EIAR VOLUME III
Appendices

CHAPTER 5 – PROJECT DESCRIPTION

Appendix 5.1: Construction Environmental Management Plan

Tullacondra Green Energy Limited

Tullacondra Green Energy Project

Construction Environmental Management Plan

604162

JUNE 2024

RSK GENERAL NOTES

Project No.: 604162

Title: Tullacondra Green Energy Project. Construction Environmental Management Plan

Client: Tullacondra Green Energy Limited

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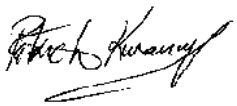
Signature		Signature	
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1 INTRODUCTION

1.1 Introduction

RSK Ireland Ltd. has been commissioned by Tullacondra Green Energy Limited (the Developer/s) to prepare this Construction Environmental Management Plan (CEMP) for the Tullacondra Green Energy Project (the Project) in Co. Cork in support of the Planning Application.

The CEMP is intended to form the basis of providing information on the management and methodologies at the site in relation to construction of the Project.

This CEMP should be read in conjunction with the Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) for the Project.

With the implementation of the Project design and the mitigation measures proposed in the EIAR, any potential environmental impacts can be appropriately managed and mitigated, thus ensuring that there will be no likely significant environmental effects from the Project.

This CEMP is a live document and should be treated as such. It will be updated to include any planning conditions and recommendations of the Planning Authority and consultees. It will be continuously reviewed and updated during the construction phase of the Project.

Reviews can be triggered by the following events:

- Changes in the relevant legislation which could impact on the mitigation requirements of the construction phase.
- Where non-compliance with mitigation arises which require an update of the CEMP.
- Where issues arise as a result of site auditing for environmental compliance.
- Where complaints are received that necessitate a change in work practices that should be reflected in the CEMP.

Updated copies will be provided to the Planning Authority, where changes are made.

1.2 Scope

This CEMP co-ordinates the mitigation recommendations in the EIAR chapters and details the mitigation measures within the EIAR chapters. The CEMP identifies the key environmental and construction contract constraints which the Contractor must adhere to. Multiple environmental receptors are present in the surrounding area.

This CEMP will be expanded and updated by the appointed construction Contractors prior to construction works commencing as some items can only be finalised with input from them when they have been appointed.

The Project is also currently at planning stage. The CEMP will also be updated to reflect any granted planning permissions and conditions.

The revised document will contain the site-specific control measures that will be applied by the Contractors and, where relevant, their sub-contractors during the construction phases of each element of the proposal and therefore some items can only be finalised with input from them when they have been appointed.

The CEMP allows for the inclusion of any additional constraints applied from planning conditions to be included in updates. As such it should be considered a live document which will be constantly updated during the construction phase of the Project. The aims of the CEMP will be to;

- Ensure construction works and activities are completed in accordance with design, mitigation and best practice approach presented in the EIAR and any associated planning documentation.
- Ensure construction works and activities are completed in accordance with all planning conditions for the Project and that the CEMP is updated as required.
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community.
- Ensure construction works and activities have no adverse effect on the integrity of any European Site.
- Ensure that construction traffic to and from the Project is strictly managed to avoid unnecessary traffic movements.
- Identify a dedicated person on site to liaise with the Public regarding any concerns that they may have in relation to the site activities.
- Adopt a sustainable approach to construction.
- Provide adequate environmental training and awareness for all Project personnel.

A copy of the CEMP will be provided to each specific Contractor working on behalf of the Developer. A copy will be maintained on site for reference by the entire workforce. It will be accessible to all site personnel, subcontractors and representatives of the relevant enforcement authority.

The CEMP will be a key construction contract document, which will ensure that the mitigation measures, which are considered necessary to protect the environment are implemented.

Suitably qualified and experienced Environmental / Ecological Clerk of Works (EnvCoW/ECoW) will be appointed to provide ecological and environmental advice during construction. The EnvCoW and ECoW will monitor construction to ensure compliance with the CEMP and help to reduce risks and delays.

Any breaches of the CEMP will be reported to the appointed Project Manager who will have the authority to stop construction works.

1.3 Document Structure

This CEMP is structured as follows:

- Section 1: Introduction and Scope of the CEMP.

- Section 2: Site and Project Description.
- Section 3: Summary of environmental setting.
- Section 4: Objectives of the CEMP.
- Section 5: Construction activities.
- Section 6: Environmental policies and legal requirements;
- Section 7: Environmental management implementation;
- Section 8: Environmental management of site activities;
- Section 9: Monitoring and environmental clerk;
- Section 10: Communication;
- Section 11: Environmental training and awareness.
- Section12: Emergency preparedness and emergency response
- Section 13: Compliance and auditing

2 SITE AND PROJECT DESCRIPTION

2.1 Site Location and Plan

The proposed wind farm is located approximately 2km south of Lisgriffin Cross, Co. Cork. The wind farm site for the proposed Project is located along the L5302 at Croughta and consists primarily of mixed farmland habitat with hedgerows and occasional areas of scrub, ponds and lakes, and man-made drains and ditches. The area in which the turbines will be located ranges in elevation from 133m above Ordnance Datum (AOD) in the south to 120m AOD in the north. Topography is discussed in greater detail in relation to stability and geohazards in EIAR **Chapter 10 Soils and Geology**.

The proposed grid connection includes works a length of approximately 13.5km in and alongside public roads to install cabling to connect the wind farm to the National Grid at the boundary of the Mallow 110kV substation located in St. Joseph's Road, Mallow. The proposed wind farm site and the route of the proposed grid connection for which planning permission is sought (indicated by the red line planning boundary) is shown in **Figure 2.1** and includes a total area of 58.6 hectares (ha).

Further information on the environmental site setting is provided in Section 3 of the CEMP.

2.2 Description of the Project

A detailed description is included in EIAR **Chapter 5 Project Description.** In summary the Project will consist of the following elements:

- nine wind turbines with a blade tip height of 175m, rotor diameter of 150m and hub height of 100m;
- turbine foundations and crane pad hardstanding areas and associated drainage;
- upgrade of existing site tracks and construction of new site tracks and associated drainage;
- access from the local public road L5302 at Croughta consisting of a new site entrance for the construction stage and upgrade of an existing entrance for the operational stage;
- an on-site 38kV electrical substation to Electricity Supply Board Networks (ESBN) specification to include control building with electrical infrastructure, welfare facilities supplied by rainwater harvesting and storage tank, a wastewater holding tank, car parking, security fencing and lighting, and all associated infrastructure, services, and site works including a temporary construction compound;
- all associated underground electrical and communications cabling connecting the turbines to the proposed electrical substation;
- a temporary construction compound and associated ancillary infrastructure including welfare services, office accommodation, parking, fencing, lighting, etc.;
- areas for temporary storage of excavated materials;

- a permanent meteorological mast of 100m height above ground level on a concrete base.
- installation of approximately 13.5km of 38kV underground electrical cabling, mainly within the public road, between the proposed on-site wind farm substation to the Mallow 110kV substation boundary at St. Joseph's Road, Mallow.
- all associated site works, including site clearance, and ancillary development including site drainage, security gates, fencing, permanent and temporary signage, and biodiversity mitigation and enhancements, including hedgerow planting.

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire wind farm is being sought. This reflects the lifespan of modern-day turbines.

The construction of the Project in its entirety is expected to take approximately 18 months. This will be confirmed in the updated CEMP when the Contractor is appointed prior to construction.

2.3 Turbine Delivery Route

Large components associated with the wind farm construction will be transported to site via the Turbine Delivery Route (TDR) (refer to EIAR **Chapter 16 Traffic and Transport**).

The RSK Project team have assessed two TDR options for the delivery of turbine components from either Foynes Port, Limerick or Ringaskiddy, Cork, including temporary works that may be required for the deliveries and pinch points along the routes where temporary accommodation works may be required (e.g., cutting back vegetation, installing temporary road surfaces, removing fencing, signs and street furniture, etc.). The routes are shown in **Figure 2.1**.

Large components associated with the wind farm construction will be transported to site from Foynes Port via TDR Option 1 or from Ringaskiddy via TDR Option 2.

The TDR Option 1 route to site is as follows:

- Loads will depart Foynes Port and travel West-East via the N69 for approximately 30km until it joins the N18.
- Loads will travel south along the N18 for approximately 4km before exiting onto the M20.
- Loads will continue west on the M20 and then join the N20.
- Loads will continue to travel south on the N20 before turning off onto L5523.
- Loads will continue west on the L5523 and L5302 to the proposed site entrance.

TDR Option 2 route, originating at Ringaskiddy Port, route to site is as follows:

- Loads will depart Ringaskiddy Port and travel Northeast via the N28 for approximately 12km until it joins the N40.
- Loads will travel along the N40 for approximately 3.5km before exiting onto the N8.

- Loads will travel North through Cork along N8 for less than a kilometre before joining onto the N20.
- Loads will continue to travel North along the N20 for approximately 37km before turning off onto L1200.
- Loads will continue north on the L1200 for approximately 7.5km before turning left onto L5302.
- Loads will continue west on the L5302 to the proposed site entrance.

There are a number of pinch points which have been identified and are detailed in EIAR **Chapter 16 Traffic and Transport**.

Accommodation works required for each TDR have been identified and are provided in **Table 2.1** and **Table 2.2** below.

Table 2.1 Accommodation Works on Turbine Delivery Route Option 1 Foynes

TDR Node Reference Number	Location	Summary Description of Proposed Temporary Accommodation Works
B	Foynes Port Access Road/N69	Road sign will require temporary removal. Lampposts require temporary removal. The top 40cm (approx.) of the wall on the lefthand side will be removed to allow for mid oversail.
D	Ferrybridge N69	Vertical alignment will be affected by trailer length/rear overhang and may need some works to avoid grounding.
E	Clarina Roundabout	Temporary hard surface in the form of compacted aggregate hard standing required on roundabout to provide a cut-through track through the centre island. This cut-through track has been utilised in the past and hence, minimal additional enabling works are required.
F	Mungret Interchange – West Roundabout	Temporary load bearing surface required on roundabout to provide a cut through track through the centre island. This cut-through track has been utilised in the past and hence, minimal additional enabling works are required.
G	Mungret Interchange – East Roundabout.	Temporary load bearing surface required on roundabout to allow for turn and oversail. This track has been utilised in the past and hence, minimal additional enabling works are required.
H	M20- N20 off ramp Southbound	Temporary removal of signs and streetlamp on left side and scrub clearance on left and right for mid and rear oversail.
I	N20 Right Curve, Ballymacrory	This curve does not have adequate dimension to accommodate the 75m long blade. Enabling works on left or right or both for oversail only will be required
J, K, L	Buttevant N20	Vegetation on left will require trimming to 2.5m over road level. Road sign will require temporary removal. Lampposts require temporary removal and vegetation on left will be trimmed above 1m in height for mid oversail.

M	Ballybeg Bends N20	Vegetation on right and left will require trimming to 2.5m over road level. Road sign will require temporary removal.
N	N20 – L5523 Junction, Boherash Cross	Vegetation on right will require trimming to 2.5m over road level. Road sign will require temporary removal. Regrading and temporary load bearing surface required on Cork Co Co lands. Temporary removal of road signs to facilitate oversail.
O	Grange Bridge L5523	Vertical alignment will be affected by trailer length/rear overhang and may need some works to avoid grounding, may be overcome using trailer technology, to be determined at detailed design stage.
P	L5523	Vegetation and Hedgerow trimming to facilitate vehicle oversail. Blade Lifter technology to be utilised to avoid third-party land take. Care must be taken around the overhead cables and poles.
Q	L5523 Site Construction Entrance	This node forms the main site entrance. Temporary hard surface in the form of compacted aggregate hard standing required.

Table 2.2: Accommodation Works on Turbine Delivery Route Option 2 Ringaskiddy

TDR Node Reference Number	Location	Summary Description of Proposed Temporary Accommodation Works
A	Shannonpark Roundabout	Vegetation on right will require trimming to 2.5m over road level. Road sign will require temporary removal. Lampposts require temporary removal and vegetation on left will be trimmed above 1m in height for mid oversail.
B	N28	Vegetation on right and left will require trimming to 2.5m over road level. Care must be taken around the overhead cables and poles.
C	N28 - N40 Junction	Vegetation on right will require trimming to 2.5m over road level. Road sign will require temporary removal. Lampposts require temporary removal and vegetation on left will be trimmed above 1m in height for mid oversail.
D	Kinsale Road Roundabout	Vegetation on right will require trimming to 2.5m over road level. Road sign will require temporary removal. Lampposts require temporary removal and vegetation on left will be trimmed above 1m in height for mid oversail.
E	Old Station Road N27	Road sign will require temporary removal. Lampposts require temporary removal and vegetation on left will be trimmed above 1m in height for mid oversail. Fence on the right require temporary removal. Blade Lifter technology to be utilised to avoid third-party land take.
F	N27 – N8 Junction	Road sign will require temporary removal. Lampposts require temporary removal. Blade Lifter technology to be utilised to avoid third-party land take.
G	N8 – N20 Junction	Road sign will require temporary removal. Lampposts require temporary removal. Blade Lifter technology to be utilised to avoid third-party land take.

H	N8 – R635 Junction	Road sign will require temporary removal. Fence on the right require temporary removal. Lifter technology to be utilised to avoid third-party land take.
I	N20	Road sign will require temporary removal. Lampposts require temporary removal. The top 40cm (approx.) of the wall on the lefthand side will be removed to allow for mid oversail.
J	N20 – L1200 Junction	Enabling works required at this intersection for mid and rear oversail. Road signs and lamp post are in sleeves and will need to be removed for each transport.
J.1	L1200 Railway Bridge crossing	Land acquisition on both sides of the tunnel is required to allow for smooth movement of turbine parts under the bridge.
K	L1200 - L5523	Enabling works required at this intersection for mid and rear oversail. Land acquisition required on the right side of the road to avoid impact on existing built-up private property.
L	L5523 Site Construction Entrance	This node forms the main site entrance. Temporary hard surface in the form of compacted aggregate hard standing required.

Some temporary accommodation for access in the form of strengthening / hardcoring of road margins/verges and roundabout islands will be necessary on the TDR (EIAR **Chapter 16 Traffic and Transport**).

All temporary accommodation works associated with the Project will be fully reinstated following the construction phase. Overhead utilities and obstructions will need to be modified at several locations to provide adequate overhead clearance. The modification of overhead utilities will involve temporary disconnections. Such works will be carried out by the utility providers in advance of turbine delivery to site.

Temporary accommodation works will only be required during the operational phase in the unlikely event of a major turbine component replacement. It is expected that these temporary accommodation works will not be required for the decommissioning phase as turbine components can be dismantled on site and removed using standard HGVs.

Specific details of the proposed temporary works are presented in the accompanying route assessment report in EIAR **Volume III, Appendix 16.1**.

A pre-condition survey will be carried out on all public roads that will be used in connection with the Project to record the condition of the public roads in advance of construction commencing. A postconstruction survey will also be carried out after the works are completed. All roads will be reinstated in a timely manner upon completion of the construction works.

Letter drops will be carried out to notify members of the public living near the proposed work locations to advise them of any particular upcoming traffic related matters.

Clear signage relating to the Project, both temporary and permanent, will be provided for accessing the site. The entrances to the site will be secured when the site is not in use. When necessary, a flagman/ banksman will be utilised to assist traffic movements at the site entrance or in other areas as required.

Turbine delivery will require the transportation of abnormal loads. This will be undertaken at off-peak times under agreement with the local authority and An Garda Síochána.

A Construction Traffic Management Plan (CTMP) has been prepared for the Project and is presented in EIAR **Volume III, Appendix 5.2**. In the event planning permission is granted for the proposed development, the Traffic Management Plan may be amended to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned. The plan will include:

- A delivery schedule.
- Details of works or any other minor alteration identified.
- The requirement for dry run of the route using vehicles with similar dimensions.

The construction of the Project in its entirety is expected to take approximately 18 months. This will be confirmed in the updated CEMP when the Contractor is appointed. It is anticipated that deliveries of turbines to the wind farm will be completed over a period of approximately five months.

2.4 Grid Connection Route (GCR)

The Project will be connected to the National Grid at the Mallow 110kV Substation via a 38kV underground electricity cable.

GCR Option 1 consists of approximately 13.5km of underground cabling with intermittent cable joint bays and other ancillary infrastructure where required.

This GCR Option 1 will be contained within onsite access tracks and will leave the Project site at the existing site entrance. This GCR will then proceed east along the L5302 local road where it turns south at Knockavadeen onto the L1200 local road through Knockane. It then turns onto L1205 and continues east across the N20 and through R581 to turn south at Fountainville onto L1207 heading south. It diverts onto a Local Road at Carhue (L53201), continuing south along the road to the east of Ballyvinter (L5320). The route continues south across the N72 and onto the L12201 then crossing the L1220-25 (St. Joseph's Road) to meet the Mallow 110kV substation.

GCR Option 2 consists of approximately 13.2km of underground cabling. This includes approximately 0.5km of underground cabling in private lands and approximately 12.7km of cabling to be installed in the public road. The proposed GCR will be contained within onsite access tracks and will leave the project site at the existing site entrance. GCR Option 2 will then proceed east along the L5302 and L5523 local roads and cross the N20 onto L5568. The GCR turns right onto L5566 and continues south past Fountainville crossing the R581 onto L1207. From here, the GCR Option 2 follows the same route as GCR Option 1 to Mallow 110kV Substation. The locations are shown in **Figure 2.1**.

HDD is proposed at two locations in GCR Option 1

- Crossing with N20
- Crossing with the Blackwater (Munster) River_140 and adjacent N72 and presented below~~,~~

HDD is proposed at three locations on GCR Option 2

- Crossing with railway track.
- Crossing with N20.
- Crossing the Blackwater (Munster) River_140 and adjacent with N72.

Due to the length of cabling within the road corridor, these works are expected to be conducted in just over a 5-month period (ca. 30 weeks, assuming 75m of ducting laid per day).

The appointed Contractor will be required to apply to the Local Authority for the appropriate closures following statutory procedures and will outline local diversions whilst maintaining local access at all times for residents, farms and businesses and An Garda Siochána as detailed in the CTMP (EIAR **Volume III, Appendix 5.2**) prior to commencement.

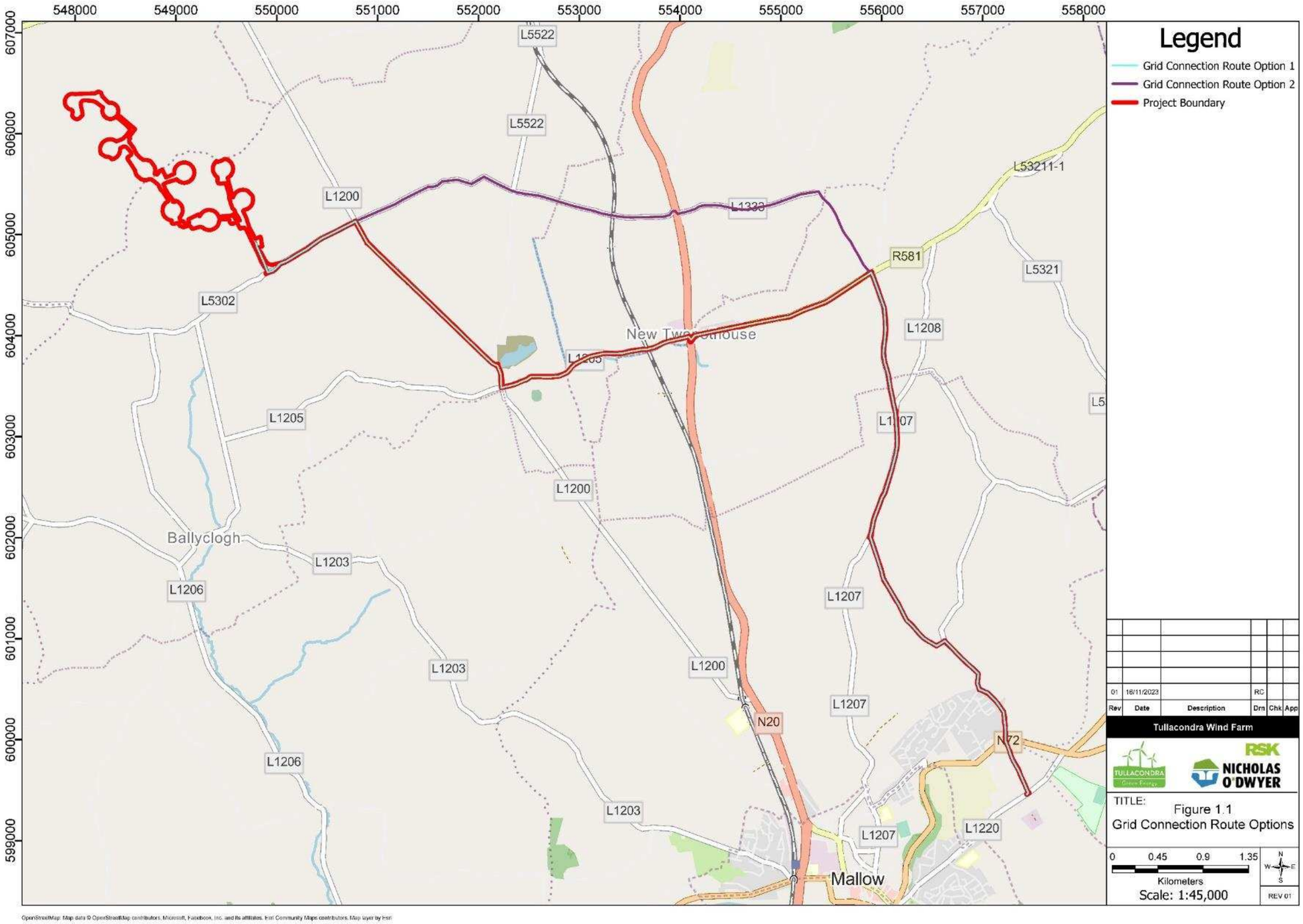

Figure 2.1: Project boundary and grid connection route options

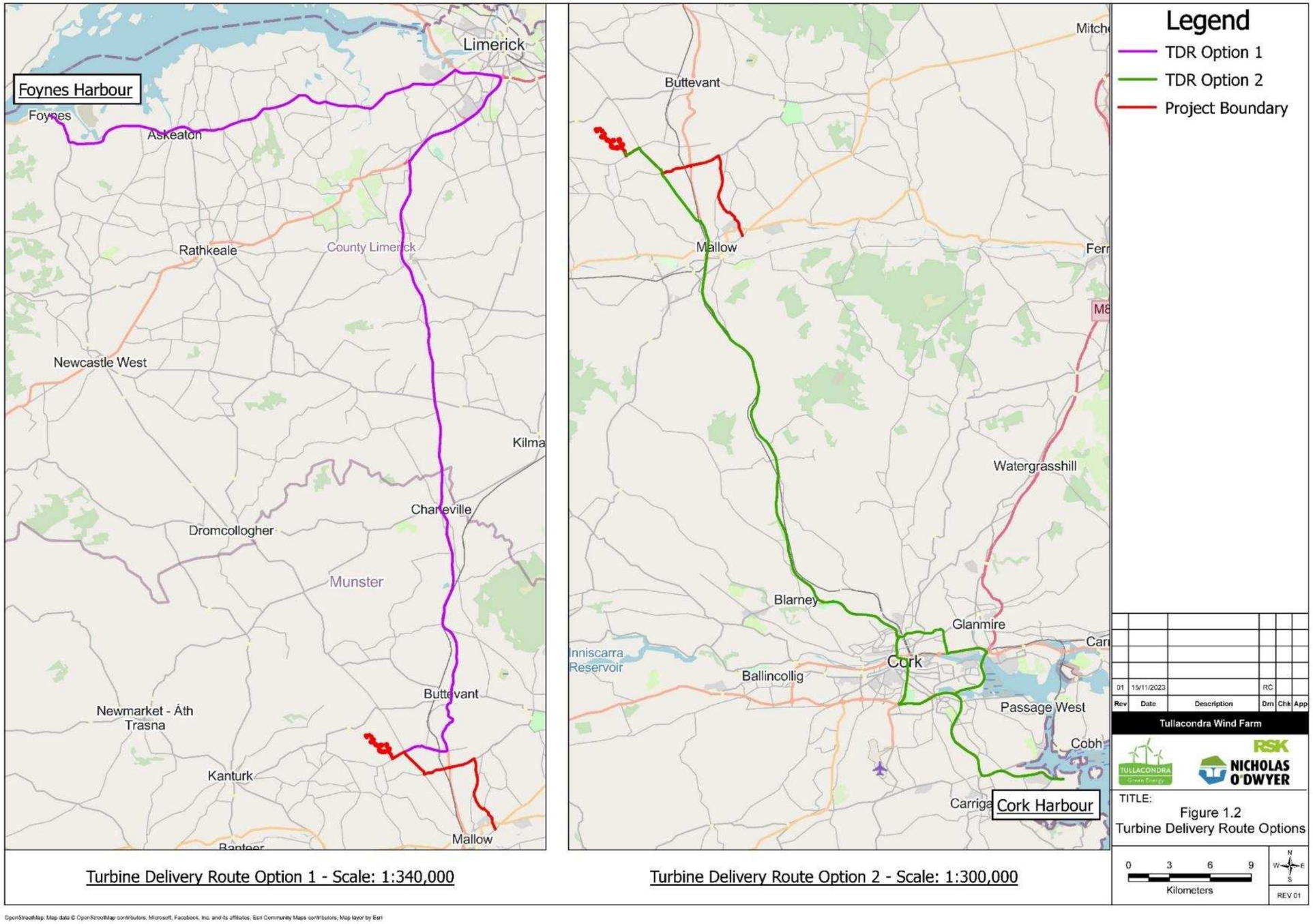

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Figure 2.2: Turbine delivery routes

2.5 Project Programme

A procurement process will commence upon full planning approval to appoint a competent and experienced Contractor for the proposed works at the Site, with a target eighteen-month completion date for construction of all phases. The proposed timeline for the Project is set out in **Figure 2.3**.

The Contractor, once appointed, will develop a detailed construction work programme including plans to minimise risks to construction workers and local residents from dust, noise and vibration and to watercourses from pollution during each phase of the Project, addressing any restrictions with regards to undertaking certain tasks within sensitive bird breeding seasons/ retention of existing hedgerow etc. to minimise the impact of the construction on the identified species which use the site and its environs.

Activity	Month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mobilisation and site setup																		
Site Clearance, Tree Felling and Fencing																		
Internal Access Tracks and Drainage																		
Turbine Hard Standings																		
Turbine / Metmast Foundation																		
Onsite Substation																		
On-site Cable Installation																		
Grid Route cable works (off site section only)																		
Turbine / Metmast Installation																		
Energisation, Commissioning & Testing																		
Biodiversity Enhancement																		
Landscaping, Fencing, Reinstatement, Demobilisation																		

Figure 2.3: Project Construction Programme

3 SUMMARY OF ENVIRONMENTAL SITE SETTING

3.1 Local Hydrology

The wind farm site and both GCRs are situated within the Blackwater (Munster) Catchment (ID: 18; Area: 3,308km^2).

All surface waters draining from the Site eventually discharge into the Blackwater (Munster)_170), from which waters eventually flow to the Upper and Lower Blackwater Estuary, and onward into the Youghal Estuary through to Youghal Bay and into the Celtic Sea. This is shown on **Figure 3.1**. The layout of the proposed wind farm has been designed to minimise potential environmental effects. The existing drainage is discussed in EIAR **Chapter 9 Hydrology and Hydrogeology**.

