Ref. No.	Monitoring Measure	Frequency	Reporting Period	Responsibility
	be ensured that the prescribed methods are employed. Any potential impacts additional to those predicted will be highlighted and if necessary, additional measures put in place to prevent them. Any deviance from the agreed methodology will be highlighted and if necessary rectified.			
10	<p>The works associated with the construction of the stormwater outfalls will require full time, on-site supervision from the ECoW. The ECoW will be responsible for:</p> <ul style="list-style-type: none"> ➤ Ensuring that the works are carried out in accordance with the approved method statements. ➤ Highlighting and discussing any deviations from the agreed plan. Deviations will be agreed with the relevant authorities and the project team in advance of adoption. ➤ Taking water samples and turbidity readings as appropriate. Discussing works and preparations with the site staff to ensure that works can be completed as per agreed method statements. ➤ Stop works if there are any effects on the Trusky Stream. 			

7. COMPLIANCE AND REVIEW

7.1 Site Inspections and Environmental Audits

Routine inspections of construction activities will be carried out on a daily and weekly basis by the Site Environmental Manager and the Construction Manager to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place.

Environmental inspections will ensure that the works are undertaken in compliance with this Construction & Environmental Management Plan and any consent conditions. Only suitably trained staff will undertake environmental site inspections.

7.2 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction of the proposed development:

Environmental Near Miss: An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

Environmental Incident: Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

Environmental Non-Compliance: Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the EMP.

7.3 Corrective Action Procedure

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Construction Manager, as advised by the Site Environmental Manager. Corrective actions may be required as a result of the following;

- > Environmental Audits;
- > Environmental Inspections and Reviews;
- > Environmental Incidents; and,
- > Environmental Complaints.

A Corrective Action Notice will be used to communicate the details of the action required. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention direct communications between the Construction Manager and the Site Environmental Manager will be conducted. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.