A majority of the Foynes TDR (Option 1, preferred route) is situated within the Shannon Estuary South Catchment (ID: 24; Area 2,033km^2) until crossing into the Blackwater (Munster) Catchment near the redline boundary of the site.

The Ringaskiddy TDR (Option 2) is situated entirely within the Lee, Cork Harbour and Youghal Bay Catchment (ID: 19; Area: 2,181km^2) until crossing into the Blackwater (Munster) Catchment along the N20 national road.

3.2 Site Drainage

The site is characterised generally by a network of historical drainage, and historical features (**Plate 9.2** in EIAR **Chapter 9 Hydrology and Hydrogeology**), non-mapped natural and artificial drainage channels, and some connections to groundwater southwest of the Project. Many of the drains are “dry drains” that contain no water for much of the year. Site surveys are presented in **Figure 9.6a** (wind farm site) and **Figure 9.6b** (grid connection) in EIAR **Chapter 9 Hydrology and Hydrogeology**.

Drains were generally dry during site visits, however there was some discharge in drains and localised pluvial flooding in some places following rainfall events. Runoff and drainage discharge at the site quickly dissipates with the exception of some localised areas possessing low permeability soils (e.g., gleys) and ‘perched’ standing water in some areas (i.e., local-scale pluvial flooding).

Particular areas of the site possessing perched surface water or ‘wet’ conditions include the general area to the north / northwest (possessing non-mapped ponds) and the area in the south of the site adjacent to existing farm building and described as ‘wet’ or ‘marshy’ ground. The site is considered to have a ‘flashy’ regime in general (intense discharge following heavy rainfall which quickly dissipates).

The site is not within a probable flood zone, however the Project has the potential to adversely affect areas downstream/elsewhere, if proper mitigation measures are not followed. The management of surface water run-off during construction and operation has been incorporated into the Project design and will be managed by (Sustainable Drainage Systems (SuDS).

Existing surface water crossings associated with surface water features and primary drainage features are also identified are presented as part of the constraints mapping in **Figure 9.17** in EIAR **Chapter 9 Hydrology and Hydrogeology**.

Assessments of the baseline hydrological and hydrogeological conditions at the site indicate that parts of the site have already experienced impacts to baseline conditions through the installation of drainage networks associated with agricultural practices.

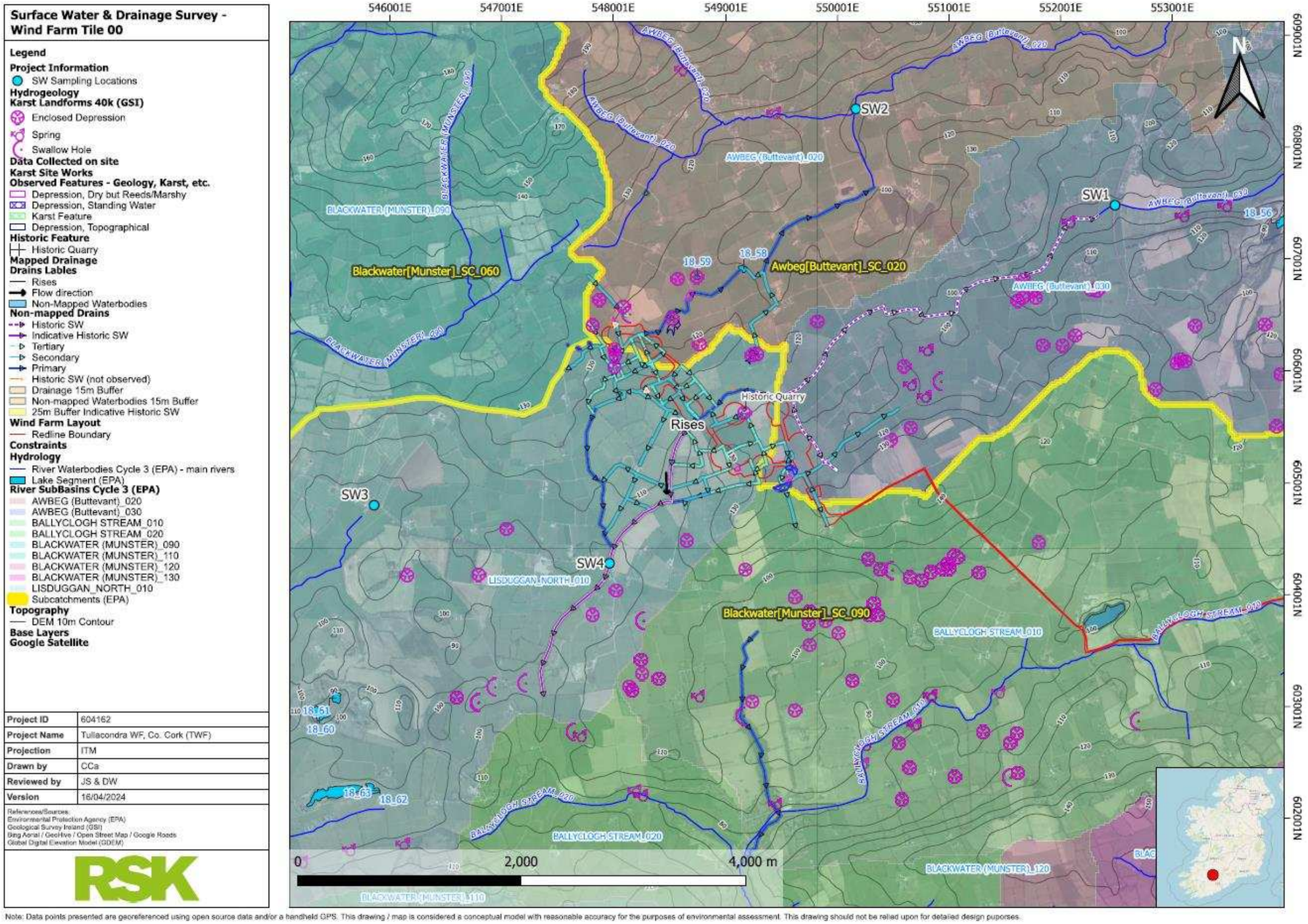


Figure 3.1: Project Hydrology

3.3 Hydrogeology – Bedrock Aquifer

Consultation with GSI (2022) well database indicates there are no mapped wells within the site boundary. The GCR does not cross within 250m of identified wells.

The northern portion of the wind farm site (encompassing the location of T1, T2 and T3) is underlain by a 'Regionally Important Aquifer - Karstified (diffuse) (Rkd)'. The southern portion of the site (encompassing T4, T5, T6, T7 and T8) is underlain by both a Locally Important Aquifer (Ll) which describes bedrock which is moderately productive only in local zones and a Poor Aquifer (Pl) which describes bedrock which is generally unproductive except for local zones.

An important consideration in terms of site hydrology and drainage is the occurrence of non-mapped karst features i.e., swallow holes in the region of the wind farm site. Portions of the wider area are drained directly by swallow holes, that is, direct connection to groundwater however as EIAR **Chapter 10 Soils and Geology**, there are no mapped karst features within the wind farm site. Various karst features (i.e., enclosed depressions and swallow holes) have been identified by the GSI (2022) along both GCRs. The GCR is underlain by the same classes of aquifers (Rkd and Ll) as the wind farm site, as shown in **Figure 9.8b** of EIAR **Chapter 9 Hydrology and Hydrogeology**.

Appropriate Surface water buffers have been applied to Karst features, as discussed in EIAR **Chapter 9 Hydrology and Hydrogeology** and **Chapter 10 Land, Soils and Geology** and summarised in section 3.7 below**.**

The receiving environment in terms of Surface Water associated with the Project is considered as being of High Importance and Medium to Highly Sensitivity.

3.4 Aquifer Vulnerability

The wind farm site is underlain by areas classified as 'Extreme (E)'; 'High (H)'; and 'Moderate (M)' vulnerability rating (EIAR **Chapter 9 Hydrology and Hydrogeology**, **Figure 9.10a**). The proposed location of T1, T3, T5 and T8 have been mapped as areas with 'High (H)' vulnerability rating. The proposed locations of T2 and T7 are in areas of 'Extreme (E)' vulnerability, and the proposed location of T4, T6 and T9 are in areas of 'Moderate (M)' vulnerability.

The GCR similarly traverse land with groundwater vulnerability ratings ranging from 'Moderately Vulnerable' to 'Extreme Vulnerability' (EIAR **Chapter 9 Hydrology and Hydrogeology**.**Figure 9.11a)**.

The receiving environment in terms of Groundwater associated with the Project is considered as being of High Importance and Medium to High Sensitivity.

3.5 Designated Site and Habitats

The Site and GCR are not positioned within, or directly adjacent to any designated or protected area, Special Protected Area (SPA), Special Areas of Conservation (SAC), National Heritage Area (NHA) or Statutory Nature Reserve of National Park (pNHA,). The nearest downstream designated areas hydrologically connected to the site include:

- Blackwater River (Cork/Waterford) SAC (EPA Site Code: 002170) situated on Awbeg (Buttevant) approximately 4.5km east.
- Blackwater River (Cork/Waterford) SAC (EPA Site Code: 002170) situated on Ballyclough Stream approximately 7.5km south.
- Awbeg Valley (Above Doneraile) pNHA, approximately 9.0km from the site.

These are discussed in EIAR **Chapter 9 Hydrology and Hydrogeology**.and **Chapter 7 Biodiversity**.

Assessments of the baseline hydrological and hydrogeological conditions at the site indicate that parts of the site have already experienced impacts to baseline conditions through the installation of drainage networks associated with agricultural practices.

3.6 Landslide Susceptibility

Landslide risk susceptibility (GSI, 2022) is 'low' and the topography of the site does not possess any peat or steep slopes, i.e., the site is generally flat. The site is relatively low-lying, and the risk of slope stability is low.

The closest mapped landslide event was recorded c. 14km to the west of the site.

The risk of slope, ground and geological stability issues arising at the site is very low, however there remains a risk of localised stability issues arising, that includes excavation side wall collapse, stockpile collapse etc.

In terms of geology, localised stability issues will not lead to significant impacts, and any occurrence will be reversed easily, however localised stability is important to consider in terms of the health and safety of operatives, and when working in proximity of sensitive receptors for example; drains and surface water features.

3.7 Constraint Buffers

As part of mitigation by avoidance during the design phase of the Project, groundwater, surface water, and drainage buffer zones were established where applicable as detailed in the EIAR Chapters. The layout of the proposed wind farm has therefore been designed to minimise potential environmental effects.

The layout was informed by the following objectives and constraints:

- Maintaining a setback from proposed turbines to inhabited houses of at least 700m (four times the tip height)
- Avoidance of sensitive habitats including non-native invasive species
- Minimising the impact on hedgerows
- Capitalising on opportunities for biodiversity enhancements
- Avoidance of known karst features
- Maintaining a buffer of at least 15m from drainage channels where possible and maintenance of a 25m buffer for the historically mapped water feature approximately 90m southwest of the proposed location of T4
- Avoidance, where possible, of existing telecommunications infrastructure links

- Maintaining a buffer of at least 20m to known archaeological monuments
- Maximising the use of existing farm tracks
- Minimising impact on farm operations during construction and operation phases
- Recommended groundwater buffer zones ranging from e.g., 15m to entire catchments (source protection in regionally important karstified aquifer) depending on site specific characteristics have been considered based on Geological Society Ireland (GSI) and EPA recommendations as detailed in EIAR **Chapter 9 Hydrology & Hydrogeology**.
- Source Protection Areas – The entire area mapped as a public or group groundwater supply protection area. EPA buffer is applicable and been considered in assessments for the site).
- 250m Groundwater Buffer Zone – Groundwater abstraction points in relation to foundations, proposed access tracks and cable trenches. Source for mapped abstraction points.(This GSI has been considered: no groundwater abstractions points are located within 250m of the Site and is therefore not applicable).

The proposed site access tracks, associated widening where required, at watercourse crossings etc. naturally fall within buffer zones associated with mapped streams / rivers.

Some of the Project footprint will fall within buffer zones due to the unique and limiting circumstances associated with the Site and the Project, including; the proposed infrastructure itself whereby the GCR traverses a relatively large distance and is limited to public and local road networks and privately owned forestry access tracks.Appropriate mitigation measures have been identified in EIAR **Chapter 9 Hydrology & Hydrogeology**.

In the scenarios above, the Turbine Hardstands and associated drainage will divert runoff away from these higher risk areas and the design the drainage network is to place buffered outfalls in more favourable areas adjacent to the Project footprint.

Portions of both GCRs pass through one surface water and two groundwater Source Protection Areas (EIAR **Volume III, Appendix 10.2**). Horizontal Directional Drilling (HDD) will take place at a single point along the N72 (tributary of the Blackwater).

A launch pit will be constructed within the L53320 public road before the junction with the N72. The launch pit is will be situtated outside of the 15m surface water buffer.

Procedures in relation to mitigating against adverse impacts in areas in close proximity to surface water / drainage or within buffer zones are detailed in a Surface Water Management Plan (SWMP) (**Appendix A**). The mitigation measures described in the following sections will also be applied.

4 OBJECTIVES OF THE CEMP

4.1 Overall Objective

The Overall Objective of this CEMP is to implement the construction of the Project in a sustainable manner, as set out in the Project design, construction standards and codes of practice, fully in compliance with the requirements of the EIAR, NIS and planning conditions ensuring no significant effect on the environment, amenity of the area or on human population.

4.2 Key Project Objectives

- Construct the Project in a sustainable manner using sustainable sources of materials where possible, maximising reuse potential of natural materials, maximising waste recycling and minimising waste production requiring off-site disposal.
- Ensure all mitigation requirements as set out in the EIAR included in any Planning Consent are fully implemented.
- In particular prevent suspended solids, concrete, oils and debris from excavations, construction activities and material deposition from entering watercourses.
- Ensuring that emergency measures are in place should an unforeseen pollution incident or potential impact arise on site.
- Ensure compliance with the requirements of mitigation with respect to air and noise.
- Where incidents arise which trigger a review of the CEMP ensure that the CEMP is updated to include any additional mitigation measures or change of practices required.
- Ensure Good waste management and housekeeping is implemented, including having clearly labelled proper segregated waste management facilities on site, proper segregation is carried out and waste is removed by a Licensed waste Contractor,(see **Appendix D** - Resource and Waste Management Plan).
- Maximising the reuse of excavated materials: stone, soil and subsoil material and avoidance of disposal off site to the extent possible.
- Ensure site security to avoid potential environmental impacts through unauthorised activity.
- Implement a Water Quality Monitoring Plan (**Appendix E**) to ensure no adverse effects on the environment or human population.
- Ensure compliance with environmental legislation particularly as it pertains to water quality, wildlife protection, Biodiversity, protected habitats and species and human health.
- Ensure construction works and activities are completed in accordance with any planning conditions.

- Minimise the impact on local landowners and the local community which may arise from construction of the wind farm and the grid connection.
- Provide adequate environmental training and awareness for all Project personnel at the commencement of the Project and periodically as required.

5 CONSTRUCTION ACTIVITIES

Experienced main Civil Contractor, Electrical Contractor and associated Subcontractors will be appointed to undertake the construction works required for the Project.

All Contractors and Subcontractors will be required to comply fully with this CEMP and any updates during the construction phase of the Project.

All Contractors and Subcontractors will be required to provide induction training, setting out the requirements of the CEMP, EIAR and NIS, with respect to protection of the environment and Human population, to all staff before commencement of construction activities.

Periodic toolbox talks must be held when any non-compliance incidents as a result of audit are identified which require updating of the CEMP, when complaints are received as a result of construction activities and when changes of legislation occur which trigger an update of the CEMP.

All Contractors and Subcontractors will be required to comply fully with the Health and Safety requirements as set out in National legislation.

Construction activity will involve all the necessary operations to construct the Project as described. A high-level overview of the construction activities involved is provided below. Note also that the precise order in which these activities will take place is not known at this stage.

- Site compound, Site Offices / Staff Welfare Units and Storage Compound.
- Temporary staff parking.
- Vegetation removal, topsoil stripping and excavation.
- Subsoil excavation.
- Storage of topsoil and subsoil for future reuse, breakout and crushing of hardstanding.
- Construction of the drainage network, drainage and silt control measures including stilling ponds.
- Importation of fill.
- Importation of steel.
- Importation of concrete.
- Construction of new units - foundation trenching, establishment of foundations, installation of utilities, SuDS, importation of building materials by HGV, storage of building materials, erection of units, erection of scaffolding, roofing, internal fit out and painting.
- Construction of access routes and parking areas - site levelling, earthworks, soil compaction, installation of road base, kerbing, road drainage, tarmacking and paving surface.
- Removal of hedgerows and reinstatement.
- Construction of site tracks and upgrade of water course crossing as required.

- Construction of turbine crane hardstandings.
- Construction of turbine foundations and wind turbine assembly.
- Construction of control building/substation.
- Construction of meteorological mast foundations and erection of met mast.
- Internal site cabling installation.
- Construction of Control building and substation including:
    - Installation of switchgear/metering.
    - Installation of transformer and externals.
- Landscaping and Signage.
- Construction of the grid connection including:
    - Linear trenching, ducting along the road network to Mallow 110kV Substation.
    - Construction of cable joint bays (6m long, 2.5m wide and 2m deep), along with two smaller communication link box chambers at intervals along the route.
    - Cable pulling and interface with the wind farm substation and Mallow 110kV substation.
    - Off-site remedial works associated.

5.1 Typical Equipment

A list of typical equipment to be used on site during the construction period is summarised below;

Site Preparation

- Wheeled Loader Lorry
- Diesel generator
- Tracked Excavators
- Dozer
- Dump Truck

Ground Works/Piling

- Excavator mounted rock breaker
- Pile driver/Crane Mounted Auger
- Tracked Excavator
- Wheeled Lorry Loader
- Dump Truck
- Pump
- Compressor

General Turbine Construction

- Articulated Lorry
- Haulage and delivery vehicles articulated and non-articulated;
- Wheeled Mobile Crane
- Tracked Mobile Crane
- Concrete Mixer Truck and Pump
- Pump
- Compressor

Access track construction

- Tracked Excavators
- Haulage and delivery vehicles articulated and non-articulated;
- Dozer
- Dump Truck
- Road roller

Miscellaneous

- Fuel tank delivery vehicles Heavy goods vehicle, Haulage and Delivery vehicles.
- Hand Tools including Hammers, Crow Bars, Shovels, Wheelbarrows.
- Power Tools including Stihl Saws, Battery Drills, Angle Grinders.
- Forklift, Scaffold including Hop Ups and Aluminium Towers.
- Pumps to enable excavation and service trenches to remain dry.

5.2 Site Clearance and Earthworks

It is anticipated that significant vegetation clearance, vegetation maintenance, earthworks and ground preparation from cut and fill works will be required as part of the Project. It is currently estimated that the volume of excavated material, (including bulking factor) due to site clearance and preparation of foundations, access tracks and substation will be approximately **95,962m^3** of which approximately **56,278m^3** is topsoil, **39,154 m^3** is subsoil and **530m^3** is rock.

Removal of the existing topsoil layer (approx. 300mm thick) will occur at the wind turbine locations, hardstand areas, drainage network, substation location, meteorological mast location, pond areas, contractors' compound and along the road network,. Stripping and removal of the topsoil layer will be coordinated with the proposed staging for the Project. The extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work area(s) and will be programmed to minimise soil handling / double soil movements. Stripped topsoil will be temporarily stockpiled and reused on site for trackside and hardstand berm construction.

Topsoil will also be spread on site adjacent to the infrastructure to a depth of approximately 75mm. Approximately, **56,063m^3** of topsoil will be reused on site for the

purpose of berm construction and landscaping purposes. The residual topsoil material, approximately **215m^3**(bulked), will be reused for site landscaping purposes.

Excavation of subsoil layers will be required as part of turbine foundation excavation, drainage, substation and meteorological mast installation. It is estimated that the quantity of subsoils to be excavated due to site clearance and preparation will be **39,154m^3**.

Disturbed subsoil layers will be stabilised as soon as practicable and reused in road construction for gradient purposes, in construction of berms, hardstand areas, underlying wind turbine foundations and for internal grid construction. An estimated **38,723m^3** of subsoil will be reused for this purpose. This will leave an estimated residual **432m^3** to be exported to a licensed waste facility.

All suitable non-hazardous excavated material will be reused on site where possible. Any excavated material that cannot be reused shall be handled and transported to exported to a licensed waste facility.

A summary table of material excavations, reuse and imported is provide in **Table 5.1** below.

Table 5.1: Excavation and Importation Quantities

Wind Farm Component	Excavation				Construction				
	Total Excavated Topsoil (m3)	Total Excavated Subsoil (m3)	Total Excavated Rock (m3)	Material requirement topsoil (m3)	Material requirement subsoil (m3)	Imported aggregate (m3)	Reused aggregate (m3)	Imported Concrete (m3)	Imported Sand (m3)
Tracks	23,076.73	6,178.12	-	-	-	13,151.95	-	-	-
Trackside Berms	-	-	-	14,420.31	2,729.64	-	-	-	-
Compound	495.00	-	-	-	-	495.00	-	-	-
Drainage	3,784.38	3,784.38	-	-	-	-	-	-	-
Hardstands	12,508.05	-	-	1,343.47	2,686.93	6,211.14	530.29	-	-
Hardstand Berms	-	-	-	6,200.15	4,005.86	-	-	-	-
Wind Turbine Foundations	1,789.71	15,775.98	331.43	-	5,485.33	6,842.65	-	5,569.14	-
Substation	679.18	4,597.99	-	-	-	4,473.41	-	1,012.83	-
Meteorological Mast	11.52	84.48	-	-	-	-	-	160.00	-
Internal grid	946.10	2,207.56	-	-	3,035.39	-	-	-	118.26

Wind Farm Component	Excavation				Construction				
	Total Excavated Topsoil (m3)	Total Excavated Subsoil (m3)	Total Excavated Rock (m3)	Material requirement topsoil (m3)	Material requirement subsoil (m3)	Imported aggregate (m3)	Reused aggregate (m3)	Imported Concrete (m3)	Imported Sand (m3)
Pond lining	-	-	-	-	-	176.40	-	-	-
Soil Spreading	-	-	-	34,099.40	20,779.32	-	-	-	-
Summary Totals	43,290.67	32,628.52	331.43	**56,063.33**	**38,722.48**	**31,350.55**	**530.29**	**6,741.97**	**118.26**
Summary with Bulking Factors	**56,277.87**	**39,154.22**	**530.29**						

Pre-earthworks drainage measures will be installed prior to earthwork activities such as access track and other infrastructure construction in order to Divert 'clean' surface water run-off and stormwater away from exposed soils of earthworks preventing further erosion; and to Prevent 'clean' water from mixing with potentially silt-laden water generated from construction works.

Best practice pre-earthworks drainage measures may include:

- Cut-off/ diversion ditches.
- Temporary interception bunds.
- Swales.
- Retention ponds.

Stilling ponds will be constructed on construction works drainage to allow silt laden water to settle out before discharge into the main drainage network.

The presence of Japanese Knotweed has been identified in two locations on site (see EIAR **Chapter 7 Biodiversity, Figure 7.4**). The first location occurs throughout an entire field boundary northeast of farm sheds to the west of Turbine 9, and the second stand was identified in a field adjacent an area of woodland within the southern part of the site near to the proposed substation location. It was also recorded at Boherash Cross on TDR Option 1 and the near to the turn off after Mallow Hospital on TDR Option 2. The removal, treatment and disposal of any identified invasive non-native plants will be undertaken in accordance with the latest guidance and Invasive Species Management Plan developed for the site by the Appointed Contractor to prevent further growth or spread beyond the site.

The Invasive Species Management Plan will be sent to the Planning Authority for approval prior to commencement of Construction Works.

5.3 Culverts / Crossings

The development of the wind farm includes the construction/upgrading of watercourse crossings over non-mapped surface water features i.e., non-mapped drains (**Figure 9.6a** and **Figure 9.6b** of EIAR **Chapter 9 Hydrology and Hydrogeology**) as provided in the **EIAR Chapter 9, Table 9.1** and in **Table 5.2** below. Refer to Planning Application Documentation **Part 2** – Planning Drawings: **20910-NOD-XX-XX-DR-C-08005** to **20910-NOD-XX-XX-DR-C-08010**. The Project will also include a number of new drainage culverts associated with the proposed access and operational tracks and drainage network.

Table 5.2: Culverts: existing and proposed

Crossing Number	Type	E ITM	N ITM
eWCC-01	Existing Culvert	548334.8	606069.8
eWCC-02	Existing Culvert	548570.1	605846.5
eWCC-03	Existing Culvert	548745.3	605569
eWCC-04	Existing Culvert	548274.3	606035.6

Crossing Number	Type	E ITM	N ITM
eWCC-05	Existing Culvert	548499.9	605931.4
eWCC-06	Existing Culvert	548923.6	605088.1
eWCC-07	Existing Culvert	549259.4	605112.2
eWCC-08	Existing Culvert	549551.9	605183.4
eWCC-09	Existing Culvert	549704.5	605080.3
nWCC-01	New Culvert	549983.5	604685.1
nWCC-02	New Culvert	549880.7	604696
Being Removed	Existing Culvert	549694.1	605125.1
nWCC-03	New Culvert	549244.2	605147.4
nWCC-04	New Culvert	549467.8	605565.7
nWCC-05	New Culvert	549491.1	605586.1
nWCC-06	New Culvert	549067.8	605095.1
nWCC-07	New Culvert	549036	605128.5
nWCC-08	New Culvert	548911.4	605544.2
nWCC-09	New Culvert	548584.3	605805.6
nWCC-10	New Culvert	548406.6	605882.2
nWCC-11	New Culvert	548444.3	606153.3
nWCC-12	New Culvert	548253.4	606323.1
nWCC-13	New Culvert	548145.1	606349.6
nWCC-14	New Culvert	548045	606346.6
eWCC-10	Existing Culvert	548412.7	605895.6
nWCC-15	New Culvert	548409.5	605905.5
nWCC-16	New Culvert	548584.7	606036.2
nWCC-17	New Culvert	548962.4	605320.2
eWCC-18	Existing Culvert	549552	605111

The proposed watercourse crossings are relatively near the head waters of the surface water network therefore, bridge or culvert specification and construction are envisaged to be of relatively low significance in terms of expected flow, etc. However, all watercourse crossings will be designed to facilitate peak, or storm discharge rates so as to avoid localised flooding and associated issues during storm events.

On the GCR Option 1 and GCR Option 2 a Horizontal Directional Drilling (HDD) under the Blackwater (Munster) River_140 (also locally known as Caherduggan South) and adjacent N72. Refer to Planning Application Documentation **Part 2** – Planning Drawings: **Drawing 20910-NOD-XX-DR-C-8216**). A launch pit will be constructed within the L53320

public road approximately 18m before the junction with the N72. The reception pit will be located approximately 6m from the N72 in the carriageway of a former public road now in part private ownership.

5.4 Grid Connection

Tullacondra Green Energy Limited proposes to connect into the Mallow 110 kV substation at St. Joseph's Road, Mallow. The grid connection from the wind farm site to the substation will be approximately 13.5km via a 38kV cable which will be underground and constructed primarily within the existing road corridor. Approximately 0.5km of the cable route will be within private lands. The design of the grid connection and connection into the Mallow 110 kV substation will comply with ESBN / EirGrid specifications and technical and operational requirements.

The grid connection cabling will be installed in trenches (c. 1.25m deep and 0.6m wide), which will be laid with five cable ducts through which the three electrical cables, communications cables, will be pulled. The ducts will be laid in accordance with ESBN standards, on bedding sand and then surrounded by concrete, red cable protection strip and yellow warning tape and steel protective plates, if required at the location, will be placed in the trench before the top of the trench is backfilled and reinstated. The cables will be pulled through the ducts and joined together at joint bays located along the route. The joint bay will comprise three underground pre-cast concrete chambers – a joint bay chamber (4.5m long, 2.03m wide and 0.96m deep), along with two smaller communication link box chambers. Cable pulling, jointing and testing will be carried out at the start and end point and at each joint bay. Once the cables have been jointed and commissioned, the entry and exit and joint bay chamber will be filled with sand and a concrete cover fitted on top. Joint bays within the public road will be reinstated in accordance with TII specifications and will be agreed with the local authority. Refer to Planning Application Documentation **Part 2** – Planning Drawings: **Drawing Number 20910-NOD-XX-XX-DR-C-08242.**

A man-hole type cover will be fitted over the start and end points of the GCR route. Over-ground identification marker posts and marker plates will be installed along the route. The manhole covers at link boxes and comms chambers and marker plates/posts will be the only surface expression of the cabling when works are completed. Cables will be installed in accordance with the ESB Networks Functional Specification for the installation of 38kV underground cables and in accordance with any updates, https://www.esbnetworks.ie/docs/default-source/publications/functional-specification-for-the-installation-of-38kv-underground-power-cables-for-contestable-projects.pdf?sfvrsn=62298b2a_10

5.5 Management of Surplus Material

It is envisaged that material excavated to construct all infrastructure elements of the wind farm (foundations, tracks, hardstands, etc.) will be used as backfill, berm construction, for site reinstatement and landscaping purposes.

A Spoil Management Plan has been prepared for the Project and is included as **Appendix B** to this CEMP.

As per **Table 5.1** above, the majority of spoil generated on site will be of subsoils and Till with some rock excavated at foundation locations.

The majority of rock excavated on site will be reused following removal from site, crushing and degrading and returned to site for use in formation of site tracks, under foundations etc..

A summary estimate of materials excavated at the wind farm site and reused in construction is provided in **Table 5.3** below.

Table 5.3: Balance of Materials Generated and Reused (Bulked)

Balance of materials following reuse on site	Generated (m^3)	Reused on site (m^3)	Balance of material (m^3)
Topsoil	56,278	56,063	215
Subsoil	39,154	38722	432
Aggregate/rock on site	530	530	0

The balance of surplus material will be reused for site landscaping purposes.

The location and estimated percentage quantity of excavated materials which will be stored prior to reuse in the temporary stock pile areas is shown in **Table 5.4**.

Table 5.4: Location and dimensions of stockpile areas within the wind farm site

Percentage Stockpile Distribution across Site	Near T1	8%
	Near T2	8%
	Near T3	10%
	Near T4	24%
	Near T6	9%
	Near T8	8%
	Near T9	11%
	Near Compound	9%
	Near Substation	6|%
	Near Site Entrance	7%

The material excavated for the construction and upgrade of site access tracks will be placed mainly in berms alongside the wind farm access tracks and/or stockpiled in designated temporary storage areas (at a height not exceeding 1m).

In relation to excavated material removed during the grid connection network installation, any earthen (sod) banks to be excavated will be carefully removed and stored separately, maintained and used during reinstatement. Surplus excavated material from roadways will be reused if suitable or disposed of to a licenced waste facility.

The use of soil stockpiles will be minimised by earthworks planning. However, where stockpiles are used, silt fences and silt mats will be employed to minimise sediment levels in run-off.

All stockpiled material will be stored at least 50m from permanent mapped watercourses in order to reduce the potential for sediment to be transferred into the wider surface water system and will be regularly inspected to ensure that erosion of the material is not taking place.

With regard to excess material from the construction of the cable joint bays and communication chambers an estimated **1,485m^3** will be removed from the construction site and brought to a licensed waste handling facility.

5.6 Importation of Fill for Wind Farm Construction

The importation of fill material will be required for access track construction, wind turbine base and backfill, substation, hardstand area and temporary construction compound. It is estimated that **31,351m^3** of material will be required to be imported onto the site.

Fill material will be sourced locally and will comprise of coarse aggregate or finer partial engineering fill or clay depending on geotechnical engineered specifications.

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.

Only suitable material will be allowed on site, this may be achieved through chemical testing prior to importation. Provided the imported material is a product with known characteristics, minimal monitoring or validatory sampling of imported loads of the material will be required, however visual inspection of all material in each load will be conducted as a minimum.

Temporary stockpiles of imported material will be kept to a minimum.

Fill areas, when target elevation has been achieved, will be stabilised as quickly and efficiently as possible.

5.7 Importation of Concrete for Wind Farm Construction

The importation of approximately **6,742m^3** of imported concrete will be required for construction of the wind farm foundations (**5,569m^3**), substation buildings (**1,013m^3**) and meteorological mast foundations (**160m^3**).

5.8 Importation of Concrete for Grid Construction

The GCR will require an estimated **4,455m^3** of imported concrete to construct.

5.9 Road and Utility Crossings

An engineering assessment was undertaken on the proposed GCR. This included field survey and engagement with the Cork County Roads Authority the Cork National Roads Office, Transport Infrastructure Ireland, Gas Networks Ireland, and Iarnród Éireann to

determine the best engineering solution for crossings of National Roads, bridges and watercourses.

Table 5.5 provides a summary of the grid connection crossing points and proposed solutions for the preferred GCR Option 1.

Table 5.5: Option 1 Grid connection crossing points and proposed solutions

Crossing Point	Drawing Ref. (refer to planning pack)	Location	Description	Proposed Construction Solution
1	20910-NOD-XX-XX-DR-C-08210	L1205-19 at Ballykitt, Mallow	Existing cattle underpass	From examination of the layout plan (Drg. 103 PL1) and section (Drg. 105 PL1) drawings on the planning file (County Cork P. A. Reg. Ref. 216326) and measurements undertaken in the field, it has been determined that there is sufficient cover over the underpass for installation of the grid cable within the road at this crossing.
2	20910-NOD-XX-XX-DR-C-08211	L1205-01 at Greenvale, Ballybeg, Twopothouse, Mallow	Under railway bridge	From measurements undertaken in the field it has been determined that there is sufficient height between the bridge archway and road level (4.29m) and width (6.2m) for undertaking grid installation works under the bridge at this location.
3	20910-NOD-XX-XX-DR-C-08212	L1205-01 at Greenvale, Ballybeg, Twopothouse, Mallow	Crossing interface with gas mains	Following consultation with Gas Networks Ireland, it has been determined that the gas mains is 2.4m depth below the level of the road. Grid ducting will be laid in trefoil to a depth of 1.25m which will provide cover of 1.15m to the depth of the gas line.
4	20910-NOD-XX-XX-DR-C-08213	L1205-01 at New Twopothouse Village	Crossing the N20	Horizontal Directional Drilling (HDD) is proposed for crossing under the N20. A launch pit will be constructed within the L 1205-01 public road approximately 20m before the junction with the N20. The reception pit will be located approximately 8m from the N20 in Council lands in front of Tower B & B.

5	20910-NOD-XX-XX-DR-C-08214	Junction R581 with L1207 at Hazelwood, Old Twopothouse Cross Roads	Crossing interface with water lines	Open cut trenching is proposed at this location following proactive engagement with the Local Authority and Irish Water. A traffic management lane closure operation will be required along the R581 on the left-hand side of the road heading in an easterly direction. To cross the road, a 4- way traffic management system will need to be in place. There are existing Irish Water utilities on the Hazelwood junction road that will be required to be crossed and in compliance with Irish Water Standards. Based on desktop and field surveys, there is sufficient room on the left-hand side of the L1207 road heading in a southerly direction beside an existing 150cm diameter watermain which is installed in the road verge. Based on desktop and field surveys, there is sufficient space in the left hand lane to install the new ducts with a lane closure only required under a controlled traffic management system.
6	20910-NOD-XX-XX-DR-C-08215	L5320 at Ballyviniter Upper	Within Ballyviniter Bridge	It is proposed to cross the existing Ballyviniter Bridge along the L5320 via Open Cut trenching. The trench will be constructed on the right hand side of the road heading in a southerly direction and crossing the bridge in the existing grass verge. There is an existing water service in the verge that may have to be diverted if still live. The trench will be constructed with minimal cover and a structural concrete slab as cover to ensure protection will be required for the new service. There is sufficient space available to replace the grass verge with a concrete finish which will not affect the road layout. Extensive discussions have taken place with the Local Authority on this proposed crossing.
7	20910-NOD-XX-	L5320 at Ballyviniter	Crossing watercourse	HDD is proposed for crossing under a watercourse

	XX-DR-C-08216	Lower, Spa Glen, Mallow		(Blackwater (Munster_140) – also locally known as Caherduggan South) at this location. A launch pit will be constructed within the L53320 public road approximately 18m before the junction with the N72. The reception pit will be located approximately 6m from the N72 in the carriageway of a former public road now in part private ownership

As part of the detailed engineering design, site investigation works will be undertaken to determine ground conditions, the extent of any underground features (i.e., bridge foundations) and depth of cover to inform detailed design of the grid connection.

Further consultations with utility providers such as Uisce Éireann, Gas Networks Ireland, and the Cork Country Roads Authority will be undertaken as part of detailed design to confirm methods of construction for the gird connection.

5.10 Wind Farm site and Underground Cabling

All power, communication and control cabling on the wind farm will be installed underground in excavated trenches which will be routed from the wind turbines to the substation along the path of site access tracks where possible.

When trench excavation works commence, the surface vegetated topsoil will be removed from the trench path and retained on the ground surface adjacent to the trench.

The excavated cable trenches will be approximately 0.60m in width and up to approximately 0.90m deep.

The cable ducting will be placed into the prepared trench, inspected, and then the trench will be backfilled.

Excavated material will be employed to backfill the trench, and any surplus material will be used as berms along the access tracks or deposited in one of the designated spoil storage locations. Cable ducts will have warning tape buried below the finished ground level. The retained topsoil will be used to reinstate vegetative cover immediately after the cables have been installed and the trench filled in.

5.11 Substation

A 38 kV electrical control substation will be located near the entrance to the wind farm in the vicinity of an existing farm shed. Refer to Planning Application Documentation **Part 2** – Planning Drawings: **Drawing 20910-NOD-XX-XX-DR-E-08003**. The electricity from the turbines will be cabled into the substation where it will be transformed, metered and regulated for export to the national electricity system. The substation will be connected to the existing Mallow 110kV substation via underground cable over approximately 13.5km. The final layout and design of the proposed substation will be to ESBN specifications.

The proposed substation contains the following:

- Substation building (internal measurements 128.7m^2 and approximately 6.3m in height), comprising:
- Independent power producer (IPP) control room.
- ESB control room.
- Switch room.
- Store room.
- Office.
- A water connection system supplied by rainwater harvesting with storage, to supply the proposed Water Closet (WC) and wash hand basin. Potable water will be supplied by bottled water or water cooler.
- A WC with connection to a sealed wastewater holding tank fitted with a high-level alarm.
- Parking for 5 vehicles.
- Lighting and fencing (2.5m steel palisade fencing or as specified by ESBN/Eirgrid).

A construction compound area (approximately 1,438m^2), will be located to the rear of the control building and typically comprises:

- Auxiliary TX (transformer).
- Capacitor bank.
- Drying room.
- Meeting room and offices for site staff.
- Toilet block.
- Canteen.
- Pre-Insertion Resistor (PIR).
- Parking for 12 vehicles.
- Lighting and fencing (2.5m steel palisade fencing or as specified by ESBN/Eirgrid).

5.12 Permanent meteorological mast

For wind farms with an MEC exceeding 10MW It is an EirGrid requirement (per EirGrid Grid Code PPM1.7.1.2 and ESB Networks Distribution Code DCC11.5.1.6) to have continuous on-site meteorological information monitoring during the operation of the wind farm.

A 100m Meteorological Mast (met mast) is proposed at the proposed wind farm site to supply continuous, real-time wind speed, wind direction, air temperature and air pressure data. The number and heights of the instruments which measure these parameters will be agreed with EirGrid during detailed design.

The proposed Meteorological Mast (met mast) will be located central to the wind farm site, midway between locations for T4 and T5. Refer to Planning Application Documentation **Part 2** – Planning Drawings: **Drawing No. 20910-NOD-XX-XX-DR-C-08004** and **Drawing No. 20910-NOD-XX-XX-DR-C-08009**. It will be accessed via a short section of track from the internal access track. A turning head will be constructed adjacent the mast site. The met mast access track will be 3.5m in width and will include associated drainage.

The met mast foundation will be approximately 8m x 8m and the mast will be affixed to a concrete plinth with a depth of 3m. The plinth will be designed and constructed similarly to the turbine foundations. It will encompass a cast-in insert or bolts to connect to the bottom of the met mast and reinforced bar structural elements. The area around and above the foundation will be backfilled with compacted crushed rock. The met mast will be linked to the closest turbine via buried Internal cabling for power and communication.

5.13 Decommissioning and Aftercare

At the end of its operational life, the Project will be decommissioned as assessed in this EIAR. Prior to decommissioning, Tullacondra Green Energy Limited may make an application to extend the life of the wind farm or repower it, however this would be subject to an entirely new planning application. Decommissioning of the wind farm elements will involve the complete removal of above ground components. Cranes will be used to disassemble each turbine section and they will be removed from the site. The upper sections of the foundations projecting above ground will be removed, and the remainder of the foundations will be covered by soils typical of the surrounding environment and then reseeded or left to re-vegetate according to ecological requirements. Leaving the turbine foundations in-situ is considered a more environmentally sensible option as to remove the reinforced concrete associated with each turbine would result in environmental nuisances such as noise, vibration and dust. Underground cables will be cut back at the turbine termination points and will be recycled. It is proposed that site access tracks will remain to allow access through the site for farm access, as considered appropriate at the time. Decommissioning the proposed development will take approximately 2 months to complete.

Details of decommissioning will be agreed with the local authority prior to any decommissioning taking place. A site-specific Decommissioning Management Plan will be prepared by the Developer for the approval of the Planning Authority before Decommissioning work can commence.

Site materials will be recycled where practicable or disposed of in accordance with waste legislation and best practice guidelines at the time of decommissioning.

As with construction, decommissioning works have could result in potential significant effects on identified sensitive receptors. Details of decommissioning will be agreed with the local authority prior to any decommissioning taking place. The potential for effects during the decommissioning phase of the Project has been fully assessed in the EIAR.

6 ENVIRONMENTAL POLICIES AND LEGAL REQUIREMENTS

All site works shall be undertaken in compliance with the CEMP and with all applicable legal and regulatory requirements.

6.1 Environmental Policies

As part of the appointment, the Contractor will provide a copy of their Safety and Environmental Policy. They will ensure that a copy of their Health, Safety and Environmental Policy is clearly displayed on site notice boards during the construction period. All employees will be required to comply with the requirements of the Environmental Policy.

The Contractor will ensure their employees and support staff (contractors, sub-contractors, suppliers etc.) actively promote and administer a strong environmental culture. To achieve this, a number of initiatives will be in operation during the life of the Project. This will include the use of poster campaigns to raise awareness of topical subjects, and toolbox talks involving all members of the Project team and site workforce.

6.2 Health and Safety Management

The Contractor shall be responsible for ensuring that the construction works Health and Safety Plan is implemented and followed on site. The works will be carried out in accordance with all relevant health and safety legislation and Codes of Practice and site rules relating to the works will be observed.

6.3 Legislation and other legal requirements

The Contractor shall comply as necessary with all relevant Statutory requirements such as the 2005 Safety Health and Welfare at Work Act (as amended, The Construction Regulations (SI 291 of 2013), the General Application Regulations (SI 299 of 2007), etc. (and any amendments thereof).

In addition, the Contractor shall comply with all the reasonable safety requirements of the Client, the Project Supervisor for the Design Process and the Project Supervisor for the Construction Phase.

A legislation register shall be held by the Contractor and reviewed periodically and updated as necessary. Any legislative changes shall be disseminated to Project management immediately, after which the method statements of any affected operations shall be changed accordingly.

A consents and licenses register shall also be held by the Contractor which will contain a schedule of all consent submissions and a tracker to confirm they are in place for the start of works. This will be tracked and managed by the Site Manager and confirmation and approved documentation will be sent to the HSEQ manager before works begin, when new consents are obtained, or when consent is withdrawn, or terminated.

7 ENVIRONMENTAL MANAGEMENT IMPLEMENTATION

7.1 Roles and Responsibilities

The appointed Contractor and all sub-contractors will be responsible for ensuring that the potential risks to the environment and local community are adequately avoided or controlled by the application of measures documented within this CEMP. These will be further developed in their amended CEMP and shall be complied with throughout the construction phase. The main organisations and persons involved in the construction phase works are set out below.

7.2 The Client

The Tullacondra Green Energy Project shall be responsible for:

- Securing the land including access required for all works.
- Appointment of the Contractor.
- Setting and communicating appropriate standards for environmental management and ensuring that their environmental policy is delivered.
- Review and comment on the CEMP.

7.3 Appointed Contractor

The Contractor shall be responsible for:

- Appointing a Site Manager / Site Supervisor.

7.4 Site Manager / Site Supervisor

The Site Manager shall be responsible for:

- Undertaking weekly Site Compound Checks, and appointing persons to supervise refuelling of tanks and bowsers.
- Ensuring the required consents are in place before work starts.
- Ensuring environmental and waste requirements are included on requisitions and in subcontracts and orders.
- Ensuring oil, including diesel is stored in properly bunded tanks / drip trays.
- Ensuring Waste Transfer Notes / Waste Consignment Notes are checked against invoices before payment.
- Liaising with statutory authorities as required and ensuring records of communication (including verbal communication) are kept. Statutory authorities should always be accompanied on site visits.
- Ensuring employees, contractors and subcontractors implement the controls set out in the CEMP.

- Ensuring employees, contractors and subcontractors receive Induction Training (including Project environmental issues) and Toolbox Talks, as appropriate.
- Ensuring personnel needed for audits are available when required.
- Verifying actions resulting from Corrective Action Requests and Observations raised during audits are completed by the deadlines.
- Ensuring environmental training is provided.
- Reporting incidents immediately to the client, and to statutory authorities where required.
- Logging and monitoring incidents and non-conformances.
- Disseminating information, including changes to legislation, and relay to relevant contractor's employees.
- Identifying employees who require environmental training and maintain training records in line with the contract for the works.
- Providing advice and dealing with queries and correspondence on environmental issues.
- Identifying significant environmental impacts for the Project and assist in setting up contracts to include the necessary controls.
- Monitoring the progress in closing out Corrective Action Requests and Observations raised during audits.
- Ensuring all records are retained and readily available.
- Carrying out monthly site audits and reporting on energy data, water usage and waste disposal and their greenhouse gas emissions.
- Appointing any third-party specialists as required.

7.5 All Staff

All staff have responsibility for the environment, responsibilities include but are not limited to:

- In the case of an incident, stopping work, implementing control procedures and reporting it to the Site Manager.
- Contacting the Waste Representative when waste needs collecting.
- Passing any queries or correspondence on public health or environmental issues to the Site Manager.
- Working in accordance with environmental procedures, the CEMP and Method Statements.
- Working in accordance with instructions issued by the Ecological Clerk of Works and/or the Environmental Clerk of Works.

7.6 The Community Liaison Officer

The Community Liaison Officer shall be responsible for:

- Responding to telephone and email queries within 48 hours of receipt.
- Sharing key contact information associated with site development with key stakeholders and update these details as required.
- As a general courtesy, alerting the community to any disruptive works one week in advance of commencement, where reasonably practicable.
- Minimising the impact of site traffic and associated parking on the local road network.
- Arranging any necessary meetings that may be requested by community representatives regarding any on-site issues.
- Circulating updates as required on the Projects progress to include information of relevance and interest to the local community.

7.7 Ecological Clerk of Works (ECoW)

An Ecological Clerk of Works (ECoW) will be appointed to address issues relating to ecological features during the construction and decommissioning phases, as described within the CEMP. Their responsibilities will include:

- Undertaking a pre-construction survey to ensure that significant effects to ecological features will be avoided.
- Inform and educate site personnel of sensitive ecological features within the Project site and how effects on these features could occur.
- Oversee management of ecological issues during the construction and decommissioning period and advise on ecological issues as they arise.
- Provide guidance to contractors to ensure legal compliance with respect to protected habitats and species on site.
- Liaise with officers from consenting authorities and other relevant bodies and contractors with regular updates in relation to construction and/or decommissioning progress.

The Contractor will implement the mitigation measures as set out in the EIAR **Chapter 7 Biodiversity** and EIAR **Chapter 8 Ornithology** which is summarised into **Appendix C** of the CEMP and in the NIS.

The appointed ECoW will have responsibility for monitoring activities that have the potential to impact on ecology or biodiversity associated with the site or linked to the site arising from site construction activities. The Contractor will adhere to the guidance by the appointed ECoW during construction.

The ECoW will ensure that all the mitigation measures set out in EIAR **Chapter 7 Biodiversity** and in the NIS are being fully implemented.

The appointed ECoW will have the authority to issue Stop Work Orders until such time that issues which may impact on ecology or biodiversity are resolved.

7.8 Environmental Clerk of Works (EnvCoW)

To ensure effective implementation of mitigation measures, environmental auditing, and monitoring of environmental obligations of the Developer, an Environmental Clerk of Works (EnvCoW) will be assigned by the Developer to carry out monitoring at the Site during the construction and operational phases of the Project.

The EnvCoW role will be to actively and continuously monitor site conditions and advise on environmental issues and monitoring compliance, and will not be responsible for implementing measures, the due duty of implementing measures will be held by the Developer / contracted construction operator.

The EnvCoW will have the authority to issue instructions to cease work if unexpected environmental risks arise, until an agreed alternative solution is identified, and risks are avoided or minimised.

The EnvCoW will be responsible for undertaking the mitigation measures in **Appendix C** of the CEMP. Their responsibilities will include, though not limited to:

- Ensuing effective implementation of mitigation measures, environmental auditing, and monitoring of the surface water management plan (**Appendix A**).
- Agree methodology for stripping existing vegetation and locations where material is to be deposited and restoration as per the Spoil Management Plan (**Appendix B)**.
- Undertake the water quality monitoring (**Appendix E**).
- Monitoring and implementation of environmental pollution preventions, providing further guidance and liaison with local authorities in relation to pollution instances if applicable **(Appendix F)**.
- Supervise the use of any cement or concrete.
- Providing guidance to contractors to ensure legal compliance with respect to pollution incidents, advising on required pollution prevention measures (as described in this EIAR) and monitoring their effectiveness.

8 ENVIRONMENTAL MANAGEMENT OF SITE ACTIVITIES

8.1 Best Practice Guidance

The Contractor will adhere to best practice guidance and requirements as detailed below, particularly the

- CIRIA guidance document C532 Control of water pollution from construction sites
- EU Construction and Demolition Waste Management Protocol – BIBM
- IEMA's latest Impact Assessment Guidance, 'A New Perspective on Land and Soil in Environmental Impact Assessment' (Feb 2022)
- Machinery Directive. See Guide to application of the Machinery Directive 2006/42/EC Edition 2.2 – October 2019 (Update of 2nd Edition).

The construction approach will also adhere to the requirements set out in the Inland Fisheries Ireland guidance document Requirements for the Protection of Fisheries Habitat during Construction and Development Works and Development Sites.

- PPG 1: Understanding your environmental responsibilities - good environmental practices. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485211/LIT_1404.pdf
- GPP 2: Above ground oil storage tanks. https://www.netregs.org.uk/media/1899/guidance-for-pollution-prevention-3-2022-update-v2.pdf
- PPG 3: Use and design of oil separators in surface water drainage systems. https://www.netregs.org.uk/media/1899/guidance-for-pollution-prevention-3-2022-update-v2.pdf
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer. https://www.netregs.org.uk/media/1887/guidance-for-pollution-prevention-4-2022-update.pdf
- GPP 5: Works and maintenance in or near water. https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf
- PPG 6: Working at construction and demolition sites Pollution Prevention Guidelines. https://www.netregs.org.uk/media/1672/ppg-6.pdf
- PPG 7: Safe storage - The safe operation of refuelling facilities. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485206/pmho0711btzl-e-e.pdf
- GPP 8: Safe storage and disposal of used oils. https://www.netregs.org.uk/media/1900/guidance-for-pollution-prevention-8-2022-update.pdf

- GPP 19: Vehicles: Service and Repair. https://www.netregs.org.uk/media/1417/gpp-19-vehicles-sevice-and-repair-no-e.pdf
- GPP 21: Pollution incident response planning. https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-21-pollution-incident-response-planning/
- GPP 22: Dealing with spills.

  https://www.netregs.org.uk/media/1643/gpp-22-dealing-with-spills.pdf
- GPP 26 Safe storage - drums and intermediate bulk containers. https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-26-safe-storage-drums-and-intermediate-bulk-containers/
- PPG 27: Installation, decommissioning and removal of underground storage tanks. https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-27-installation-decommissioning-and-removal-of-underground-storage-tanks/
- CIRIA (Construction Industry Research and Information Association) Environmental Good Practice on Site (fourth edition (C741), https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductcode=C741&Category=BOOK:
- CIRIA: Control of Water Pollution from construction sites. Guidance for consultants and contractors, https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532&Category=BOOK;
- CIRIA Control of Water Pollution from Linear Construction Sites. Technical Guidance C648.
- https://www.ciria.org/CIRIA/ProductExcerpts/C648.aspx;
- CIRIA: The Suds Manual (C753F) https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C753F,;
- CIRIA SuDS Manual Technical Guidance C697 https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C753F,
- CIRIA Report Number C532 (2001): Control of water pollution from construction sites - Guidance for consultants and contractors. https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532&Category=BOOK,
- National Roads Authority: Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes https://www.tii.ie/technical-services/environment/planning/Guidelines-on-Procedures-for-Assessment-and-Treatment-of-Geology-Hydrology-and-Hydrogeology-for-National-Road-Schemes.pdf,

- Wind Farm Development Guidelines for Planning Authorities (September 1996), https://www.gov.ie/en/publication/f449e-wind-energy-development-guidelines-2006/,
- Eastern Regional Fisheries Board: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites https://www.fishingireland.net/environment/fullconstructionanddevelopment.html
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters, https://www.fisheriesireland.ie/sites/default/files/migrated/docman/2016/Guidelines%20Report%202016.pdf,

  Nature Scotland(V3 2015): Good Practice During Wind Farm Construction https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Good%20Practice%20during%20wind%20farm%20construction.pdf,
- EPA, BEST PRACTICE GUIDELINES for the preparation of resource & waste management plans for construction & demolition Projects (2021) https://www.epa.ie/publications/circular-economy/resources/CDWasteGuidelines.pdf
- TII: The Management of Waste from National Road Construction Projects GE-ENV-01101 December 2017,

  https://www.tiipublications.ie/library/GE-ENV-01101-01.pdf
- TII: Guidelines for the Treatment of Otters Prior to The Construction Of National Road Schemes,

  https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf
- TII: Guidelines for the Treatment of Badgers Prior to The Construction Of National Road Schemes,

  https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Badgers-prior-to-the-Construction-of-a-National-Road-Scheme.pdf
- TII: Guidelines for the Treatment of Bats During The Construction Of National Road Schemes,

  https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Bats-during-the-Construction-of-National-Road-Schemes.pdf
- TII: Guidelines for the Crossing of Watercourses During the Construction Of National Road Schemes,

  https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Crossing-of-Watercourses-during-the-Construction-of-National-Road-Schemes.pdf
- TII: Guidelines for the Protection And Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes,

https://www.tii.ie/technical-services/environment/construction/Guidelines-for-the-Protection-and-Preservation-of-Trees-Hedgerows-and-Scrub.pdf

- Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads Revision 1, December 2010,

  https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf

8.2 Construction Phase Prevention of Pollution

The appointed Contractor(s) will implement at a minimum all of the Mitigation Measures as set out in the following Chapters of the EIAR and NIS prepared for the Project:

- Chapter 6 Population and Human Health
- Chapter 7 Biodiversity
- Chapter 8 Ornithology
- Chapter 9 Hydrology and Hydrogeology
- Chapter 10 Land, Soils and Geology
- Chapter 11 Material Assets
- Chapter 12 Shadow Flicker
- Chapter 13 Noise &Vibration
- Chapter 14 Landscape and Visual
- Chapter 15 Archaeology, Architecture & Cultural Heritage
- Chapter 16 Traffic and Transport
- Chapter 17 Air Quality
- Chapter 18 Climate

A Summary Table of Mitigation Measures is provided in **Appendix C** to the CEMP.

The Summary Table will be reviewed and updated with additional mitigation measures should these be required during the construction phase.

8.3 Hydrology and Drainage Management

Site drainage and drainage management and control is set out in EIAR **Chapter 9 Hydrology and Hydrogeology**.

A Surface Water Management Plan has been prepared for Project, see in **Appendix A** of this CEMP. The Contractor will implement in full the requirements of the Surface Water Management Plan provided.

The Project Hydrologist/Design Engineer will attend the site during the Construction Phase to ensure that the drainage design and drainage controls are constructed in accordance with the mitigation measures outlined in **Appendix A** (Surface Water Management plan) and EIAR **Volume III, Appendix 9.4** (conceptual graphics).

8.4 Resource and Waste Management

To ensure effective control of waste arising from construction activities and to minimise waste generation and final disposal requirements the Contractor will adhere to the requirements of the Resource and Waste Management Plan for the Site which is provided in **Appendix D** of this CEMP.

The Resource and Waste Management Plan sets out the principles and approach to materials and waste management and must be fully adhered to by the Contractor(s) and all subcontractors appointed to construct the Project.

8.5 Horizontal Directional Drilling (HDD) drilling

All chemical fluids used in the boring process are to be inert to the environment (environmentally safe) and follow the relevant legislation. The Contractor is to retain a chemical register and have Safety Data Sheet (SDS) documents available onsite during the operation. The Contractor will also be responsible for a Fluid Management procedure which should include:

- Drilling Fluid program and MSDS.
- Management of spoil including volume on site and specialised site storage.
- Management of drilling fluid displacement (expected volumes and proposed storage).

Considering the high volumes, high flow rates and high contaminant content (drilling spoil) of water arising for drilling activities, water will be managed and treated by means of a settlement tank and/or associated infrastructure (EIAR **Volume III, Appendix 9.4 – Tile 21**).

If a separation (recycling) system is to be used it must be adequately sized and bunded to handle the through-put of the drilling fluid so continuous drilling and reaming operation can be maintained. A separation system must be complete with screens and hydro - cyclones to separate the solids from liquid. Drilling fluids and drill spoils will be disposed off-site at an approved licensed location or discharged to the local surround area with approved licencing permits.

All equipment used during HDD will be in good working order, checked regularly and maintained when necessary. Fluid return lines used in HDD process should be tested for leaks prior to use to check their reliability. Plant machinery not in use is required to have drip trays below engines as well as at refuelling points, if necessary.

All practices involving bentonite will be monitored closely, that is: pumping pressure, drilling mud formulation i.e., drilling fluid volume and the volume of mud returns.

Fuels, lubricants and hydraulic fluids for equipment use on Site will be carefully handled to avoid spillage, properly secured and provided with spill containment kits in case of incident to ensure best practice.

Spill kits, hydrocarbon mats, oil booms etc., will be maintained at areas of works for emergency use and replaced when necessary. Emergency response and frac-out procedures are detailed in **Appendix F**.

8.6 Traffic Management

A Construction Traffic Management Plan (CTMP) has been prepared for the Project and is presented in EIAR **Volume III, Appendix 5.2** of the EIAR.

9 MONITORING & ENVIRONMENTAL CLERK

To ensure effective implementation of mitigation measures, environmental auditing, and monitoring of environmental obligations of the Developer, an Environmental Clerk of Works (EnvCoW) will be assigned by the Developer to carry out monitoring at the Site during the construction and operational phases of the Project.

The EnvCoW role will be to actively and continuously monitor site conditions and advise on environmental issues and monitoring compliance, and will not be responsible for implementing measures, the due duty of implementing measures will be held by the Developer / contracted construction operator.

The EnvCoW will have the authority to temporarily stop works in a particular area of the site to ensure corrective measures are implemented and adverse environmental impacts are minimised if not avoided.

Monitoring of pollution prevention and mitigation undertaken by the EnvCoW assigned by the Developer will include:

- Monitoring site pollution prevention plan.
- Water quality monitoring.
- Advising on required pollution prevention measures (as described in this EIAR) and monitoring their effectiveness.
- Liaison with local authorities in relation to pollution instances if applicable.
- Considering EnvCoW will be responsible for monitoring a broad range of environmental factors at the Site, technical monitoring and advice will be sought such as from specialist consultants as the need arises e.g., installation and website for telemetry.

A detailed Water Quality Management Plan (WQMP) has been prepared and is attached as **Appendix E** and a Surface Waste Management Plan attached as **Appendix A** to this CEMP.

The requirements of the WQMP and any updates will be fully implemented by the Contractor(s) engaged to construct the Project.

10 COMMUNICATION

10.1 Internal Communication

Environmental mitigation measures shall be incorporated into the Risk Assessments and Method Statements (RAMS) prepared by all contractors working on the site. All RAMS shall be communicated to the workforce by the Site Manager.

Weekly construction meetings shall be held during the construction phase. These meetings shall include health, safety and environmental matters such as

- Works activities underway and planned.
- Mitigation measures required to be implemented.
- Results of weekly inspections and any audit results/ feedback.
- Any corrective and preventive actions required to be implemented.
- Identification of areas for continual improvement.
- Status of staff competence and training needs.
- Status of the CEMP and of any required consents and approvals and the need for review and updating.

Any issues resulting from daily or weekly audits shall be discussed with appropriate corrective actions agreed. A 'weekly look ahead' shall be provided at the construction meeting where any environmental constraints or special requirements can be discussed and agreed in advance, where required.

The Site Manager shall conduct daily construction briefings, as required, to ensure site personnel are advised of any specific environmental requirements and constraints.

Toolbox talks will be scheduled as and when necessary, over the duration of the Project.

The Contractor will directly and promptly communicate any environmental issues with the relevant body/department via phone or email.

Site notice boards will display the Environmental Policy of the Client, emergency contacts list, relevant statutory and non-statutory advice and guidance; and any other relevant information. These environmental notice boards will be situated in prominent positions including the main reception area of the site office / compound.

10.2 External Communication

Prior to works commencing on site a Stakeholder Communications Plan will be developed and implemented. This may comprise of circulating information leaflets or similar to inform local residents or residents' associations of each phase of the development with particular emphasis on safety, traffic management and the control of noise and dust throughout the construction period. Communications will take place at a minimum 2-weeks in advance of the works commencement for each construction phase. The contractor will promote and aim to maintain excellent relationships with adjacent local residents, businesses, occupiers and the general public through regular communication and updates on construction activities that may affect them.

All communications received by the Contractor that are relevant to the works in site, including enquiries and complaints, shall be passed to the Site Manager.

If required by the Client any relevant contractors shall attend community engagement events, meetings, etc details of which shall be communicated to stakeholders in advance.

The Site Manager shall serve as the point of contact for the regulatory authorities for their specific activities. Communications from the regulatory authorities received at the site by the Site Manager shall be immediately reported to the Client.

The Contractor shall maintain a record of all communications.

Through the induction all members of the workforce shall be made aware that any direct approaches from members of the public should be directed to their Site Manager. The Site Manager shall record all approaches made by members of the public and shall advise the Client's Project Team of all comments received at the worksite from members of the public.

10.3 Public Liaison

The Contractor will establish early community relations with the surrounding residents and local community. All local residents and where relevant businesses shall be notified in advance of works commencing on site.

A Community Liaison Officer will be appointed for the duration of the Project and will be responsible for complaint management, public consultation and liaison with the public.

The Community Liaison Officer will manage any complaints from the community in a fair and efficient manner and share key information associated with site development such as potential disruptive works as and when necessary.

10.4 Complaints Procedure

The Contractor shall put in place a system for recording, and responding to, all complaints received from third parties. The system shall include the timely reporting of all such complaints.

As a minimum the activity leading to the complaint will be stopped immediately; or where not possible to entirely stop the activity reduce it to the lowest possible level e.g., shut off all non-essential plant.

All complaints will be acknowledged by the Contractor or Project Team on receipt and assessed to determine what information is required from all parties in order to formulate a response. The complainant will be called on the same day if a phone number is provided. Where a phone number is not provided an email response shall be given within three days. All complaints shall be recorded and investigated.

The Contractor will ensure that the complaints log is made available to the local authority if requested.

10.5 Documentation

The Site Manager shall be responsible for documenting and retaining safe all suitable records relating to environmental issues at the site and/or arising from site operations.

Documents shall be stored in a suitable manner and backups created to safeguard the records. This CEMP shall be a controlled document and authorised latest version shall be signed and dated by the responsible person[s]. Other site data records and environmental management documentation will include, but not necessarily be limited to the following:

- Copies of relevant consents, permissions, or other approvals/ authorisations.
- Environmental data records including monitoring results, waste transfer notes/ records of waste collection and treatment/disposal.
- Records of any environmental incidents including actions taken and resolution.
- Records of complaints including actions taken and resolution.
- Records of all plant / equipment entering / leaving site together with any relevant compliance documentation (for instance in respect of noise or air pollutant emissions class).
- Copies of any enforcement notices or instructions issued by the local authority or any statutory regulatory body.
- Record of any prosecutions pending or resolved, and any penalties enforced.
- Records of daily site inspections.
- Records of weekly/monthly audits and minutes of environmental team briefings.
- Records of staff training including site inductions and toolbox talks.

11 ENVIRONMENTAL TRAINING AND AWARENESS

11.1 Inductions

All Project personnel and sub-contractors shall receive an Environmental Induction Presentation, prior to commencement of works onsite. No personnel, including sub-contractors, shall be permitted to commence employment on site without prior attendance at an induction.

Environmental topics covered in the induction shall include but will not be limited to:

- Water resources and pollution prevention.
- Emergency response procedures and incident reporting.
- Waste management and housekeeping.
- Management structure.
- Duties and responsibilities.
- Relevant procedures.
- Ecologically sensitive areas.
- Consents, licenses and Legislation.
- Environmental best practice.

11.2 Toolbox Talks

Regular 'Tool-Box Talks' on specialised topics shall supplement the induction course. Toolbox talks shall be used to highlight issues of concern and to disseminate new information not previously provided. They will also offer site personnel with the opportunity to provide feedback.

Tool-Box Talks shall include, but will not be limited to, instances where:

- There is a change to existing legislation, which requires an operational change.
- Site inspections or audits have identified corrective actions which require rolling out.
- Work is being undertaken in environmentally sensitive areas and pollution response procedures.
- There are significant changes in environmental conditions, i.e., heavy rainfall.

The frequency and topics of the Toolbox Talks shall depend upon the phase of construction. They shall be provided as often as necessary to address site-specific environmental requirements.

Toolbox talk topics for environmental management shall include, but will not be limited to:

- Control of noise and dust emissions.

- Environmental incident and reporting.
- Silt and water management.
- Waste management and segregation.

Records of all ‘Tool-Box Talks’ and attendance shall be kept in the site offices.

11.3 Specialist training

Specialist training for specific members of the construction crews will be provided as required. This may include, but will not be limited to:

- Emergency environmental crews.
- Environmental Monitoring.
- Waste representatives.
- Fuel tanker drivers and refuelling activities.
- HDD crew related to breakout of drilling fluids.

12 EMERGENCY PREPAREDNESS AND EMERGENCY RESPONSE

An Emergency Response Plan has been prepared for the Project and is attached to this CEMP as **Appendix F**.

Prior to commencement of construction, the Environmental Clerk of Works (EnvCoW) will prepare a register of corrective action and emergency response sub-contractors that can be called upon in the event of an environmental incident, and/or to give training on escalating incident where useful, including e.g. specialist hydrocarbon spill response, specialist hydrological and/or water quality response.

Mitigation measures as outlined in the previous sections will reduce the potential for contamination of waters during the construction phase of the Project. However, there remains the risk of accidental spillages and or leaks of contaminants, and excessive loading of surface water mitigation infrastructure.

The Emergency Response Plan Potential emergencies and respective emergency responses include:

- Hydrocarbon spill or leak – Hydrocarbon contamination incidents will be dealt with immediately as they arise. Hydrocarbon spill kits will be prepared and kept in vehicles associated with the construction phase of the proposed development. Spill kits and will also be established at proposed construction areas, for example, a spill kit will be established and mobilised as part of the turbine erection materials and equipment. Suitable receptacles for hydrocarbon contaminated materials will also be at hand.
- Significant hydrocarbon spill or leak – In the event of a significant hydrocarbon spillage, emergency responses will be escalated accordingly. Escalation can include measures such as installation of temporary sumps, drains or dykes to control the flow or migration of hydrocarbons and contaminated runoff will be contained, managed and pumped to a controlled area in line with Active Management including treatment through a suitably equipped treatment tank and Granular Activate Carbon (GAC) vessels.
- This process will be managed by the EnvCoW in conjunction with a preidentified consultant (EnvCoW) in regard to effective remediation, treatment and removal of hydrocarbon contaminated water and soils Excavation and appropriate disposal of contaminated soils will be required in this instance.
- If a significant hydrocarbon spillage does occur, the contractor on behalf of the Developer will have an approved and certified clean-up consultancy available on 24-hour notice to contain and clean-up the spill. The faster the containment or clean-up starts, the greater the success rate, the lower the damage caused and the lower the cost for the clean-up.
- Cementitious material – Cement / concrete contamination incidents will be dealt with immediately as they arise. Spill kits will also be established at proposed construction areas, for example a spill kit will be established and mobilised as part of the turbine erection materials and equipment. Suitable receptacles for cementitious materials will also be at hand.
- In the event of a significant contamination or polluting incident the relevant authorities will be informed immediately.

The Emergency Response Plan sets out the requirements with respect to the following:

- Managing & Reporting Environmental Incidents
- Roles and Responsibilities
- HDD break out
- Spill Kits
- Fire Prevention
- Extreme Weather
- Emergency Contacts
- Incident Reporting and Investigation
- Incident Response

The Emergency Response Plan is to be considered a live document which is to be updated on a regular basis by the Site Manager.

13 COMPLIANCE AND AUDITING

13.1 Project Works Area Inspections

13.1.1 Site Inspections and Environmental Audits

The ECoW and the Site Construction Manager will carry out routine inspections of construction activities.

Site inspections will be carried out on a daily and weekly basis at locations which are relevant to the construction activities taking place on site to ensure all controls are in place and are functioning to prevent pollution events occurring.

Inspections carried out will ensure that the activities taking place are in compliance with the mitigation set out in the EIAR, the NIS and in compliance with this CEMP and all other planning application documents.

Inspections will be carried out by suitably trained staff only.

A log of all inspections shall be maintained on site by the ECoW and made available for inspection by the Local Authority on request.

Any identified failures or potential failures in pollution control measures will be logged as well as any corrective actions taken.

13.1.2 Auditing

The purpose of Environmental Audits is to identify and to highlight the underlying causes of non-compliance. Good environmental audits will result in system and performance improvement.

A schedule of environmental audits will take place during the construction phase will be set up and agreed with the Planning Authority prior to commencement of construction.

The Environmental Audits will be carried out by contractor staff or alternatively by external personnel acting on their behalf.

The results of environmental audits will be documented and provided to Project management personnel.

Corrective Actions, if required will be identified and agreed with the Contractor together with the time frame for their implementation.

13.1.3 Environmental Compliance

Identified incidents will be classified as Near Miss, Minor or Major in accordance with

Table 13.1: Incident Reporting and Investigation

Incident Classification	Definition
Near Miss	An event, controlled through implementation of an effective incident control measure (e.g., drip tray used, effective use of noise barrier).
Minor Environmental Incident	Incidents that have caused minor harm or damage to the environment e.g. • a minor fuel spill below 20 litres onto ground which is immediately cleared; • a minor spill of a chemical not classified as presenting an ecotoxic risk; • exceeding noise levels; • silt runoff from site which does not enter into a surface water feature; or • excess dust emissions.
Major Environmental Incident	Incidents that have caused or may cause significant harm or damage to the environment e.g. • a minor fuel spill which impacts a sensitive land feature, a water body, or drains; • a major fuel spillage over 20 litres; • any spillage of a chemical which is classified as presenting an ecotoxic risk; • silt runoff from site which enters a water feature; or • receipt of a nuisance complaint.

An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary.

Where Minor or Major incidents occur, Corrective Action will be taken immediately, an assessment of the impact arising from the activity will be made and recorded by the ECoW, a report generated on the issue, action taken and effectiveness of the corrective action taken.

The Corrective Action Report will be made available to the Planning Authority or other Statutory Body on request.

The appropriate Corrective Action will be implemented by the Site Supervisor/Construction Manager, as advised by the EnvCoW.

A Corrective Action Notice will be issued to the Main Contractor and will include the details of the incident and the action required to be taken.

The Corrective Action Notice will include a section to be completed when the actions required are completed.

This CEMP will be updated and reviewed prior to commencement of construction, and also every six months thereafter during the construction phase of the Project or when triggered by the need to do so due to an environmental incident, on foot of a complaint

or new legislative requirements which lead to a change in mitigation or management practices on site.

APPENDIX A – SURFACE WATER MANAGEMENT PLAN

CONTENTS

1 INTRODUCTION

This Surface Water Management Plan (SWMP) forms part of the Construction Environmental Management Plan (CEMP) for the Tullacondra Green Energy Project (the Project) in Co. Cork.

The SWMP sets out the minimum surface water management requirements which must be implemented during construction of the Project.

The SWMP should be considered a live document and is to be updated by the Contractor at the commencement of the Project and on a quarterly basis thereafter, or as more frequently as the need arises to ensure that it is current and has the most up to date information.

A copy of the SWMP and any updates shall be maintained on site as part of the Environmental Clerk of Works (EnvCoW's) Environmental Management System.

An electronic copy of the SWMP and any updates shall be provided to the following:

- Tullacondra Green Energy Limited office
- Cork County Council Planning Department
- Inland Fisheries Ireland
- Contractor
- All sub contractors working on the project.

The EnvCoW shall maintain a record of all versions of the SWMP issued.

2 PROJECT DESCRIPTION

Site Location and Plan

The Tullacondra Green Energy Project is located in County Cork in the townlands indicated in **Table 1** and its location is provided in **Figure 1**.

Table 1: Townlands and Electoral Districts in which the proposed Project is located

Proposed development	Townlands
Wind energy project inclusive of turbines, site access tracks, substation, and construction compound	Polnareagha and Ardskeagh (Templemary E. D.); and Tullacondra and Croughta, (Kilmaclenine E. D.).
Grid connection route from wind farm site to Mallow 110kV substation	Kilmaclenine, Croughta, Knockaunavaddreen, and Copestown (Kilmaclenine E. D.); Ballybeg (Buttevant E. D.), Baltydaniel East, Twopothouse, and Curraghkerry (Caherduggan E. D.); Ballyviniter Upper, Cloghlucas North, Curraghphadeen, Ballyviniter Middle, Ballyviniter Lower, Parkadallane, Carrigoon More and Carrigoon Beg (Mallow Rural E. D.).

The proposed wind farm is located approximately 2km south of Lisgriffin Cross, Co. Cork. The wind farm site for the proposed Project is located along the L5302 at Croughta and consists primarily of mixed farmland habitat with hedgerows and occasional areas of scrub, ponds and lakes, and man-made drains and ditches. The area in which the turbines will be located ranges in elevation from 133m above Ordnance Datum (AOD) in the south to 120m AOD in the north.

The proposed grid connection includes works in and alongside public roads to install cabling approximately 13.5km to connect the wind farm to the National Grid at the Mallow 110kV substation located in St. Joseph's Road, Mallow. The proposed wind farm site and the route of the proposed grid connection for which planning permission is sought (indicated by the red line planning boundary) is shown in **Figure 1** and includes a total area of 58.6 hectares (ha).

Description of the Project

A detailed description is included in EIAR **Chapter 5 Project Description.** In summary, the Project will consist of the following elements:

- nine wind turbines with a blade tip height of 175m, rotor diameter of 150m and hub height of 100m.
- turbine foundations and crane pad hardstanding areas and associated drainage.
- upgrade of existing site tracks and construction of new site tracks and associated drainage.
- access from the local public road L5302 at Croughta consisting of a new site entrance for the construction phase and upgrade of an existing entrance for the operational phase.
- an on-site 38kV electrical substation to Electricity Supply Board Networks (ESBN) specification to include control building with electrical infrastructure, welfare facilities supplied by rainwater harvesting and storage tank, a wastewater holding tank, car

parking, security fencing and lighting, and all associated infrastructure, services, and site works including a temporary construction compound.

- all associated underground electrical and communications cabling connecting the turbines to the proposed electrical substation.
- a temporary construction compound and associated ancillary infrastructure including welfare services, office accommodation, parking, fencing, lighting, etc.
- areas for temporary storage of excavated materials.
- a permanent meteorological mast of 100m height above ground level on a concrete base.
- installation of 38kV underground electrical cabling, mainly within the public road, between the proposed on-site wind farm substation to the Mallow 110kV substation boundary at St. Joseph's Road, Mallow.
- all associated site works, including site clearance, and ancillary development including site drainage, security gates, fencing, permanent and temporary signage, and biodiversity mitigation and enhancements, including hedgerow planting.

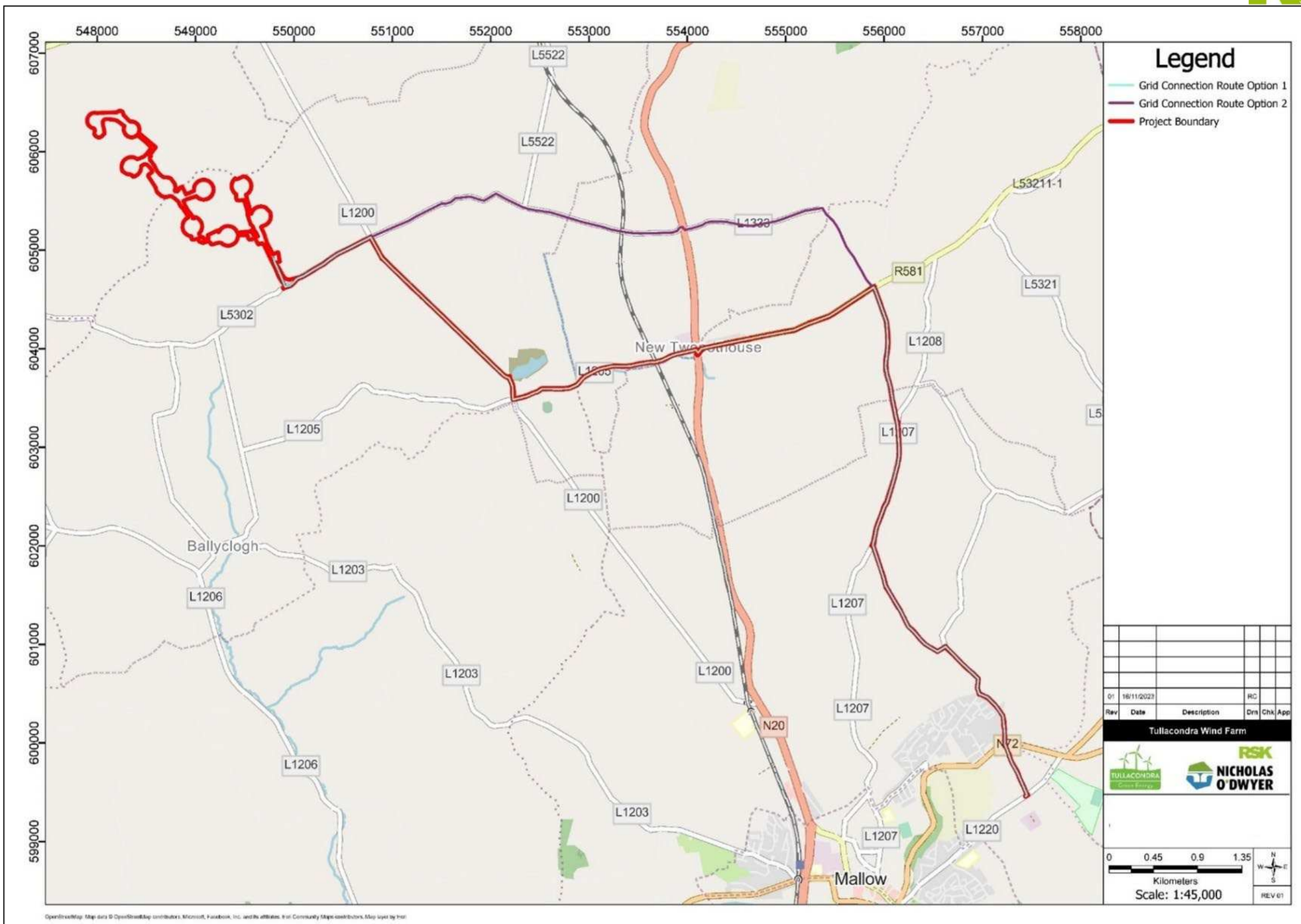


Figure 1: Tullacondra Green Energy Project and Grid Connection Site Location Map

3 MONITORING, ENVIRONMENTAL CLERK AND EMERGENCY RESPONSE PROTOCOLS

Environmental Clerk of Work

To ensure effective implementation of mitigation measures, environmental auditing, and monitoring of environmental obligations of the Developer, an Environmental Clerk of Works (EnvCoW) will be assigned by the Developer to carry out monitoring at the Site during the construction and operational phases of the Project.

The EnvCoW role and monitoring schedule is outlined in the Water Quality Monitoring Plan (WQMP).

Managing & Reporting Environmental Incidents

Environmental incidents including accidental spillages on soils (e.g. fuel), breeches of thresholds (environmental quality standards – TSS exceeding 25mg/l), and significant environmental incidents will be reported to the Local Authority as part of emergency responses to such incidents. Incident notification will be escalated to relevant third parties where relevant e.g. Inland Fisheries Ireland (IFI) if surface water receptors are intercepted.

Emergency Response Protocols

Mitigation will set out to minimise any potential for contaminants to reach sensitive receptors identified during the construction phase of the Project are encompassed in passive management of construction water, however, there remains the risk of accidental spillages and or leaks of contaminants, and excessive loading of surface water mitigation infrastructure.

EnvCoW will monitor the efficacy of mitigation measures applied, and were failing to achieve the objectives set, emergency response and mitigation measures are escalated until such time as the site stabilises and objectives of mitigation are being achieved once more.

Details of these protocols are outlined in the WQMP (**Appendix E** of the CEMP).

4 ENVIRONMENTAL CONSTRAINTS AND MITIGATION MEASURES

The descriptive mitigation measures outlined in this report (section 5 & 6) will be applied to the Project design and construction methodologies with a view to avoiding and/or minimising any potential adverse effects to water quality in the receiving surface water network. The aims and examples of important considerations in relation to mitigation measures described in the EIAR are further clarified here.

The available guidance stipulates varying surface water buffer widths depending on type of activity, receptor type and sensitivity, and riparian zone characteristics including topography (steepness). Recommended surface water buffer widths range from 5m to 50m depending on site specific and activity specific characteristics. For the purposes of this assessment the following conservative approach was applied in EIAR **Chapter 9 Hydrology and Hydrogeology**:

- 50m Surface Water Buffer Zone - Mapped surface water features i.e., mapped streams, rivers, lakes. Source for mapped surface water features; EPA.
- 15m Drainage Buffer Zone - Non-mapped drainage features i.e., non-mapped streams, natural and artificial drainage features, except where the area is crossed at track locations. Source for non-mapped surface water features desk study and aerial photography assessment, Lidar topographic data and field observations. With exceptions where the area is crossed at track locations.
- Due to the cumulative effect of constraints identified by planning, environmental or engineering disciplines, avoiding buffers is not always possible e.g. watercourse crossings. Where this occurs, mitigation is elevated and tailored on a case by case basis where relevant.

Figure 2 presents an identified historic surface water feature which is mapped as 'rising' within close proximity to the Project. This feature, and mentioned previously, is located approximately 90m west of the proposed works. As a precautionary principle a 25m buffer has been prescribed to this feature, as presented in **Figure 3**.

Significant drainage features have been identified and mapped in so far as practical. Such drainage features, while not mapped or prescribed buffer zones in the guidance, will be treated with the same consideration as mapped drainage during the design and construction phase of the Project i.e., mitigating for the potential for drainage connection to receiving surface water network.

Groundwater buffer zones are dependent on the characteristics of the receptor e.g., private well, or public supply source protection zone, and the characteristics of the underlying geology and associated aquifer e.g., poor unproductive aquifer, or regionally important karstified aquifer. Recommended groundwater buffer zones range from e.g., 15m (exclusion zone karst swallow holes) to entire catchments (source protection in regionally important karstified aquifer) depending on site specific characteristics. For the purpose of this assessment the following conservative approach on the buffer distances has been applied:

- 15m Surface Karst Feature Buffer Zone e.g., swallow holes.
- 250m Groundwater Buffer Zone – Groundwater abstraction points in relation to foundations, proposed access tracks and cable trenches. Source for mapped abstraction points: GSI. Not applicable, none within 250m of the site.

- Source Protection Areas – The entire area mapped as a public or group groundwater supply protection area. Source: EPA. This is applicable.
    - Entire Catchment (Karst aquifer) – The entire catchment associated with a public or groundwater supply protection area which is underlain with a karstified aquifer.

None of the proposed works fall within a buffer zone associated with an EPA mapped river. The proposed turbine delivery routes associated widening where required, at watercourse crossings etc. naturally fall within buffer zones associated with mapped streams / rivers. Some of the proposed turbine hardstands, and site access tracks fall within buffer zones associated with existing natural and constructed drainage features at various locations (**Figure 3**). These features pose an elevated risk in terms of connectivity to surface water receptors downstream.

Following site surveys significant natural and artificial drainage features observed which are relatively well connected to the mapped surface water network and/or regional groundwater bodies have been included in considering constraints. Given the extensive drainage network existing at the site the construction activities associated with the Project will invariably be in close proximity to surface water / drainage features, including within the buffer zones such that there will be a requirement for further enhancing and specifying mitigation measures.

Some of the Project footprint will fall within buffer zones due to the unique and limiting circumstances associated with the site and the development. Careful consideration and special attention to planning is required for the identified locations within the surface water buffer zones. Each proposed construction location will possess unique characteristics and will require assessment on a case-by-case basis to ensure adequate measures are implemented. Method statements and the proposed design of any road crossings will also require agreement from Inland Fisheries Ireland (IFI) in advance of construction which invariably must be constructed within the buffer zones. The mitigation measures described in the following sections will also be applied.

Of note in relation to the Grid Connection Route Option 2 is the crossing of the Blackwater (Munster) River_140 (also locally known as Caherduggan South) along the N72 which will be crossed via Horizontal Directional Drilling, and works are assumed to take place outside surface water buffer zones. A launch pit will be constructed within the L53320 public road approximately 18m before the junction with the N72. This location is on the boundary of the Inner Protection of a groundwater source protection area (Ref. Oliver Cross PWS).

The Waters of Life EU Integrated Project initiative, as outlined in EIAR **Chapter 9 Hydrology and Hydrogeology**, aims to reverse the loss of high-status water bodies in the Republic of Ireland. This catchment-based approach aims to use local, tailored, best practices to engage communities in the protection of water bodies in their community. An example of this can be found downstream of the Awbeg river Kilbrin sub-catchment adjacent to the site blue line boundary (BLB).

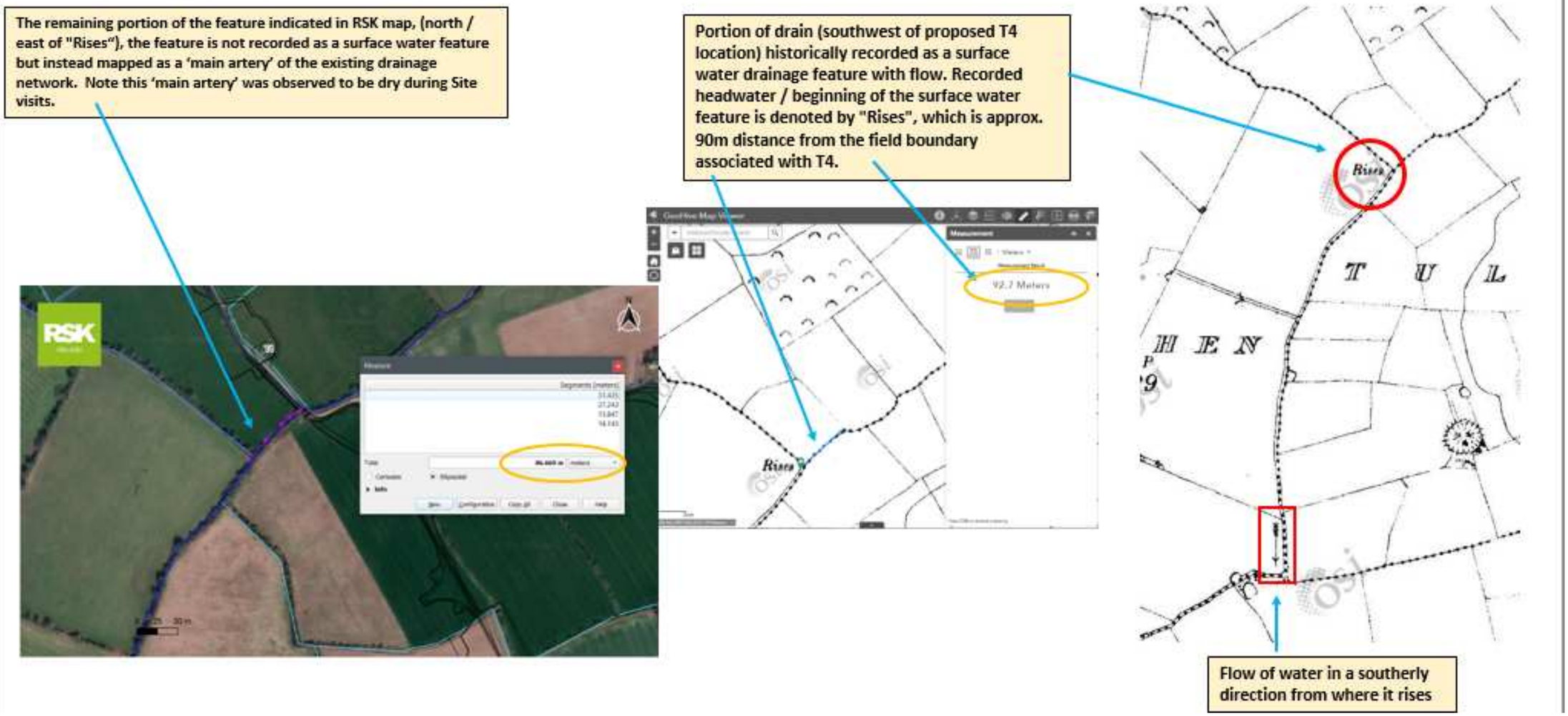


Figure 2: Historic Map

Constraints Wind Farm Map Overview

Legend

Project Information

Hydrogeology

Karst Landforms 40k (GSI)
- Enclosed Depression
- Swallow Hole
- Karst Landforms 25m Buffer

Data Collected on site

Historic Feature
- Historic Quarry

Mapped Drainage

Drains Lables
- Rises
- Flow direction
- Non-Mapped Waterbodies

Non-mapped Drains
- Historic SW
- Indicative Historic SW
- Tertiary
- Secondary
- Primary
- Drainage 15m Buffer
- Non-mapped Waterbodies 15m Buffer
- 25m Buffer Indicative Historic SW

Mapped Well
- Private Wells
- 250m Buffer Private Well

Wind Farm Layout
- Redline Boundary
- Turbines V11
- Met Mast
- Permanent Access Track
- Temporary Access Track
- Turbine Hardstands
- Substation Hardstand
- Temporary Stockpile Areas

Temporary Construction Compound Area
- Temporary Compound
- Temporary Storage
- Truck Wheel Wash
- Site Drainage Layout copy

Constraints

Hydrology

Groundwater Vulnerability 1:40000 (GSI)
- Rock at or near Surface or Karst (X)
- Extreme (E)

Topography
- DEM 5m Contour

Base Layers

Google Satellite

Project ID	604162
Project Name	Tullacondra WF, Co. Cork (TWF)
Projection	ITM
Drawn by	CCa
Reviewed by	CM
Version	10/05/2024

References/Sources
Environmental Protection Agency (EPA)
Geological Survey Ireland (GSI)
Bing Aerial / GeoHive / Open Street Map / Google Roads
Global Digital Elevation Model (GDEM)

RSK

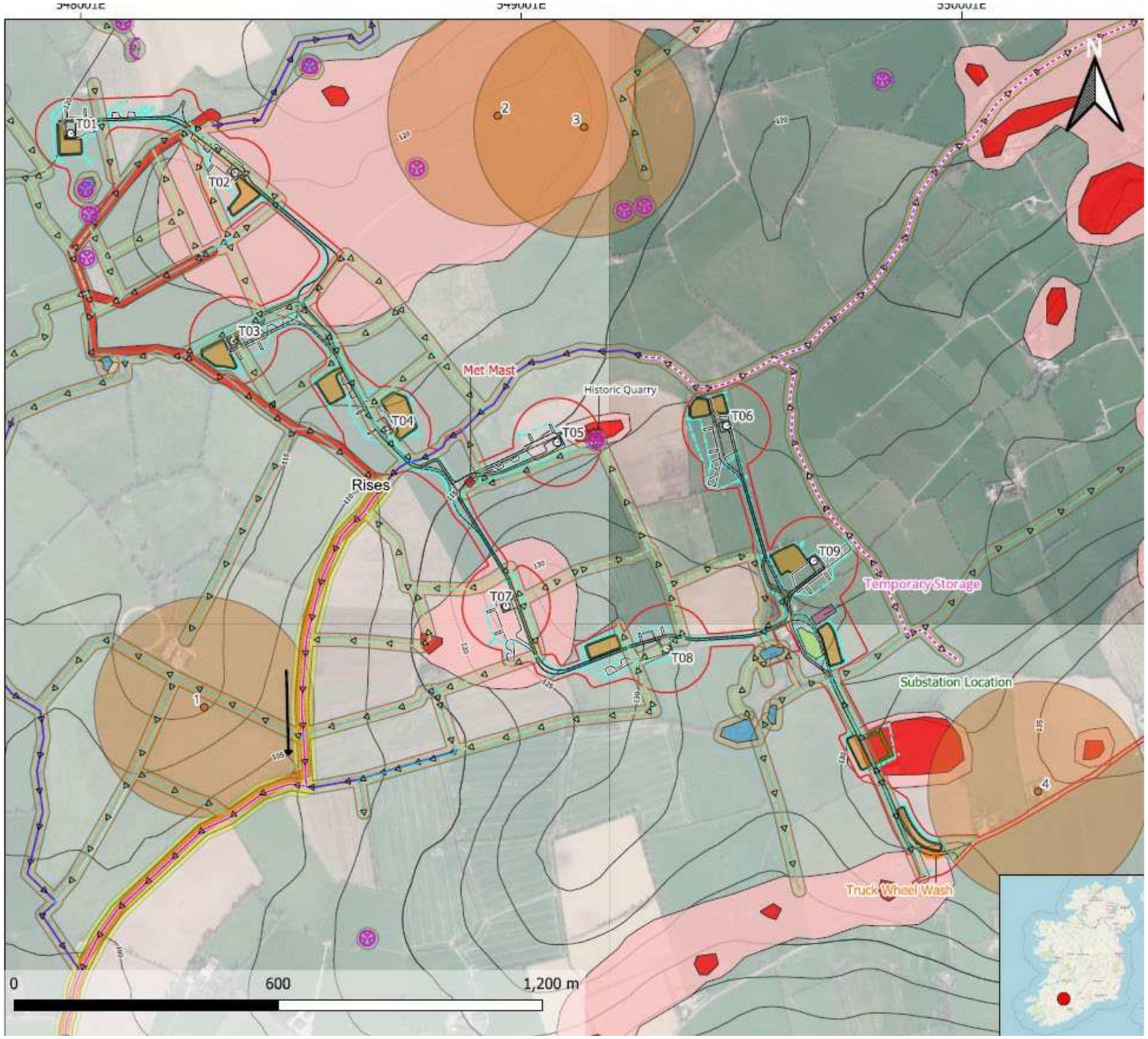


Figure 3: Constraints Overview Map

5 DRAINAGE SYSTEM OVERVIEW

The drainage system has been designed for this Project, considering all constraints outlined in section 4. It aims to ensure the Project does not change the baseline water quality within or downstream of the Site. The drainage system includes the following:

- A 50m buffer from watercourses except at water crossings. These will be marked out prior to works beginning on site.
- Drainage will be installed in parallel with track construction.
- Check dams will be mainly used for track drainage. All track sections will drain to settlement-attenuation ponds.
- Silt fencing will be utilised during water crossings and around stockpiles.
- Settlement-attenuation ponds will be used at every major excavation.

SuDS Drainage Design

Drainage features constructed at a site as part of the wind farm development have the potential to significantly adversely effect on the baseline hydrological regime, particularly in areas in close proximity to karst features, as identified during site visits.

As part of mitigation by avoidance during the design phase of the wind farm, groundwater, surface water, and drainage buffer zones were established where applicable, excluding areas crossed at track locations. Buffer zones are intended to drive the design process by minimising or avoiding the risk to surface water features by restricting construction disturbance to outside these zones, in turn protecting riparian vegetation and providing potential for filtering of runoff from the site and maintaining the baseline hydrological and drainage regime at the site.

Where drainage networks exist, collected / diverted runoff will likely be diverted back into the existing network. In such instances, it is important to include the existing drainage network in designing and specify the treatment train and attenuation features, including improving, modifying, and constructing attenuation features in drainage channels. Similar considerations for newly constructed drainage channels, the modification and/or improvements of existing drainage will be designed with a view to maintaining or improving the hydrological regime at the site.

The drainage design for the proposed site will be such that drains are positioned adjacent to the footprint of the development, therefore the proposed drainage infrastructure can be considered part of the development footprint.

Site surveys identified significant natural and artificial drainage features which are connected to the mapped surface water network and/or regional groundwater bodies, these are outlined as constraints in section 4 and **Figure 3**. The construction activities associated with the Project will invariably be in close proximity to surface water / drainage features, including within the buffer zones such that they will be subject to further enhancement and specific mitigation measures.

There is increased potential for water pollution in these areas, in particular sedimentation to local surface water features due to the excavation and generation of spoil and emplacement of stone materials during the construction phase of the project. To ensure this is reduced and mitigated for Sustainable Drainage Systems (SuDS) will be implemented.

The design criteria for the SuDS design are as follows:

- To select and install ecologically sensitive drainage.
- To minimise alterations to the ambient site hydrology and hydrogeology.
- To provide settlement and treatment controls as close to the site footprint as possible and to replicate the existing hydrological environment of the site.
- To minimise sediment loads resulting from run-off during the construction phase.
- To preserve greenfield runoff rates and volumes.
- To provide settlement ponds to encourage sedimentation and storm water runoff settlement.
- To reduce stormwater runoff velocities throughout the site to prevent scouring and encourage settlement of sediment locally.
- To manage the problems of erosion and allow for the effective revegetation of bare surfaces.
- To control water within the site and allow for the discharge of runoff from the site within the limits prescribed in the Salmonid Regulations

The purpose of incorporating a SuDS design is:

- To provide sufficient detail to ensure that water pollution will not occur as a result of construction activities at the site and to minimise the risk of any such occurrence.
- To regulate the rate of surface water run-off downslope to prevent scouring and to encourage settlement of sediment locally.
- To provide appropriate retention times such that no flooding will occur.
- To provide settlement ponds to encourage sedimentation and storm water runoff settlement.

6 DETAILED DESIGN CONSIDERATIONS

Nature based solutions couple SuDS with ecology and biodiversity mitigation can also provide opportunities to attain net biodiversity gain.

One of the main objectives of Nature Based Solutions and SuDS is to create an array of runoff stilling areas / standing water and promote diffuse discharge and recharge of runoff at the proposed site. The objective of nature-based solutions will be to reverse the effect of the Project where there is the opportunity and where it is appropriate through surveying and risk assessment.

SuDS Design Principles

The approach to treatment and attenuation of storm water is as follows:

- Additional drainage measures will only be added as necessary. The dimensions of these features will avoid intercepting large volumes of water. Any changes to the SWMP must be agreed with the Environmental Manager and the EnvCoW.
- Surface water runoff from the proposed Site Access Tracks will be managed with crossfall downslope to mimic the natural drainage patterns of the Site.
- Drainage vegetation (vegetation including grasses established within a drainage channel can filter runoff water. Living and decomposing plants and roots and associated microorganisms trap sediments and take up excess nutrients used, will be similar in species to the local area and will be approved by the Environmental Clerk of Works.
- Temporary erosion protection together with silt fences may be required (**Figure 4**).
- Tracks will be constructed from aggregate and will not be surfaced with geotextile materials, thus allowing for permeation and helping to reduce runoff volumes. Therefore, a reduced runoff coefficient of 65% is applicable. For hardstands, an open textured stone will be used as these will only be functional during construction of the specific turbine, a higher permeability is envisaged and the run-off co-efficient is reduced to 50%.
- An additional 20% rainfall will be included to allow for a possible increase in rainfall intensity due to climate change.
- Stormwater runoff within the trackside drainage will be treated through the provision of check dams, within a range depending on local slope of the drain as significant levels of sediment are not expected because of the surface dressing of the tracks (**Figure 5**). All trackside drainage will drain to settlement-attenuation ponds (**Figure 6**).
- Discharging directly back into the surrounding area will assist in maintaining the hydrological characteristics of the Site.

- Where vegetation is removed from sloped areas during construction, these areas will be reinstated as early as possible using the same vegetation or similar vegetation as advised by the EnvCoW.
- A sump may be required for trench dewatering. Water will subsequently be pumped into settlement-attenuation ponds or a siltbuster.
- The level of silt runoff during construction will be monitored which is detailed in EIAR **Chapter 9 Hydrology and Hydrogeology** and if found to be excessive of 25 mg/L in any area, will subsequently be managed by the provision of additional silt attenuation features such as silt fences or silt traps.

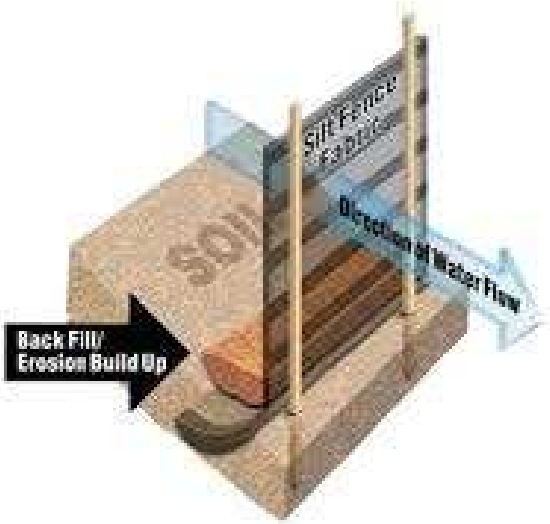


Figure 4: Silt Screen system

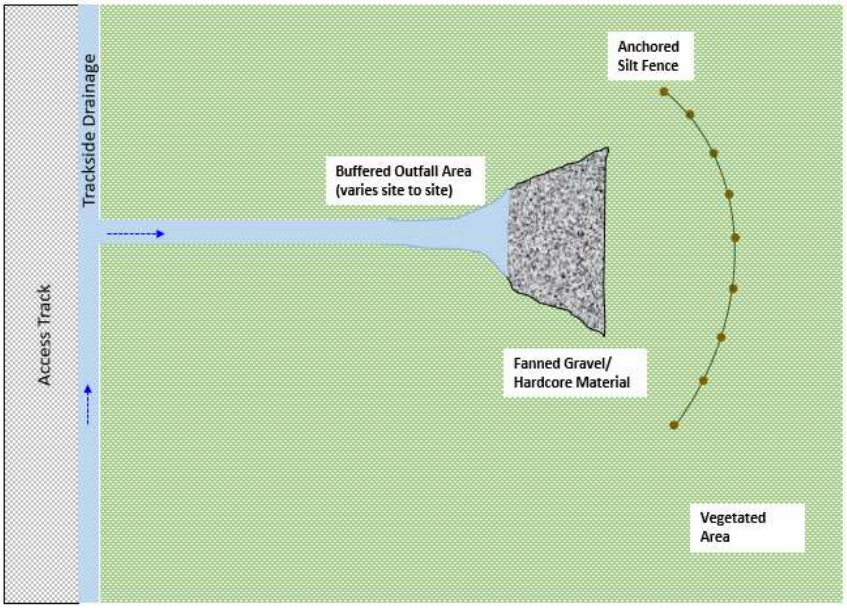


Figure 5: Collector Drains & Buffered Outfalls (dirty water interception ditch)

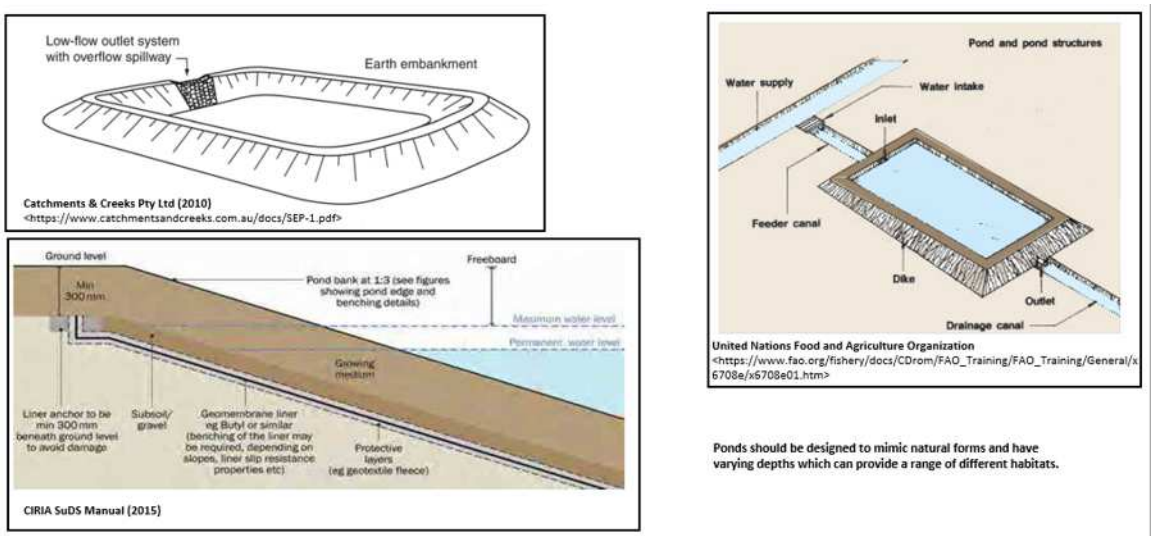


Figure 6: Settlement Ponds

Active Management Treatment Plans

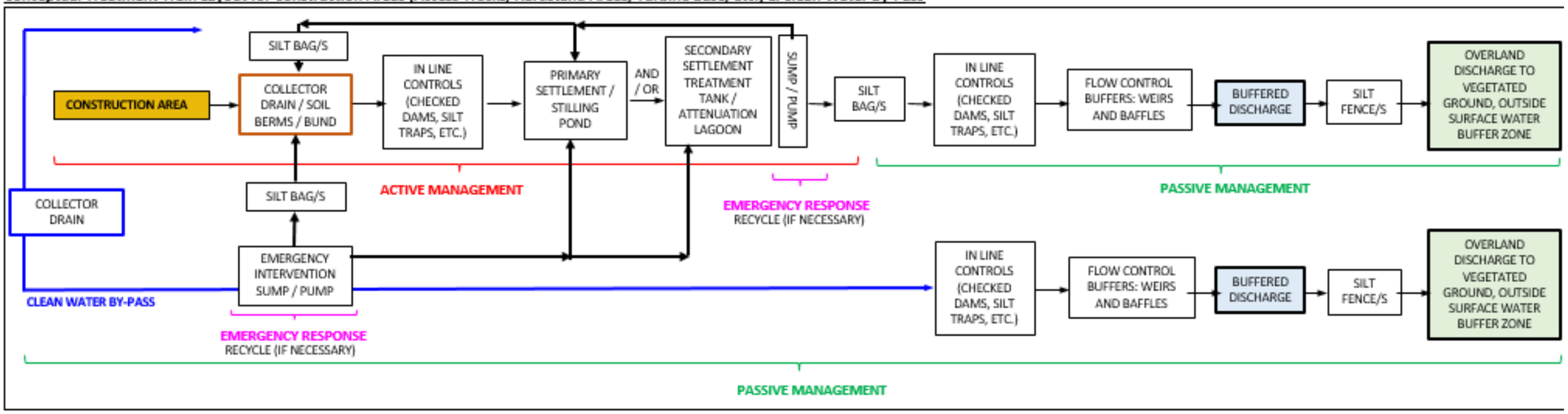
In all instances where construction water, or runoff has the potential to entrain solids during excavation and other construction activities, runoff will be contained by means of temporary berms (lined geotextile of similar), bunds (lined) and sumps. This will be referred to as dewatering. Construction water (contaminated) will be pumped to the treatment train (**Figure 7**).

Pre-excavation, the following activities will be completed; felling of required trees and remove required vegetation from the site, including grass, shrubs, and bushes. Stockpile vegetation in a designated area for later removal or use in the restoration of the site. Remove the topsoil to the required depth to prepare the area for construction. Stockpile the topsoil in a designated area for

later use in the restoration of the site. Remove the subsoil to the required depth to prepare the area for construction.

Contaminated water arising from construction works, namely, excavations, drilling and temporary stockpiling, will be contained and treated prior to release or discharge. The schematic presented here is a conceptual model of measures implemented to manage arisings and runoff (**Figure 8**).

Conceptual Treatment Train Layout for Construction Areas (Access Tracks, Hardstand Areas, Turbine Base, etc.) & Clean Water By-Pass



NOTES:

- Wherever possible, outfalls will be positioned outside of Surface Water Buffer Zones.
- For areas of the development footprint within Surface Water Buffer Zones, in line measures such as silt screens will be over specified e.g. double / triple silt screens, and access to emergency intervention sump / pumps will be facilitated through design and/or emergency response.
- Quality of runoff entering buffer zones will be good i.e. suspended solids <25mg/l. Where runoff quality is poor, emergency response will be to use an intervention sump / pump and pump divert runoff to an area of the drainage network where it will be treated before redistribution and discharge.

Conceptual Treatment Train Layout for Construction Areas & Associated Infrastructure within Surface Water Buffer Zones

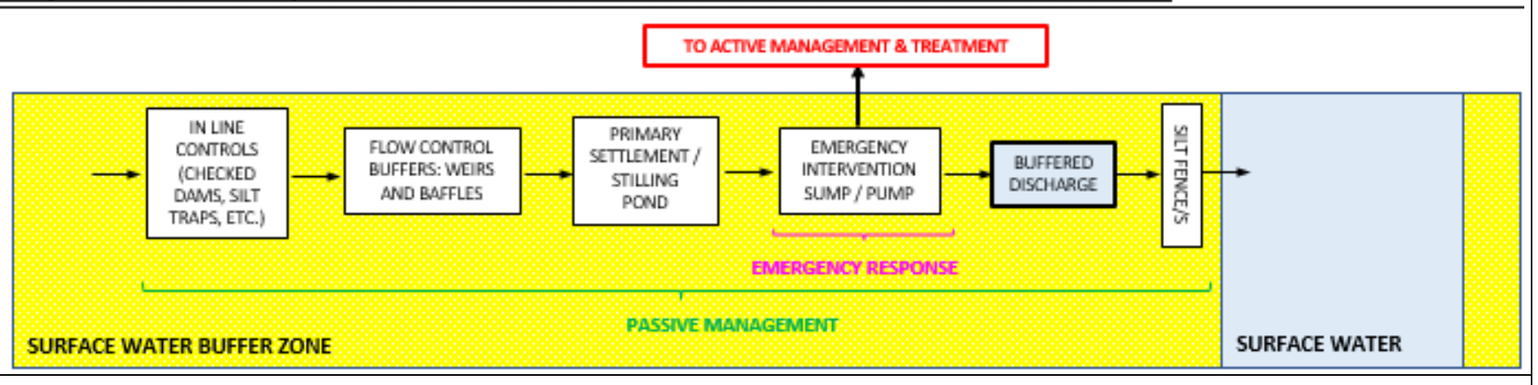


Figure 7: Passive and Active Treatment train flow Diagram

Conceptual Dewatering and Treatment Train Flow Diagram

Contaminated water arising from construction works, namely; excavations and temporary stockpiling, will be contained and treated prior to release or discharge.
The schematic presented here is a conceptual model of measures implemented to manage arisings and runoff.

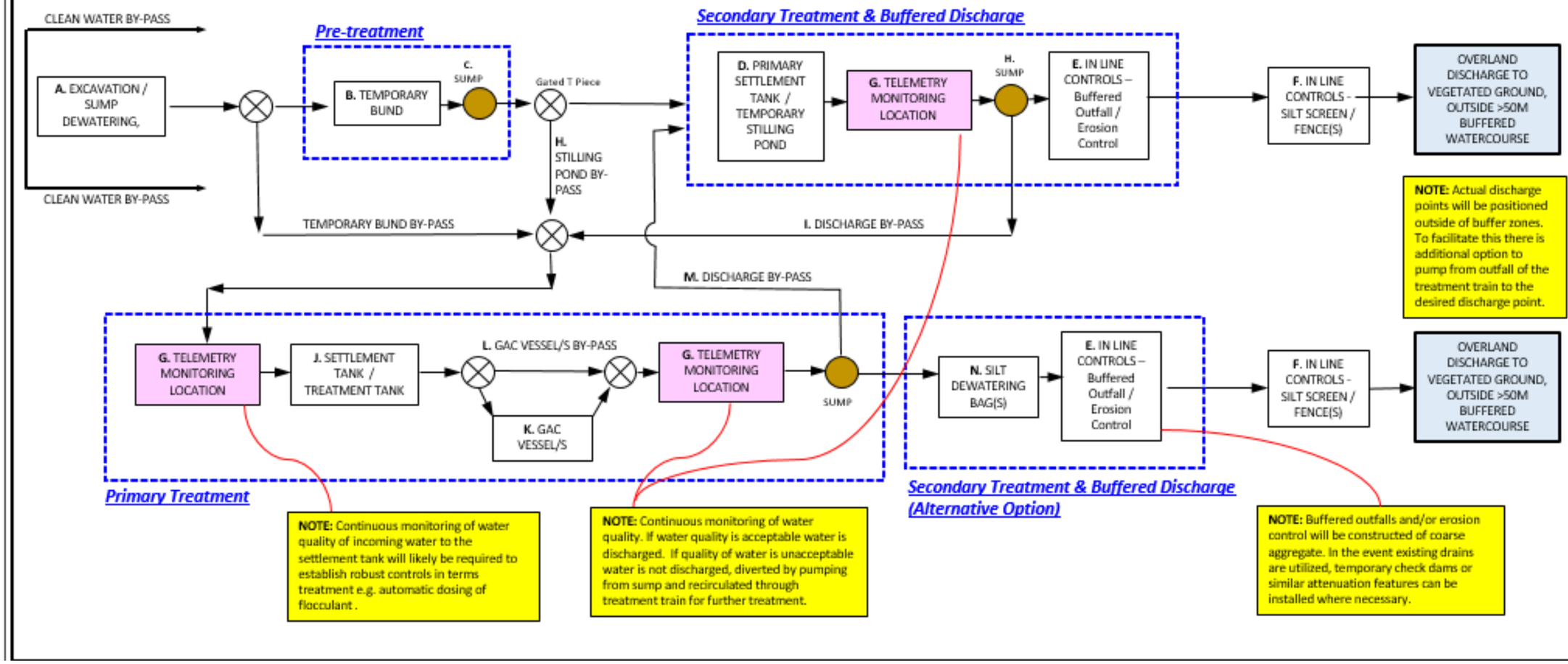


Figure 8: Treatment train flow Diagram

Active Treatment Train of Construction Waters

The following sets out the Active Treatment train for construction waters:

- A. Arisings. Arisings from the launch / reception pit, or any other significant excavation (e.g., cable joint bays), will be directed to the treatment train.
- B. Temporary Bund. Arising control area i.e., a temporary bund. Gross solids will be temporarily deposited here. Water arising with the material will be allowed to drain to sump.
- C. Sump / Pump. Sump will discharge by gravity / pumped to stilling pond.
- D. Temporary Stilling Pond. This can be constructed using soils for bunding in combination with an impermeable liner.
- E. Outfall. The outfall from the stilling pond will be buffered (coarse aggregate) to dissipate energy and diffuse discharging water.
- F. Silt Screen. A silt screen will be in place down gradient of the stilling pond outfall. This is a precautionary measure to mitigate peak loads or surcharges in the system.
- G. Monitoring Location/s. Discharge quality will be monitored in real time using telemetry systems. Monitoring of discharge quality will be carried out at the outfall of the stilling pond i.e., before being actually discharged to surface vegetation or surface water (licenced).
- H. Sump / Pump. Discharge By-Pass. If water discharging from the stilling pond exceeds quality reference limits water will be diverted (pumped) from the stilling pond to the settlement / treatment tank.
- I. Stilling Pond By-Pass. Similar to Discharge By-Pass, if conditions dictate water can be diverted directly to settlement / treatment tank.
- J. Settlement / Treatment Tank. A settlement tank will in line and ready to use if required i.e., water quality at stilling pond outfall fails to meet quality reference limits. The tank will be equipped with treatment systems which will be activated as the need arises, for example, very fine particles which are very slow to settle can be treated with a flocculant agent to promote settlement of particles.
- K. GAC Vessel/s. As a precautionary measure, GAC (Granulated Activated Carbon) vessel/s will be in line and ready to use if required. GAC vessels are used to filter out low concentrations of hydrocarbons. Significant hydrocarbon contamination is only envisaged under accidental circumstances. If a hydrocarbon spill does occur, normal operations will pause and the treatment train will be utilised to remediate captured contaminated runoff.
- L. GAC Vessel By-Pass. If the quality of the water is acceptable in terms of hydrocarbon contamination.

- M. Treated water will be discharge by gravity / pump to the stilling pond for additional clarification, monitoring and buffered discharge to vegetated area.
- N A silt bag can be used as alternative to stilling ponds. However, silt bags must only be used as primary method in lower risk areas i.e., outside of buffer zones, etc. Stilling ponds will be the primary method (D, N) is circumstances where risk is elevated, however a gate vale and silt bag can be included in the treatment train and used as an emergency discharge route in the event that the stilling pond needs remediation or maintenance.

In all instances, stilling ponds (D), silt bags (N) and outfalls (E) will be situated outside of surface water buffer zones. At many locations, works will be within buffer zones. In these instances, waters can be pumped to the treatment train which can be positioned upgradient along the road (grid connection route) where discharge to vegetated areas / roadside drains can be managed.

Discharge of non-contaminated storm runoff to vegetated land within the Site boundary is not a licenced activity however this methodology is possible only under relatively low flow conditions (e.g., <2 litres per second (l/sec) typical of runoff over a relatively small site area. In the event that the expected incoming flow rate or dewatering rate is relatively high (>2 l/sec) a discharge licence will be acquired.

The discharge points will be identified during the licence application process. As discussed previously, the main components of the treatment will be positioned outside of the 50m surface water buffer zone where possible. The developer will identify suitable locations for the establishment of temporary infrastructure considering other variable such as traffic and access management. Similarly, the preferred location of discharge points will be outside of buffer zones and into minor or non-mapped surface water / drainage features where possible. The subject drain will be inspected to ensure connection to the mapped network (not blocked).

The quality of the water being discharged will be monitored. If discharge water quality is poor (e.g., >25mg/l) additional measures will be implemented, for example, pausing works as required and treating construction water by dosing with coagulant to enhance the settlement of finer solids – this can be done in a controlled manner by means of a suitably equipped settlement tank. Collected and treated construction water will be discharged by gravity / pump to a vegetated area of ground within the site, (**Figure 5**). Silt fences will be established at the discharge area to ensure potential residual suspended solids are attenuated and the potential for erosion is reduced, (**Figure 4**). The discharge area will be outside of buffered areas (similar to dewatering of excavations. The quality of water discharged will be in line with licence discharge limits assigned by the local authority and will be monitored in real time (telemetry with 15 min sampling rate), as well as laboratory samples taken, analysed and reported and the frequency indicated in the licence.

7 POST CONSTRUCTION DRAINAGE MANAGEMENT

Following the completion of construction, a full review of construction phase temporary drainage will be undertaken by the appointed Contractor (in conjunction with the Environmental Manager, Site Engineer and the Project EnvCoW), with a view to removing drainage infrastructure that is no longer required during the Project's operational phase.

APPENDIX B – SPOIL MANAGEMENT PLAN

CONTENTS

1. INTRODUCTION

The Tullacondra Green Energy Project is located in County Cork in the townlands indicated in **Table 1**.

Table 1: Townlands and Electoral Districts in which the proposed Project is located

Proposed development	Townlands
Wind energy project inclusive of turbines, site access tracks, substation, and construction compound	Polnareagha and Ardskeagh (Templemary E. D.); and Tullacondra and Croughta, (Kilmaclenine E. D.).
Grid connection route from wind farm site to Mallow 110kV substation	Kilmaclenine, Croughta, Knockaunavaddreen, and Copestown (Kilmaclenine E. D.); Ballybeg (Buttevant E. D.), Baltydaniel East, Twopothouse, and Curraghkerry (Caherduggan E. D.); Ballyviniter Upper, Cloghlucas North, Curraghphadeen, Ballyviniter Middle, Ballyviniter Lower, Parkadallane, Carrigoon More and Carrigoon Beg (Mallow Rural E. D.).

The proposed wind farm is located approximately 2km south of Lisgriffin Cross, Co. Cork. The wind farm site for the proposed Project is located along the L5302 at Croughta and consists primarily of mixed farmland habitat with hedgerows and occasional areas of scrub, ponds and lakes, and man-made drains and ditches. The area in which the turbines will be located ranges in elevation from 133m above Ordnance Datum (AOD) in the south to 120m AOD in the north.

The proposed grid connection includes works in and alongside public roads to install cabling approximately 13.5km to connect the wind farm to the National Grid at the Mallow 110kV substation located in St. Joseph's Road, Mallow. The proposed wind farm site and the route of the proposed grid connection for which planning permission is sought includes a total area of 58.6 hectares (ha).

A detailed description is included in EIAR **Chapter 5 Project Description.** In summary, the Project will consist of the following elements:

- nine wind turbines with a blade tip height of 175m, rotor diameter of 150m and hub height of 100m.
- turbine foundations and crane pad hardstanding areas and associated drainage.
- upgrade of existing site tracks and construction of new site tracks and associated drainage.
- access from the local public road L5302 at Croughta consisting of a new site entrance for the construction phase and upgrade of an existing entrance for the operational phase.
- an on-site 38kV electrical substation to Electricity Supply Board Networks (ESBN) specification to include control building with electrical infrastructure, welfare facilities supplied by rainwater harvesting and storage tank, a wastewater holding

tank, car parking, security fencing and lighting, and all associated infrastructure, services, and site works including a temporary construction compound.

- all associated underground electrical and communications cabling connecting the turbines to the proposed electrical substation.
- a temporary construction compound and associated ancillary infrastructure including welfare services, office accommodation, parking, fencing, lighting, etc.
- areas for temporary storage of excavated materials.
- a permanent meteorological mast of 100m height above ground level on a concrete base.
- installation of 38kV underground electrical cabling, mainly within the public road, between the proposed on-site wind farm substation to the Mallow 110kV substation boundary at St. Joseph's Road, Mallow.
- all associated site works, including site clearance, and ancillary development including site drainage, security gates, fencing, permanent and temporary signage, and biodiversity mitigation and enhancements, including hedgerow planting.

2. PURPOSE OF THE SPOIL MANAGEMENT PLAN

The purpose of this Spoil Management Plan is to describe how it is planned to construct the Project in a manner that is sustainable to ensure the landscape is not adversely impacted as a result of the Project and to ensure that site management practices are carried out to complete the Project safely and in the interest of orderly development.

The plan also sets out a methodology to prevent:

1. Rock or soil excavated during the construction phase from being adversely stockpiled on site following the completion of construction works in areas not suitable for same.
2. Adverse local effects on sensitive habitats.

The ultimate aim is to construct the Project in a sustainable manner that facilitates regeneration of natural habitats at locations affected by construction works and that will minimise the damage incurred on sensitive habitats.

3. SPOIL MANAGEMENT

Site investigations were carried out along the proposed internal access track routes, at each turbine hardstand location and at the substation location. This detailed information allowed a location-specific assessment of ground conditions to be carried out. Based on this information, adjustments to the site infrastructure were carried out. The outcome of identifying all of the environmental, technical and engineering constraints for the site was that an infrastructural layout could be provided in the most sensitive way considering the need for spoil storage.

3.1. Excavated Spoil Management

Spoil will invariably be generated during excavations for access tracks, hardstands, wind turbine foundations, etc. Minimisation of the production of this spoil is to be treated as a high priority, but it is nevertheless accepted that there will be generation of excess spoil in the form of a mixture of topsoil, subsoil and rock.

Excavated material will be stored at predesignated temporary stockpile locations adjacent to construction areas as shown on **Drawing No. 20910-NOD-XX-XX-DR-C-08003** (**Part 2** of the Planning Application Documentation). It will then be reutilised for infill, berm and landscaping purposes such that there will be no stockpiles left at the end of construction. This helps reduce the need for transportation of spoil across large areas and results in a reduced risk of dirty water generation. All earth material excavated from the site will be reserved on site and used in site re-instatement. Once reinstatement is complete the temporary storage sites will be re-vegetated with the “top mat”. This refers to the use of topsoil intended for use in the farmland topsoil spread, to prioritise areas where construction activities were carried out and providing a suitable soil condition for the land owners.

3.2. Excavated Spoil

Owing to the good geotechnical conditions on site the works can be constructed on the existing surface with minimal subsoil excavation in a large number of areas. This cuts down the quantity of spoil generated. In areas of sloping ground there is a need to cut or fill into the ground to facilitate the necessary access track and hardstand gradients. This results in the generation of sizeable volumes of spoil. Foundation excavations will also require excavation to depth. Other areas of construction, the substation for example, will also require the stripping of topsoil as a minimum. All of this infrastructure generates material that contributes towards the total cut spoil volume for the site.

The management of temporary spoil storage areas will involve the following:

- Drainage in the form of interceptor drains has been designed to exclude any clean water runoff reaching spoil storage areas.
- Run off form spoil storage areas will be directed to the dirty water drainage system and will be settled in the treatment train (see the Surface Water Management Plan included as **Appendix A**) prior to discharge from the site.
- Mineral subsoil shall be excavated and stored separately to topsoil; this will prevent mixing of materials and facilitate reuse afterwards.

- All materials which require temporary storage will be stockpiled at low angles (<1 in 5) to ensure their stability and secured using silt fencing where necessary. This will help to mitigate erosion and unnecessary additions of suspended solids to the drainage system.
- If necessary, mineral soils will be covered while stored to minimise run-off.
- Sediment management systems, such as silt fencing, will be provided around the proposed temporary spoil storage areas where necessary.

3.3. Temporary Storage of Excavated Material

No permanent stockpiles will be left on site after the completion of the construction phase works. After completion of the turbine base reinstatement works, all remaining stockpiled materials are to be used on site. It is proposed to use the stockpiled subsoil material to cover up the temporary access tracks and to create berms within the site. It is further proposed to ensure the area upon which top soil is intended for reinstatement includes these covered up temporary access tracks.

Any materials excavated during the construction phase, which are to be used in the site reinstatement and landscaping process shall, in the first instance, be stored on site in an environmentally safe manner in the designated areas (as shown on **Drawing No. 20910-NOD-XX-XX-DR-C-08003** (**Part 2** of the Planning Application Documentation)) that will not result in the pollution of waters or the smothering of ecologically sensitive habitats.

The following principles will be adhered to when considering the temporary storage of excavated materials;

- Spoil will be deposited, in layers of 0.50m and will not exceed the thickness (maximum stockpile height of 2.0m).
- Spoil storage areas were selected to ensure slopes were less than 5 degrees to the horizontal and greater than 10m from the top of a cutting.
- Once reinstatement is complete the temporary storage sites will be re-vegetated with the “top mat”, as described in Section 3.1.
- Upon commencement of the restoration phase, guidance from The Environmental Clerk of Works (EnvCoW) will be sought to confirm the methodology and programme.

3.4. Reinstatement

Reinstatement works will commence at a late stage of construction. However, part of the reinstatement works, such as the completion of a turbine foundation or hardstand can be carried out following the completion of individual sections of work. Ongoing restorative programming facilitates the immediate relocation of material from one turbine base excavation to another completed area and in doing so can limit the requirement for temporary storage of material on site.

Excess stone and spoil which is unsuitable as a vegetation layer shall be placed in the temporary spoil storage areas. Suitable material of sufficient density excavated during the works will be reused in various methods during the construction works. This includes the use of excavated materials in the construction of track side and hardstand surround berms and in finishing off the turbine hardstand areas after construction works, and the

use of excavated subsoil for the backfilling of internal grid routes and the turbine foundations.

3.5. Control Measures

The following generalised control measures will be enforced during construction:

- No storage of excavated material other than in areas selected for such activities; temporary stockpile within the development footprint at proposed areas (maximum stockpile height of 2.0m).
- Exclusion zones delineating the working corridor will be installed around all working areas using post and rope fences. No activity will be permitted past this fence.
- Water build-up in excavations will be avoided.
- Upslope cut-off drains and surround berms will be installed in advance of construction.
- Existing drainage patterns will be maintained as far as is practicable.
- Deviation from the agreed work methodology must be approved by the Environmental Clerk of Works (EnvCoW).
- The site supervisor will suspend work if work practices or weather conditions are unsafe as defined by Met Éireann's weather alert categories. The colour coding used by Met Éireann is fully aligned with international best practice and the European Meteoalarm system (www.meteoalarm.eu):

Alert Category	Description
Yellow	Not unusual weather. Localised danger
Orange	Infrequent. Dangerous / disruptive
Red	Rare. Extremely dangerous / destructive

- Where suitable material is available, it will be used for the immediate backfilling of any excavations following completion of construction at that location.
- Creating a methodology for covering up of the stockpiled materials during high rainfall events in order to minimise run-off.

4. SITE SPECIFIC SPOIL MANAGEMENT PLAN

4.1. Method of Excavation

The general principles of extraction set out in this plan will be adhered to at all times during the construction phase.

4.2. Method of Construction

For the construction phase, the activities that are considered likely to generate spoil are as follows:

- Construction of new and temporary access tracks.
- Temporarily side casting of materials during excavation of drainage channels and construction of berms.
- Excavation and reinstatement areas for spoil.
- Excavations for turbine bases, crane hardstands, substation, meteorological mast and the temporary site construction compounds.

Prior to the commencement of construction work on the required infrastructure above, the following will be considered:

- Existing ground profile.
- Existing ground soil type.
- Bearing capacity of required access tracks, turbine bases and hardstands.
- Existing natural drainage regimes on site.
- Proposed turbine manufacturer assembly and transport delivery specifications.
- Environmental buffer areas and zones.

4.2.1. Excavated Infrastructure

New tracks and hardstands will generally be constructed using imported stone aggregate obtained from local quarries and placed over a layer of geogrid. Where large cuts are required a limited amount of stone will be generated that can be reused in construction. A similar approach will be taken for other infrastructure required for the project.

Typically, the sequence of constructing new access tracks and hardstands will comprise the following:

I. The appointed contractor will survey the area for any unforeseen hazards prior to the commencement of works and set up warning signage as appropriate.

II. Excavators will first remove any topsoil / vegetative layer which may be present if deemed required. Hardstands and tracks will be constructed on grade where possible. This topsoil material will be transported to the temporary storage area and maintained for re-use during the restoration phase of the wind farm construction. Material to be reused will generally be kept adjacent to the location

for reuse where possible. The footprint of the topsoil / vegetation removal areas will be kept to a minimum in order to minimise spoil generation and to prevent any runoff of silt during heavy rainfall.

III. Excavators will continue to strip and excavate the softer subsoil where required which will be temporarily stored in the designated areas in accordance with approved methods with the use of an articulated dumper truck. Excavated material will only be temporarily stored on slopes not steeper than 1 in 5 and to a maximum height of under 2.0m at the required setback from streams at the selected temporary spoil storage areas where they will either be reused for construction activities immediately or be stored until the need to reuse the material arises.

IV. All excavations to be carried out will be battered back to a safe angle of repose.

V. Once a section of the excavated infrastructure is exposed to formation, a layer of geogrid will be laid out which will be covered with imported aggregate stone as required.

VI. The stone will be delivered to the required work area and spread out locally with the use of excavators and compacted with the use of a roller which will roll the stone aggregate in maximum 250mm layers on top of the geogrid / geotextile material in order to achieve the required design strength.

VII. Drainage as shown on **Drawing No. 20910-NOD-XX-XX-DR-C-08004** to **Drawing No. 20910-NOD-XX-XX-DR-C-08010** (**Part 2** of the Planning Application Documentation), will be constructed to manage clean and dirty water runoff in sensitive areas. Additional care will be taken during any construction works adjacent to the existing stilling ponds within the site.

VIII. The final running surface of the new excavated access tracks will be capped with a layer of hard-wearing Cl 804 stone material or similar using a road grader.

IX. Any surplus spoil material generated from the excavated infrastructure will be transported back to the temporary spoil storage areas. Excavated topsoil and subsoil will be kept separate at the excavation and storage areas.

X. The appointed contractor will ensure that on-site personnel are aware of environmental constraints / sensitive areas within the wind farm site in which works are to be avoided.

4.3. Reuse of Stockpiled Materials

The excavated topsoil is intended to be permanently deposited on the site. It will be used for surface reinstatement of excavated areas infilled following construction and coverage of trackside berms. Any balance will be spread on farmland within the Project boundary at a depth of up to 150mm. This will ensure no loss of topsoil material for the landowners.

Prior to the use of areas for storage, clean water drain will first be excavated upslope, to intercept existing greenfield flow. Storage area will be picked up by dirty water drain and discharged into a river via stilling ponds. Dirty water arising from construction phase will be conveyed and transferred into a settlement pond prior to discharge via a buffered outfall.

Inspections of the storage areas will be made by a geotechnical engineer through regular monitoring of the works. The appointed contractor will review work practices at spoil temporary spoil storage areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated.

The surface of the deposited spoil will be profiled to a gradient not exceeding 1 in 5 and vegetated naturally.

It is currently estimated that the quantity of excavated material, when bulked up, due to site clearance and preparation of foundations, access tracks and substation will be approximately **56,278m³** of topsoil**, 39,154m³** of subsoil and **530m³** of rock.

Majority of topsoil excavated material will be reused (**56,063m³**). Used as Type 5A, 5B or 5C material, utilised in the vicinity of turbines locations, finishes areas and at turbine hardstand areas. Also used as a backfill to the internal grid route. Having said this, it won't be used for access track construction, where suitable soil bearing capacity is required.

Same as for topsoil excavated material, majority subsoil excavated material will also be reused (**38,722m³**). Utilised as Type 4 material for the construction of access trackside berms and hardstand areas and backfill for internal grid routes. This material can also be used at wind turbine foundations (optional, subject to satisfactory ground conditions).

Rock aggregate excavated material of **530m³** will be reused at hardstanding areas, predominantly to support access track foundations.

The surplus spoil material is proposed to be stored at 10 stockpile locations during construction. The balance of surplus material will used on site for landscaping purposes.

The location of the stockpile areas is shown in **Table 2** together with the estimated percentage breakdown of surplus material at each location.

A summary of the spoil storage distribution is shown in **Table 2** below.

Table 2 Spoil Storage Volumes

Location	Storage capacity (m^3)	Stockpile distribution proportions
Near T1	3,456	8%
Near T2	3,806	8%
Near T3	4,377	10%
Near T4	11,024	24%
Near T6	4,054	9%
Near T8	3,393	8%
Near T9	4,987	11%
Near Compound	4,004	9%
Near Substation	2,833	6%
Near Site entrance	3,138	7%
Total	45,072	100

4.4. Role of Environmental Clerk of Works (EnvCoW)

An EnvCoW will be appointed for the construction phase of the Project. As part of this role the EnvCoW will conduct the following works in relation to surplus spoil management:

- Demarcate ecological constraints on the working areas and route corridors, in consultation with the Geotechnical/Civil Designer as necessary.
- Agree proposals for temporarily side casting and temporary storage areas as development proceeds.
- Agree methodology for stripping existing vegetation and locations where material is to be deposited.
- Agree timing of restoration and reinstatement of access track sides.
- Issue instruction to cease work if unexpected risks arise, until an agreed alternative solution is identified, and risks are avoided or minimised.

5. CONCLUSION

Spoil will be reused or stored locally on a temporary basis to its point of generation, reducing the impact of long-haul routes. No peat is present on site and all of the excavated spoil will be reused. Sufficient temporary storage areas are provided for material that are intended for reuse in a later phase of the Project. Excavated material will be used for reinstatement of excavated areas infilled following construction.

APPENDIX C – SUMMARY OF MITIGATION MEASURES

CONTENTS

1. INTRODUCTION

This is a summary of the mitigation which will be implemented during the construction phase of the Tullacondra Green Energy Project (the Project) in Co. Cork. All mitigation and monitoring measures relating to the construction phase of the Project are also set out in the relevant chapters of the Environmental Impact Assessment Report (EIAR). The mitigation measures have been grouped together according to their environmental field/topic and are presented under the following headings:

- Biodiversity
- Ornithology
- Hydrology and Hydrogeology
- Land, Soils, and Geology
- Material Assets
- Shadow flicker
- Noise and Vibration
- Landscape and Visual
- Archaeology and Cultural Heritage
- Traffic and Transport
- Air Quality
- Climate

A Construction Environmental Management Plan (CEMP) has been prepared for the Project which sets out the key environmental management measures associated with construction of the proposed development, to ensure that the environment is protected, and any potential effects are minimised. The CEMP includes an Emergency Response Plan, Spoil Management Plan, Surface Water Management Plan, Water Quality Management Plan and a Resource and Waste Management Plan. A separate Construction Traffic Management Plan (CTMP) has been prepared and is included in EIAR **Volume III, Appendix 5.2**.

An Environmental Manager / Ecological Clerk of Works (EnvCoW/ECoW) with appropriate experience will be appointed for the duration of the construction phase to oversee the implementation of the CEMP.

It is intended that the CEMP will be updated where required prior to the commencement of construction to include all mitigations and monitoring measures, conditions and or alterations to the EIAR and application documents should they emerge during the course of the planning process and will be submitted to the Planning Authority for written approval.

2. SUMMARY TABLE OF MITIGATION MEASURES

Ref No.	Reference Heading	Reference Location	Mitigation Measure
EIAR Chapter 5 –Project Description			
Construction Phase			
MM1	**Environmental Management of Construction Activities**	**5.3.1.1**	• A CEMP has been prepared for the proposed development and is included in EIAR **Volume III, Appendix 5.1** of this EIAR. The CEMP sets out the key environmental management measures associated with the construction of the proposed development, to ensure that during these phases of the Project, the environment is protected, and any potential effects are minimised. A separate CTMP has been prepared and is included in EIAR **Volume III, Appendix 5.2** of this EIAR. • The final CEMP and CTMP will be developed further upon planning approval, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned.
MM2	**Refuelling**	**5.3.1.2**	• Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. For vehicles that require refuelling onsite, a limited amount of fuel will be stored on site in the temporary construction compounds and bunded to at least 110% of the storage capacity of fuels to be stored. On-site refuelling of machinery will be carried out at dedicated refuelling locations a minimum distance of 50m from watercourses using a mobile double skinned fuel bowser. The fuel bowser, a custom-built refuelling trailer or similar will be re-filled on site by the local supplier by means of a fuel truck or similar and will be towed to refuelling locations by a 4x4 jeep to where machinery is located. The 4x4 jeep will be equipped with a drip tray, spill kits and fuel absorbent pads in case of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use. Only designated competent operatives will be authorised to refuel plant on site.
MM3	**Concrete Management**	**5.3.1.3**	• Concrete will be delivered from local batching plants in sealed concrete delivery trucks, as required.

Ref No.	Reference Heading	Reference Location	Mitigation Measure

			• When concrete is delivered to site, only the chute of the delivery truck will be cleaned in a dedicated bunded area, using the smallest volume of water necessary, before leaving the site. Concrete trucks will then exit the site and return to the supply plant to wash out the mixer itself.
			• The concrete pours at the turbine locations will be planned in advance and proposed mitigation measures are detailed in EIAR **Chapter 9: Hydrology and Hydrogeology** and are summarised as follows:
			  ○ Using weather forecasting to assist in planning large concrete pours, and avoiding large pours where prolonged periods of heavy rain is forecast.
			  ○ Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
			  ○ Only the chutes will be cleaned prior to departure from site, and this will take place at a designated area at the temporary construction compound. The contents will be allowed to settle, and the supernatant will be removed off site by licenced contractor.

MM4	**Dust Suppression**	**5.3.1.4**	• In periods of extended dry weather, dust suppression may be required to ensure dust does not cause a nuisance. If necessary, damping down of site compounds will be undertaken to prevent the generation of dust. • To reduce mud and debris from getting onto the local road network, a wheel wash facility will be employed at exiting points on-site which will wash mud and debris from vehicles egressing the site.
MM5	**Traffic Management**	**5.3.1.5**	• Traffic management at the site will be coordinated by an appointed Traffic Manager for the duration of the construction phase of the proposed development. • A pre-condition survey will be carried out on all public roads that will be used in connection with the development to record the condition of the public roads in advance of construction commencing. • A post construction survey will also be carried out after the works are completed. • All roads will be reinstated in a timely manner upon completion of the construction works.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Letter drops will be carried out to notify members of the public living near the proposed works to advise them of any particular upcoming traffic related matters. Clear signage relating to the development, both temporary and permanent, will be provided for accessing the site. • The entrances to the site will be secured when the site is not in use. • When necessary, a flagman will be used to assist traffic movements at the site entrance or in other areas as required. • For the grid connection construction, cable trenching will be carried out with the aid of either lane closures or road closures, which will ensure that the trenching works are completed as expeditiously as possible. • Road closures will be applied for by the appointed contractor and will outline local diversions whilst maintaining local access at all times for residents, farms and businesses, and restrictions during school drop off and collection times, where applicable. • Road closures will be subject to the applicable statutory processes as implemented by the Local Roads Authority. 'Rolling road closures' will be implemented, whereby the works will progress each day along a road, which will have the effect of reducing the impact for local residents. • A traffic management plan for the cable trenching will be adopted, in consultation with Cork County Council, to provide a safe environment for road users and construction workers. • Turbine delivery will require the transportation of abnormal loads. This will be undertaken at off-peak times under agreement with the local authority and An Garda Síochána and in accordance with the Abnormal Load Permit. • A Construction Traffic Management Plan (CTMP) has been prepared for the Project and is presented in EIAR **Volume III, Appendix 5.2** of the EIAR. In the event planning permission is granted for the proposed development, the final CTMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned.
MM6	**Spoil Management**	**5.3.1.6**	• Any soil excavated for the construction of site tracks within the site will be re-used on site in berms and for landscaping purposes associated with the Habitat Management Plan (EIAR **Volume III, Appendix 7.3**) and along the margins of the site tracks.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Any soil excavated for the construction of site tracks within the site will be re-used on site in berms and for landscaping purposes associated with the Habitat Management Plan (EIAR **Volume III, Appendix 7.3**) and along the margins of the site tracks. • Berms will be created from suitable excavated material and located on the opposite side of infrastructure to any interceptor drains. The berms will therefore not obstruct flow or risk siltation to interceptor drains. • Berms will be placed outside the roadside drains which drain the new site tracks. • Further details related to management of soil during the construction phase can be found in EIAR **Chapter 10 Soils and Geology** and within the CEMP in EIAR **Volume III, Appendix 5.1**. • Spoil arisings during construction works will be stored at a height of maximum 2m and a minimum of 25m from watercourses. In addition to a minimum buffer distance, silt fences will be placed between the spoil storage areas and significant water crossings to prevent silt from entering the drains during construction. These temporary spoil mounds will have side slopes battered back to 1:1 and will be covered when left for extended periods of time. • Following completion of construction, all plant and machinery will be removed from the site. The temporary works/assembly areas needed for the construction period will be reinstated using the original spoil material removed and stockpiled close to the location from where it was excavated as explained in EIAR **Chapter 7 Biodiversity** and EIAR **Chapter 10 Soils and Geology**.
MM7	**Waste Management**	**5.3.1.7**	• A Resource and Waste Management Plan (RWMP) has been prepared for the Project and is presented in EIAR **Volume III, Appendix 5.1**. The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each phase of construction of the proposed development. Disposal of waste will be a last resort. • The developer, in conjunction with appointed contractor, will reduce, reuse and recover as much of the waste generated on site as practicable and ensure the appropriate transport and disposal of residual waste off site to licensed facilities. This is in line with the relevant National Waste Management Guidelines and the European Waste Management Hierarchy, as enshrined in

Ref No.	Reference Heading	Reference Location	Mitigation Measure

			the Waste Management Act 1996, as amended, and circular economy principles.
			• Prior to the commencement of the development, a construction Waste Manager will be appointed by the contractor. The role of the waste manager will be to record, oversee and manage everyday handling of waste on the site. The waste manager or delegate will record the following:
			  ○ Waste taken for reuse off-site.
			  ○ Waste taken for recycling.
			  ○ Waste taken for disposal.
			  ○ Reclaimed waste materials brought on-site for reuse.
			• Wastewater from the staff welfare facilities will be collected in a sealed storage tank. All wastewater will be tankered off-site by an authorised waste collector to a wastewater treatment plant.

NM8	**Monitoring**	**5.3.2**	• The baseline monitoring undertaken at the site will be repeated periodically before, during and after the construction phase to monitor any deviations from baseline water quality that occur at the site. • During the construction phase, daily inspection of silt traps, buffered outfalls and drainage channels and daily measurement of total suspended solids, electrical conductivity, and pH at selected water monitoring locations on the site (locations close to active working zones). Monitoring of same during times when excavations are being dewatered (likely high in solids) will be completed. Physiochemical properties will be monitored at baseline sampling locations and thresholds established in line with water quality reference concentrations/limits which will be set using relevant instruments for example, Surface Water Quality Regulations, <25mg/l Total Suspended Solids (TSS). • Site water runoff quality at all surface water monitoring locations will be monitored on a continuous basis during the construction phase of the development. • Continuous monitoring at downstream baseline surface water monitoring locations will be carried out during the construction phase. • During the construction phase of the Project, the development areas will be monitored daily for evidence of groundwater seepage, which presents as water ponding and wetting of previously dry spots, and visual monitoring of the

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			effectiveness of the constructed drainage and attenuation system so that it does not become blocked, eroded or damaged during the construction process. • During the construction phase of the Project, the development areas and adjacent receiving drainage systems will be monitored daily for evidence of erosion and other adverse effects to natural drainage channels and existing degraded areas whereby soils/subsoils are exposed and prone to enhanced degradation. • During the construction phase of the Project watercourse crossings will be monitored frequently (daily during construction phase). The water course crossings will be monitored in terms of structural integrity and in terms of their effect on respective watercourses. • Monitoring will be carried out at each significant construction location along the GCR (HDD, any excavation >2.0m) and at significant environmental receptors including the following Environmental Monitoring Locations: ○ Upstream and downstream of surface water crossings on mapped rivers. ○ Groundwater abstraction points within buffer zones (mapped wells, source protection areas, and/or associated Regionally Important Karst Aquifer). ○ Similar to the wind farm site baseline monitoring, baseline surface water samples will be obtained at upstream and downstream sampling locations at each significant construction location over mapped rivers. Baseline surface water samples will be obtained at accessible locations such as existing bridges on public roads. Where upstream access is poor, the upstream baseline sampling location will be directly/immediately upstream of the construction location (e.g., existing bridge / culvert). ○ At construction areas requiring drilling (HDD) and/or significant excavations (launch pits, cable joint bays), and in the management of general excavations, arisings will be managed carefully with a view to containing and treating all drained water and runoff which will likely be laden with suspended solids. Active continuous monitoring will be required at these locations. The monitoring location will be at the outfall or discharge point of the treatment train at any respective location.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• A Geotechnical Clerk of Works will be employed during the construction phase to monitor excavation activities, to verify that safety standards are being met and monitor for any potential stability issues, particularly in areas of deeper excavations, and areas with the potential to encounter weathered limestone or karst features. • All major sub-surface groundworks associated with the Project (as identified in EIAR **Chapter 15 Archaeology and Cultural Heritage**), buffer zones will be fenced off and will be subject to a programme of archaeological monitoring. • Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations and duration (including baseline monitoring) with the local authority.
MM9	**Working hours for construction**	**5.3.3**	• Working hours for construction will generally be from 07:00 to 19:00 on weekdays, with reduced working hours from 08:00 to 14:00 on a Saturday. It should be noted that it may be necessary to commence turbine base concrete pours earlier due to time constraints incurred by the concrete curing process. Also, turbine deliveries will generally be early morning working hours.
EIAR Chapter 6 – Population and Human Health - No specific mitigation measures required			
EIAR Chapter 7 – Biodiversity			
Pre-Commencement Phase			
MM11	**Ecological Clerk of Works (ECoW)**	**7.8.3**	• An Ecological Clerk of Works (ECoW) will be appointed to address issues relating to ecological features during the construction and decommissioning phases, as described within the CEMP. ○ Undertaking pre-construction surveys to ensure that significant effects to ecological features will be avoided. ○ Inform and educate site personnel of sensitive ecological features within the Project site and how effects on these features could occur. ○ Oversee management of ecological issues during the construction and decommissioning period and advise on ecological issues as they arise. ○ Provide guidance to contractors to ensure legal compliance with respect to protected habitats and species on site.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			○ Liaise with officers from consenting authorities and other relevant bodies and contractors with regular updates in relation to construction and/or decommissioning progress.
Construction Phase			
MM12	**Hedgerow loss mitigation**	**7.10.3**	• Replacement hedgerow habitat will be created in proportion with the type and extent of habitat loss during construction. Hedgerows that will be temporarily lost in order to facilitate construction works will be reinstated on a like-for-like basis in the same location, where they fall outside of the proposed bat buffers. In total, this amounts to the reinstatement of 20m of hedgerows where temporary losses will occur. Where new gaps in hedgerows need to be created in order to facilitate permanent site access then existing gaps within those hedgerows, which are present to facilitate farm access, will be planted in order to minimise potential fragmentation effects. This equates to approximately 15m of replacement hedgerow planting. • In areas where hedgerows cannot be reinstated (i.e., due to permanent works or around bat buffer zones) then they will be created elsewhere within the site. To accommodate the Project, 411m of hedgerows will be permanently lost, primarily due to avoiding reinstating in-situ those hedgerows that need to be removed to accommodate temporary works, where they fall within bat buffer areas and where in the interest of road safety sight lines need to be maintained at the site entrance. To offset for these losses an additional 2,911m of new hedgerow will be planted across the site, which represents a significant increase in hedgerow habitat, over and above the extent of which will be affected, and an overall net gain for biodiversity. • Planting is proposed to be distributed across the site in areas where potential enhancement will provide significant benefits to the heterogeneity of the area, and improve connectivity to bat foraging, commuting, and roosting areas along other hedgerows and woodlands off-site. Planting will ensure that collision risk to bats does not increase by strategically placing these newly created habitats away from turbines. Hedgerow planting will be arranged following single row and double row planting methodologies, utilising old field boundaries wherever possible and incorporating hedgerow trees to offset the small losses of some tree habitat. The proposals and management of this is detailed within the HMP

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			which additionally describes the monitoring techniques to ensure this habitat remains viable (see EIAR **Volume III, Appendix 7.3**).
MM13	**Habitat creation and enhancements**	**7.10.6.1**	• Hedgerow planting and enhancement to provide additional nesting, foraging, and commuting habitats for a range of species, namely pygmy shrew, hedgehogs, bats, birds, and badgers. Proposals will position hedgerows in a way that will create commuting corridors for bats that will decrease the risk of collisions with turbines. Planting will use native plant species of known value to wildlife, whilst rotational management regimes will be adopted to newly planted and existing hedgerows to create varying age structures which will be favoured by different species and at different times of the year. • Woodland planting and enhancement to further provide additional nesting, foraging, and commuting habitats. Planting will take place in three areas along the peripheries of the site and will incorporate a varying mosaic of different species and age structures, using native species of known value to the local ecology. Management will include rotational coppicing as well as the creation of glades and rides to benefit butterfly and other invertebrate species. • Wildflower meadow creation to improve the botanical diversity of the site as well as increasing available habitat for invertebrate species. Two areas are proposed with one being in the area of improved grassland just south of the woodland in the north and the other in the vicinity of the proposed substation toward the south of the site. • Scrub enhancement will aim to improve current condition of the scrub to be more beneficial for wildlife by varying the age structure and developing the ground flora. This will be done through the provision of coppicing, natural regeneration, grazing management, and bracken control. • Wet grassland management to improve botanical diversity and provide further foraging and breeding habitat for species such as butterflies and other invertebrates. It is proposed that the two areas of wet grassland will be expanded into one larger area that will be fenced off to reduce grazing pressure. • Enhancement of existing ponds. Enhancement of two existing waterbodies on site will include eutrophication management, botanical planting, invasive species management, and the creation of a bund to prevent nutrient enrichment from the surrounding agricultural landscape. Open canopy farmland

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			ponds dominated by aquatic macrophytes are known to be positively associated with many species, such as invertebrates, birds, and mammal species. • Field margin development adjacent to boundary features such as hedgerows and ditches to provide nesting, foraging, and sheltering habitat and to improve habitat connectivity. Flower-rich margins typically support a more diverse invertebrate assemblage, providing food for a range of species. • Bee bank creation (i.e., sand banks) in two locations to provide additional habitat for the buff mining bee, which was recorded to be present on site. • Bee pole provision to provide additional habitat for the buff mining bee and other solitary insects. Bee poles will be erected in a number of locations within the site adjacent to suitable habitat for invertebrates such as bee banks, wildflower meadows, and ponds. • Bat box provision throughout both pockets of existing woodland to increase roosting habitat for bat species. Bat boxes will be positioned sensitively so as to avoid increasing the risk of collisions with turbines. • Habitat piles (collection of logs and dead wood) will be incorporated into quiet and varied habitats in the site to offer refuge for hedgehogs, hibernating reptiles, and amphibians, as well as deadwood specialist insects. Wherever possible, they will be created using any logs generated from vegetation clearance to reduce waste. • Tree planting will involve planting a line of native trees around the peripheries of the proposed new substation. • Invasive Non-Native Species (INNS) management will involve the control of Japanese knotweed in the southern section of the. A further site visit in advance of the pre-construction phase will be undertaken to map Japanese knotweed and any other invasive species that may have spread into new areas since the baseline surveys were conducted, which will inform an appropriate management strategy. On most occasions, a herbicide (Glyphosate) will be used as it is relatively low cost and does not involve the removal of hazardous waste from the site.
EIAR Chapter 8 – Ornithology			
Pre-Commencement Phase			

Ref No.	Reference Heading	Reference Location	Mitigation Measure
MM18	**Ecological Clerk of Works (ECoW)**	**8.8.4**	An Ecological Clerk of Works (ECoW) will be appointed to address issues relating to birds and other sensitive habitats and species. Their responsibilities will include, but not be limited to: • Undertake a pre-construction walkover survey to ensure that significant effects on breeding and non-breeding birds will be avoided. • Undertake nesting bird checks on any vegetation that needs to be removed within the breeding season. • Inform and educate site personnel of sensitive ornithological features within the Project site and how effects on these features could occur. • Oversee management of ornithological issues during the construction and decommissioning period and advise on ornithological issues as they arise. • Provide guidance to contractors to ensure legal compliance with respect to protected bird species on site. • Liaise with officers from consenting authorities and other relevant bodies and contractors with regular updates in relation to construction and/or decommissioning progress.
Construction Phase			
MM19	**Habitat Protection**	**8.10.2**	• Retainment of areas of more important habitat within the landscape design (*e.g.*, waterbodies and woodland). • Minimisation of the extent of habitat loss during construction as much as is possible within the development design. • Selection of delivery routes which use existing built infrastructure wherever possible, with laying of cables underground. • Presence of an ECoW on site to oversee any ornithological issues during construction.
MM20	**Habitat reinstatement and creation**	**8.10.2.1**	• Habitats will be created in proportion with the type and extent of habitat loss during construction. All temporary habitat loss will be reinstated on a like-to-like basis, including along the turbine delivery and grid connection route. Ideally, vegetation will be allowed to regenerate naturally, but if this is not possible then planting will take place. As hedgerow loss is the main cause of significant effects for passerine species, the replacement of this habitat will be the main focus. In areas where hedgerows cannot be reinstated (i.e., due to permanent

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			works or around bat buffer zones (see EIAR **Volume II Chapter 7 Biodiversity)** then they will be created elsewhere within the site. To accommodate the proposed development, 431m of hedgerow habitat will be removed, primarily due to accommodating the temporary working areas in the vicinity of Turbine 4 and Turbine 8 and in order to maintain safe sightlines for vehicles exiting the site on to the L5302 public road at Croughta (as detailed in EIAR **Volume II Chapter 7 Biodiversity**). To offset for these losses 2,911m of hedgerow habitat will be planted across the site. This represents a significant increase in hedgerow habitat, over and above the extent of which is impacted, and an overall gain for biodiversity.
MM21	**Enhancement measures**	**8.10.5**	• Hedgerow planting and enhancement to provide additional nesting, foraging, and commuting habitats for a range of species, primarily scrub dwelling passerine species such as yellowhammer. Planting will use native plant species of local provenance and of known value to wildlife, whilst rotational management regimes will be adopted to newly planted and existing hedgerows to create varying age structures which will be favoured by different species and at different times of the year. • Woodland planting and enhancement to further provide additional nesting, foraging, and commuting habitats. Planting will take place in three areas along the peripheries of the site and will incorporate a varying mosaic of different species and age structures, using native species of known value to the local ecology. Management will include rotational coppicing as well as the creation of glades and rides to benefit butterfly and other invertebrate species. • Wildflower meadow creation to improve the botanical diversity of the site as well as increasing available habitat for invertebrate species, a common prey source for bird species. Two areas are proposed with one being in the area of improved grassland just south of the woodland to the north of the site and the other behind the proposed substation toward the south of the site. • Scrub enhancement will aim to improve current condition of the scrub to be more beneficial for bird species by varying the age structure and developing the ground flora. This will be done through the provision of coppicing, natural regeneration, grazing management, and bracken control. • Wet grassland management to improve botanical diversity and provide further foraging and breeding habitat for species such as waders, butterflies, and other

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			invertebrates. It is proposed that the two areas of wet grassland will be expanded into one larger area that will be fenced off to reduce grazing pressure. • Enhancement of existing ponds. Enhancement of two existing waterbodies on site will include eutrophication management, botanical planting, invasive species management, and the creation of a bund to prevent nutrient enrichment from the surrounding agricultural landscape. Open canopy farmland ponds dominated by aquatic macrophytes are known to be positively associated with many species, such as invertebrates, birds, and mammal species. • Field margin development adjacent to boundary features such as hedgerows and ditches to provide nesting, foraging and sheltering habitat and to improve habitat connectivity. Flower-rich margins typically support a more diverse invertebrate assemblage, providing food for a range of breeding bird species. Use of wild bird seed planting mixtures can be adopted to provide a food source, particularly during winter for species such as yellowhammer. • Bird box provision throughout pockets of existing woodland to increase nesting opportunities for bird species. Bird boxes will be positioned sensitively so as to avoid increasing the risk of collisions.
EIAR Chapter 9 – Hydrology and Hydrogeology			
Pre-Commencement Phase			
MM24	**Natured Based Solutions**	**9.6.1**	• Nature Based Solutions (NBS) will be adopted at the Wind Farm site where possible and have been incorporated into the design. NBS include Sustainable Drainage Systems (SuDS), which will be employed to attenuate runoff and reduce the hydrological response to rainfall at the Site.
MM25	**Design Features**	**9.6.1**	• Check dams have been incorporated into the design and will be constructed along the drainage network at regular intervals. Check dams will be used in the construction and operational phase, made of suitable locally sourced coarse aggregate (similar geology), and are intended to attenuate (impede) surface water runoff in the drainage channel, therefore slowing the velocity of the runoff

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			in turn reducing the potential for erosion in the channel and allowing suspended solids to settle out if present. • Stilling ponds have been incorporated into the drainage design**,** with buffered outfalls**,** which will be constructed at drainage outfalls associated with the construction runoff drainage network. Buffered outfalls will be established at intervals along the clean water interception ditch. Similar to check dams; some stilling ponds around operational infrastructure will be remain (for the life of the Project / drainage network), made of suitable coarse aggregate, and are intended to attenuate surface water runoff in the drainage channel, slowing the velocity of the runoff before discharging to vegetated areas (buffered outfall). Slowing the water velocity allows suspended solids to settle out if present. At low velocity the runoff has increased opportunity to percolate through the coarse aggregate and into the surrounding landscape.
Construction Phase			
MM26	**Increased runoff Proposed Mitigation Measures – Wind Farm and GCR**	**9.6.2.1**	• A Spoil Management Plan will be prepared as part of the Construction & Environmental Management Plan. It will incorporate provision on materials management with a view to establishing material balance (reuse of excavation arisings) during the proposed construction phase, thus minimising the potential for or the length of time excavated materials are exposed and vulnerable to entrainment by surface water runoff. • In sensitive areas for example areas of the GCR or TDR in close proximity to surface waters, excavation of material will be conducted in a controlled manner whereby any temporary deposit of the material in buffer zones can be minimised. For example, vacuum excavation techniques or similar will be used for excavations within Surface Water Buffer zones and other sensitive areas (constraints). All surplus spoil from trenches in public roadways will be removed from site as it is excavated and transported to a licenced facility for disposal. • Temporary stockpile locations have been identified. Temporary stockpile areas will be managed to facilitate the orderly segregation of material types, be isolated from the receiving surface water network by the use of silt screens etc. and are limited in height (2m), 15m from drains where possible. • Exposed soils (exposed temporary stockpiles) will be covered with plastic sheeting during all heavy rainfall / storm events and during periods where

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			works have temporarily ceased before completion at a particular area (e.g., weekends, overnight, etc). • Stockpiles are located away from drains where possible with silt fencing /silt screen in place. • All drainage infrastructure required for the management of surface water runoff will be established before excavation works commence. Similarly, mitigation measures related to surface water quality will be implemented before excavation works commence. • Clean Water and dirty water interception ditches**,** will be established to direct/divert surface water runoff from development areas, including temporary stockpiles, and direct same into established treatment trains including stilling ponds.
MM27	**Release and Transport of Suspended Solids and Associated Nutrients**	**9.6.2.2**	• The drainage, attenuation and other surface water runoff management systems will be installed concurrent with the main construction activities to control increased runoff and associated suspended solids loads in runoff during intensive construction activities e.g., excavation of turbine base. Conceptual and information graphics associated with mitigating runoff quality are pres • Diffuse surface water runoff quality will be managed as follows: ○ Silt will be established along the perimeter of source areas e.g., stockpiles, within the drainage network, and in existing natural drains which are likely to receive surface water runoff**.** This will reduce the potential for high suspended solids loadings. Double silt fences / screens will be deployed at outfalls within surface water buffer areas. Silt fences will be temporary features but will remain in place for a period following the completion of the construction phase until such time that site conditions are stable. • Runoff will be managed as follows: ○ In line Stilling ponds will buffer the run-off discharging from the drainage system during construction, by retaining water, thus reducing the hydraulic loading to watercourses. These stilling ponds are designed to reduce flow velocity to 0.3m/s at which velocity, silt particle settlement occurs. Stilling ponds will remain along the operational infrastructure (life of development at

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			minimum). The locations of stilling pond have been chosen as a part of the drainage design. • In line Check Dams will be constructed across drains. Check Dams will reduce the velocity of run-off in turn facilitating the settlement of solids upstream of the dam. Check Dams will also reduce the potential for erosion of drains. Rock filter bunds may be used for check dams however, wood or straw/hay bales will also be used if properly anchored, that is; supported with rock or fitted timber to reduce potential for material to be swept away by incoming water. Multiple Check Dams will be installed, particularly in areas immediately downgradient of construction areas. Check dams will only be constructed in drainage infrastructure and not in significant surface water features i.e., streams or rivers. Check Dams (comprised of rock) established will remain along the operational infrastructure. The following will be implemented in the design of Check Dams and their deployment: • Check dams will be installed at 50m intervals within the length of drainage channels. This is dependent on the slope angle and height of check dams constructed. • Erosion protection will be established on the downstream side of the check dam i.e., cobbles or boulder (100-150mm diameter) extending at least 1.2m. • Check dams will be constructed as part of the drain i.e., reduce the potential for bypassing between the drain wall and check dam. • Routine inspections and silt removal will take place to present silt building up. • Water pumped from excavations, or any waters clearly heavily laden with suspended solids will be contained and managed and pumped through the pre-established Active Management treatment. • Active monitoring of water quality by turbidity measurement will be undertaken on an regular basis during rainfall events.
MM28	**Release of Hydrocarbons**	**9.6.2.3**	• In instances where refuelling of vehicles on site is unavoidable, a designated and controlled refuelling area will be established at the site. The designated refuelling area will enable low risk refuelling and storage practices to be carried out during the works. The designated refuelling area will contain the following attributes and mitigation measures as a minimum requirement: • The designated refuelling area will be located a minimum distance of 50m from any surface waters or site drainage features.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• The designated refuelling area will be bunded to 110% volume capacity of fuels stored at the site. • The bunded area will be drained by an oil interceptor that will be controlled by a penstock valve that will be opened to discharge storm water from the bund depending on the quality of the water. • Management and maintenance of the oil interceptor and associated drainage will be carried out by a suitably licensed contractor on a regular basis, including decommissioning following construction. • Any oil contaminated water will be disposed of at an appropriate licensed waste disposal site. As a precautionary measure, to mitigate against potential spills at other areas of the site, the following mitigation measures will be implemented: • Oil absorbent booms and spill kits will be available adjacent to all surface water features associated with the development. The controls will be positioned downstream of each construction area and at principal surface water drainage features. Oil booms deployed will have sufficient absorbency relative to the potential hazard. • Spill kits will also be available at construction areas such as at turbine erection locations, the temporary construction compound, onsite substation, spoils storage areas and Met Mast location etc. • Spill kits will contain a minimum of oil absorbent pads, oil absorbent booms, oil absorbent granules, and heavy-duty refuse bags for collection and appropriate disposal of contaminated matter. • Should an accidental spill occur during the construction phase of the development, such incidents will be addressed immediately, this will include the cessation of works in the area of the spillage until the issue has been resolved and reporting incidents to the relevant authorities. • A detailed spill response plan will be prepared as part of the site-specific CEMP. • Drainage diversion and silt fencing will be installed between construction and receptors such as the swallow hole or enclosed depressions located on/near site. • For large machinery such as cranes, a drip tray will be used and spill kits will be on hand.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
MM29	**Release of Horizontal Direction Drilling Fluid**	**9.6.2.4**	• Drilling fluids such as Bentonite or Clearbore will be used. Clearbore is an environmentally friendly, Water–Based Mud suitable for tunnelling and drilling operations (Drilling Supplies Europe), or similar will be used in drilling operations. • In the case of a spill, the leak will be stopped, contained and prevented from entering drains or water courses. Any recoverable product will be collected and disposed of properly. If a significant quantity of material enters drains or watercourses, an emergency response will be activated, and Drilling fluid will be contained within the launch pit. **Drill Fluid Disposal** • Drilling mud containing spoil recovered from the bored path can be retrieved at the launch and reception sites of the bore. This spoil can be treated in one of two ways. It can either be transferred off-site to an approved and authorized EPA license facility (in accordance with the Waste Management Act 1996 as amended) to be properly disposed of; or the spoil can be pumped to a mechanical separation container. This involves drill mud being stored within a holding tank until separation of particulates can be achieved, only then can the fluid be discharged to the surrounding area. • Very fine solids, or colloidal particles, are very slow to settle out of waters and the finest of particles require near still water and long periods of time to settle, therefore, such particles are unlikely to settle despite at sufficient rates. To address this, flocculant will be used to promote the settlement of finer solids prior to discharging to surface water networks.
MM30	**Release of Wastewater Sanitation Contaminants**	**9.6.2.5**	• The wastewater/sewerage will be collected and held in a sealed storage holding tank, fitted with a high-level alarm. The high-level alarm is a device installed in the storage tank that is capable of sounding an alarm during a filling operation when the liquid level nears the top of the tank. • All wastewaters will be emptied periodically and tankered off-site by a licensed waste collector to an authorised wastewater sanitation plant for treatment. There will be no onsite treatment of wastewater. • Routine inspection of the temporary facilities will be carried out to ensure no overloading and no leakages are occurring.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
MM31	**Release of Construction and Cementitious Materials**	**9.6.2.6**	In order to mitigate the potential effect posed by the use of concrete and the associated effects on surface water in the receiving environment, the following precautions and mitigation measures will be implemented: • The procurement, transport and use of any cement or concrete will be planned fully in advance of commencing works by the contractor's Environmental Manager and supervised at all times by the developer appointed Environmental Clerk of Works (EnvCoW). • Accidental spillages will be directly intercepted by drainage or surface water networks associated with the development. • Precast concrete will be used wherever possible i.e., formed offsite. Elements of the development where the use of precast concrete will be used include structural elements such as cable joint bays. Elements of the development where the use of precast concrete is not possible includes turbine and substation foundations. Where the use of precast concrete is not possible the following mitigation measures will apply. • The use of concrete will be minimised, where possible. The risk of runoff will be controlled and minimised, as concrete will be contained in an enclosed, excavated area. • Vehicles transporting cement or concrete to the site will exit the site through a designated wash out station at the batching facility and be visually inspected for signs of excess cementitious material. This will prevent the likelihood of cementitious material being accidentally deposited on the public road network. • Only the chutes from the concrete trucks will be cleaned in bunded areas prior to departure from site, and this will take place at a designated area at the temporary construction compound/storage area. The contents will be allowed to settle, and the supernatant will be removed off site to a licenced wastewater treatment plant. • Concrete will be poured during metrological dry periods/seasons in so far as practical and reasonably foreseeable and will not proceed during any yellow (or worse) rainfall warning issued by Met Éireann. • Excavations will be prepared before pouring of concrete by pumping standing water out of excavations. • Any shuttering installed to contain the concrete during pouring will be installed to a high standard by experienced persons. Additional measures will be

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			introduced where required to minimise potential leaks, for example the use of plastic sheeting or other sealing products at joints. • Temporary storage of cement bound sand (if required for construction of the substation building) will be stored at a dedicated storage area only where there is no direct drainage to surface waters and where the area has been bunded e.g., using sandbags and geotextile sheeting or silt fencing to contain any solids in run-off. • Ground crew will have a spill kit readily available, and any spillages or deposits will be cleaned/removed as soon as possible and disposed of appropriately. Mitigation measures recommended in relation to non-hydrocarbon potential contamination of groundwater: • All other liquid-based chemicals such as paints, thinners, primers and cleaning products etc. will be stored in locked and labelled bunded chemical storage units.
MM32	**Excavation Dewatering - Active Construction Water Management**	**9.6.2.7**	• In all instances where construction water, or runoff has the potential to entrain solids during excavation and other construction activities, runoff will be contained by means of temporary berms (lined geotextile of similar), bunds (lined) and sumps. This will be referred to as dewatering. • The quality of the water being discharged will be monitored. If discharge water quality is poor (e.g., Total Suspended solids >25mg/l) additional measures will be implemented, for example, pausing works as required and treating construction water by dosing with flocculant to enhance the settlement of finer solids – this will be done in a controlled manner by means of a suitably equipped settlement tank. • Collected and treated construction water will be discharged by gravity / pump to a vegetated area of ground within the site. • Silt fences will be established at the discharge area to ensure potential residual suspended solids are attenuated and the potential for erosion is reduced. • The quality of water discharged will be monitored in real time (telemetry with 15 min sampling rate), as well as laboratory samples taken, analysed and recorded to ensure no deterioration in water quality at the site.
MM33	**Excavation Dewatering –**	**9.6.2.8**	• Passive management systems will include some of the features described in active management treatment trains.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
	Passive Construction Water Management		• Passive systems are intended to function with minimal supervision, however in the management of construction water on this Project, in many cases the diverted water will likely require active management to ensure sensitive receptors are protected. For example, diverted storm water, if clean can discharge to the receiving vegetated areas or existing drains, but any construction waters effected by contaminants on the site must be managed, and active management / treatment is required.
MM34	**Watercourse Crossings**	**9.6.2.9**	• All watercourse crossings will be designed to facilitate peak, or storm discharge rates so as to avoid localised flooding and associated issues during storm events. • Works in relation to watercourse crossings will be planned and carried out ahead of commencement of any instream works. To mitigate against any potential for onsite flood risk and consequences with regards to some portions of the grid connection route: • Works at this location will be carried out outside of heavy rainfall or flood events, by monitoring the meteorological forecast. • Monitoring of local weather and flood alerts will be conducted on an ongoing basis. During potential scenarios where flooding is probable, imminent or occurring, the potential for contamination or similar effects will be minimised. This includes limiting exposed soils (in situ / temporarily stored), potentially hazardous materials and equipment, and personnel from the flood 'danger zone' (probable flood area).
MM35	**Construction and Diversion of Drainage**	**9.6.2.10**	• Contracted operators will draft method statements and risk assessments in line with mitigation outlined in this report and in consultation with relevant guidance prior to commencing works (as part of the watercourse crossing consent application). Method statements will be included in the CEMP. The application of the IFI protocol and timing of events to ensure works are undertaken during low/no flow. • Diversion of artificial drainage channels will be required at locations where the development layout intercepts existing artificial drainage networks. • Any newly installed drain will be fully formed prior to the diversion of existing drainage. Twin wall corrugated pipe will be used for in stream works. All areas

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			where dirty water interception ditches are implemented within drainage buffers (15m) will require the addition of silt screens, these areas include all infrastructure units particularly south of T4, and West of T6 and T9. • The construction area will be isolated, this means; the water feature (drains) will be temporarily dammed upstream of the watercourse crossing and flow will be diverted by means of a flume / pipe by gravity or pumped (this is referred to as over pumping) downstream of the watercourse crossing and construction area. • Following the successful upstream damming, a downstream dam or barrier will also be established. The downstream barrier will ensure contaminated runoff in the isolated work area will be contained and managed and will block surface water back flow in lower lying or flatter areas. • In order to ensure isolation and over pumping is carried out effectively, the methodology will ensure that dams are secure / sufficiently supported, and that pumping of water will continue uninterrupted and that pumps are capable of keeping up with the discharge rate of the surface water feature. Pumping systems will require backup and fail-safe protocols e.g., backup pumps and generator. At surface water features e.g., non-mapped drains, isolation and diversion of drainage will be implemented or works undertaken during no flow in the system.
MM36	**Release of Hydrocarbons Groundwater Extraction**	**9.6.2.11**	• Mitigation measures for increased runoff are outlined in Section 9.6.2.1, the release of suspended solids and nutrients are outlined in Section 9.6.2.2.. All mitigation measures will be applied along with mitigation by avoidance.
MM37	**Monitoring and Emergency Responses– Wind Farm Site and Grid Connection Route**	**9.6.2.12**	• Monitoring of the wind farm site and grid connection route will be carried out by an Environmental Clerk of Works (EnvCoW). The EnvCoW will advise on environmental issues and monitoring compliance, and will not be responsible for implementing measures, the due duty of implementing measures will be held by the developer/contracted construction operator.
EIAR Chapter 10 – Lands, Soils and Geology			
Construction Phase			

Ref No.	Reference Heading	Reference Location	Mitigation Measure
MM41	**Construction Environmental Management Plan (CEMP)**	**10.5.2.1**	• All construction works will be managed and carried out in accordance with the Construction Environmental Management, which will be updated by the civil engineering contractor and agreed prior to any works commencing on site.
MM42	**Engineering controls**	**10.5.2.2**	• Pending consent for the Project, confirmatory geotechnical testing will be carried out to tailor the engineering controls, such as use of geotextile membranes, required for each individual element. • Piling will be undertaken in areas of weathered rock to ensure stability of foundations. A geotechnical risk register will be completed and maintained as part of the construction works. • Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations
MM43	**Land Take**	**10.5.2.3**	• Following construction, the areas where hardstand, crane pads etc. are in place, will be covered over in topsoil and will be reintroduced for current agricultural practices. This will reduce the land take during the operational phase.
MM44	**Ground or Soil Sealing**	**10.5.2.4**	• Soil sealing will be mitigated using a geotextile membrane on top of soils, this material will likely lead to a degree of subsidence with time. This will reduce the changes the geotechnical and hydrogeological attributes, for example, increased runoff.
MM45	**Erosion and degradation**	**10.5.2.5**	• Limiting the amount of exposed soil at any one time. • Limiting vehicular movement to established infrastructure as far as practicable. • Ceasing construction activities during periods of sustained significant rainfall events, or directly after such events. • Covering exposed temporary stockpiles with plastic sheeting during periods where works have temporarily ceased (e.g., weekends / overnight) and ahead of heavy rainfall / storm alerts. • Reusing soils and subsoils as quickly as possible. • Any areas not required for operation will be reinstated including drainage to minimise future erosion of the soils.
MM46	**Erosion and degradation**	**10.5.2.5**	• Limiting the amount of exposed soil at any one time.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Limiting vehicular movement to established infrastructure as far as practicable. • Ceasing construction activities during periods of sustained significant rainfall events, or directly after such events. • Covering exposed temporary stockpiles with plastic sheeting during periods where works have temporarily ceased (e.g., weekends / overnight) and ahead of heavy rainfall / storm alerts. • Reusing soils and subsoils as quickly as possible. • Any areas not required for operation will be reinstated including drainage to minimise future erosion of the soils.
MM47	**Subsoil and Bedrock Removal**	**10.5.2.6**	• Best practice will be applied during construction which will minimise the amount of soil and rock excavation. • All works will be managed and carried out in accordance with the Construction Environmental Management Plan (CEMP), which will be updated by the civil engineering contractor and agreed prior to any works commencing on site. • Excavated subsoils and bedrock will be managed in such a way that separate temporary stockpiles will be designated as to not mix induvial soils horizons which will, in turn will facilitate reuse on site. • Subsoil and bedrock which are excavated as part of the initial decommissioning and construction phase will be reused onsite wherever possible. • Plate bearing tests on compressive rock strength will be undertaken during intrusive ground study before works commence to aid in the assessment of mitigation by reuse of bedrock material. • Geotechnical testing on imported material will be carried out prior to its reuse onsite particularly for reuse as a running or load bearing surface and will only be reused for those purposes if the suitability of same is conforms to relevant standards. • After construction, any areas not required for operation will be reinstated. • Drainage measures will be reinstated as required in order to minimise future erosion of the soils.
MM48	**Storage of Stockpiles**	**10.5.2.7**	Mitigation measures for stockpiles related to construction of the wind farm are as follows:

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• All temporary stockpiles will be positioned on established and existing hardstand areas or in designated areas which are appropriate for short term storage. • Temporary stockpiles will be managed similarly to active excavation areas in terms of potential for solids entrainment by runoff (silt screens). See EIAR **Chapter 9 Hydrology & Hydrogeology** for further details. • Temporary stockpiles will be limited in height (1.5m for topsoil and 2m for subsoil) and shall have side slopes battered back to a safe angle of repose. • Exposed temporary stockpiles will be covered in plastic sheeting during periods where works have temporarily ceased (e.g., weekends / overnight) and ahead of heavy rainfall / storm alerts. • Temporary stockpile areas will be managed to facilitate the orderly segregation of material types where practical. Separate temporary stockpiles will be designated so as to not mix individual soils horizons which will, in turn will facilitate reuse on site. • Excavated topsoil, subsoil and rock will be re-used on the site as soon as possible, thereby reducing the need for double handling, reducing the requirements of stockpiles and reducing the potential for soil erosion. • Surplus material will be transported to a nearby storage area for longer term storage and subsequently used for soil spreading during reinstatement. • No stockpiles will remain on site following the construction phase of the development and are therefore both temporary and reversible. Mitigation measures for stockpiles related to the grid connection route include: • Temporary spoil deposition areas will be restricted to less than 1.5m in height for topsoil and 2m for subsoil and will be subject to approval by the Site Manager and the Project Environmental Clerk of Works (ECoW). • The temporary stockpiles will be kept outside of any sensitive receptor buffers. • Any excavated material will be later used to backfill the trench where appropriate, any surplus material will be transported to a licensed facility in accordance with the Circular Economy Act.
MM49	**Vehicle Movements**	**10.5.2.8**	• Excavated material will only be moved short distances from the point of extraction (as far as practicable) and will be used locally for reinstatement, landscaping of improvement areas, reducing the on-site traffic.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Ancillary machinery will be kept on established turbine hardstands, and no vehicles will be permitted outside of the footprint of the development and will not move onto land that is not proposed for the development if it can be avoided. • No vehicular movement will be permitted in archaeological buffers (refer also to EIAR **Chapter 15 Archaeology, Architecture & Cultural Heritage** • Where vehicular movement is necessary outside of the development, ground conditions will be maintained as well as possible. This includes for example replacing sods, smoothing over with excavator bucket etc. • For the grid connection route, before starting construction, the area around the edge of each joint bay which will be used by heavy vehicles will be surfaced with a terram cover (if required) and stone aggregate to minimise ground damage.
MM50	**Soil contamination**	**10.5.2.9**	• Construction activities will be restricted to the footprint of the development, therefore the potential for contaminants reaching soils is likely limited to the footprint of the development or construction area. • Dedicated, bunded storage areas will be used for all fuels or hazardous substances. • Any and all contaminants including any contaminated soil will be removed from the site in an appropriate manner if and when they should be produced or observed, and suitable remediation work undertaken. • In the event of a significant contamination or pollution incident e.g., discharge or accidental release of hydrocarbons / fuel, contamination occurrences will be addressed immediately, this includes the cessation of works in the area of the spillage until the issue is resolved. If necessary, the relevant authorities will be notified, and stakeholders will also be promptly informed. *Release of Hydrocarbons* • A fuel management plan will be prepared (and included in the CEMP) which provides a list of mitigation measures to reduce the potential effects on soils from the release of hydrocarbons. This plan includes how hydrocarbons are to be stored and monitoring and maintenance measures.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Any vehicles coming onto the site will be required to be inspected and cleaned before leaving the temporary construction compound and advancing to the destined construction area. • In the event of an accidental spill, contamination occurrences will be addressed immediately, this includes the cessation of works in the area of the spillage until the issue is resolved. No materials contaminated or otherwise will be left on the site. Suitable receptacles for hydrocarbon contaminated materials will also be at hand. Upon usage, spill kits will be promptly replaced. *Imported aggregate* • To mitigate against the potential effects of importing contaminated aggregate to the land and soils, only verified clean, inert material will be used. • Imported rock will be locally sourced and conform to relevant standards, will not change the baseline conditions and is strong enough to prevent run off. *Invasive Species* • Areas which have been identified as containing non-native invasive species (see EIAR **Chapter 7 Biodiversity, Figure 7.4**) will be avoided and fenced off. • The removal, treatment and disposal of any identified invasive non-native plants including contaminated soils will be undertaken in accordance with the latest guidance by the Appointed Contractor to prevent further growth or spread beyond the site.
MM51	**Material and waste management**	**10.5.2.10**	• A Resource and Waste Management Plan has been prepared as part of the CEMP. All excavated earth materials, wherever possible, will either be re-used in an environmentally appropriate and safe manner e.g., reinstatement, landscaping or removed from the site at the end of the construction phase. • Any surplus of natural materials (e.g., soils) to be used as backfill or deposited elsewhere in the Site will not be deposited to above existing / original ground level for the area in question. Surplus natural materials may be utilised to aid in the development of habitat enhancement for a number of recorded species on site e.g., bee banks for endangered bee species identified on site, see EIAR **Chapter 7 Biodiversity.** • Excavated materials onsite will be reused and recycled according to the Waste Hierarchy. Where it is not possible to reuse onsite, any excess materials will be

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			taken offsite and reused as a by-product where appropriate or disposed of at a licensed facility at the end of the construction phase in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended).
MM52	**Ground stability**	**10.5.2.11**	• A Geotechnical Clerk of Works will be employed during the construction phase to monitor excavation activities, to verify that safety standards are being met and monitor for any potential stability issues, particularly in areas of deeper excavations, and areas with the potential to encounter weathered limestone or karst features. • A geotechnical investigation will be carried out at each proposed infrastructure unit location prior to works commencing. Surveying will include the drilling of boreholes by rotary core to depth within competent bedrock to determine the strength of rock and assess the potential for karst or weathered rock at each location by a qualified geotechnical engineer to inform foundation design. Piling will be undertaken in areas of weak rock to ensure long term stability. • Short term temporary stockpiles will be limited to 1.5m height and removed for reuse/remediation purposes or transported to the designated temporary spoil storage deposition areas. • All site excavations and construction will be supervised by a geotechnical engineer/ engineering geologist. • The Contractor's methodology statement and risk assessment will be in line with the CEMP and will be reviewed and approved by a suitably qualified geotechnical engineer/engineering geologist prior to site operations. • Particular attention and pre-construction assessment (developer / sub-contractor site specific risk assessment and method statement (RAMS) and on-site toolbox talks etc.) and mitigation planning will be given to any new infrastructure, for example, the proposed site tracks, culverted watercourse crossings and associated hardstand. • On site training and toolbox talks will ensure any response to any potential incident is mobilised quickly and efficiently. • Draining water from the construction area will be done through advanced dewatering techniques to avoid ground stability risks. In particular, ponding of

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			water will not be allowed to occur in recent excavations. Sumps will be utilised to remove water following rainfall events. • An emergency response system will be developed for the construction phase of the Project, particularly during the early excavation phase. This, at a minimum, will involve 24-hour advance meteorological forecasting (Met Éireann download) linked to a trigger-response system. • Construction activities will not occur during periods of sustained significant rainfall events, or directly after such events to allow time for work areas to drain. Following heavy rainfall events, and before construction works recommence, the site will be inspected and corrective measures implemented to ensure safe working conditions, for example dewatering of standing water in open excavations, etc. • Vehicular movements will be restricted to the footprint of the proposed development. • Temporary stockpiles will be restricted to the footprint of the proposed development and adhere to mitigation measures. • In the unlikely event of a stability issue the assigned geotechnical engineer will assess each scenario and will escalate to the following mitigation scope as the need arises.
EIAR Chapter 11 – Material Assets			
Construction Phase			
MM55	**Waste**	**11.5.1**	A Resource and Waste Management Plan (RWMP) will be prepared which will cover all aspects of waste management during the construction phase. • The objective of the RWMP will be to maximise the reuse of construction materials either onsite or offsite. • All waste generated during the construction phase will be managed in accordance with the relevant waste management regulations. • Waste generation on site during construction works will be properly supervised with designated waste storage and segregation areas. • Materials required will be ordered only as needed to reduce excess materials leading to waste.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Where excess materials do arise, these will be returned to the supplier where possible. • Hazardous waste during construction, such as waste oils and lubricants, will be segregated, stored appropriately, classified, transported and disposed of by appropriately permitted waste contractors in accordance with all relevant national and international waste legislation.
MM56	**Utilities**	**11.5.1**	Ongoing consultation with Uisce Éireann, Bord Gáis EirGrid, ESBN and other relevant service providers within the locality, and all works will comply with any requirements or guidelines they may have. The works contractor will be obliged to ensure there are no interruptions to these utility services unless this has been agreed in advance. Coordination and consultation will be had between the project team and ESBN and Uisce Éireann, and other relevant service providers within the locality, as the design of the Project progresses.
MM57	**Telecommunications**	**11.5.1**	A mitigation measure of re-routing delivery of service into Vodafone Base Station Shinanagh from an alternative Vodafone Feeder/POP site was put forward to Vodafone, who agreed to the proposal. Refer to **Volume III Appendix 11.1 Telecommunications Impact Study**.
EIAR Chapter 13 – Noise and Vibration			
Pre-Commencement Phase			
MM61	**Community Notification**	**13.10.1**	Prior to the commencement of construction an active community engagement exercise shall be undertaken by the community liaison officer. Letter drops shall take place in advance of the works. The nature of the information letters provided details of the Project, specifically: • Contractor name and contact details. • Project description. • Expected duration of works. • A commitment to implement procedures and measures to minimise noise and vibration. This community notification exercise should be repeated in the event of an expected intensification of works in any area and/or in advance of works that occur

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			outside of the permitted construction operating hours (any such works will be subject to prior agreement with the Local Authority).
Construction Phase			

MM62	**General Overview of Works Mitigation Measures**	**13.10.1**	Best Practicable Means as defined in BS 5228-1: 2009+A1: 2014 should be employed at all times to reduce noise and vibration to a minimum.
			The client and the chosen contractor shall ensure that the following guidelines will be applied where applicable:
			• The quietest reasonably available equipment should be selected for use on site. The methods of works shall be carefully considered, and appropriate noise and vibration control measures put in place to ensure that the relevant noise/vibration criteria are achieved.
			• As far as reasonably practicable, the noise from reversing alarms will be controlled or limited. This will be undertaken through following a hierarchy of techniques:
			  ○ The site layout will be designed to minimise reversing.
			  ○ Banksmen will be utilised to avoid so far as reasonably practicable the use of reversing alarms.
			  ○ Reversing alarms will incorporate where reasonably practicable features such as broadband signals or 'smart alarms' to reduce the level of noise.
			• Where an enclosure is in place it should be used.
			• Where reasonably practicable, vehicles and mechanical plant associated with the construction works will be fitted with effective exhaust silencers and shall be maintained in good working order.
			• Machines and vehicles in intermittent use will be shut down or throttled down to a minimum during periods between works.
			• The movement of delivery materials outside of normal working hours shall be kept to a minimum and handled in a manner that minimises noise.
			• All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good working order and operated such that noise emissions are minimised as far as reasonably practicable.
			• All employees shall be provided with an appropriate induction and ongoing briefings regarding the management of environmental issues. This will involve

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			emphasising the need for employees to show consideration to nearby noise sensitive receptors, including residential neighbours. They will be briefed on not generating unnecessary noise when on site or when leaving and arriving to the site. • The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs weekdays and between 7:00hrs and 13:00hrs on Saturdays. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (*i.e.*, concrete pours and turbine assembly) it could occasionally be necessary to work out of these hours.
EIAR Chapter 14 – Landscape and Visual – No mitigation measures required			
EIAR Chapter 15 – Archaeology and Cultural Heritage			
Pre-Commencement Phase			
MM65	**Establishment of buffer zones**	**15.15**	• The buffer zones will be fenced off as agreed with the Cork County Archaeologist prior to the start of the construction phase.
MM66	**Archaeological Testing**	**15.15**	• As part of an advance works programme prior to construction, advance archaeological test trenching will be carried out for within the areas of major groundworks proposed on the site around each turbine location, the location of the proposed substation and along the parts of the site tracks that are located in agricultural fields closest to areas of highest archaeological potential. If any significant buried archaeological remains are identified during this testing, further mitigation in the form of targeted archaeological strip, map and sample excavation will be agreed with Cork County Council and the National Monuments Service to preserve by record any buried archaeological remains which can't be preserved in situ by detailed design mitigation/micro siting. This advanced test trenching will: ○ Be carried out by a suitably qualified archaeologist under licence. ○ Result in a detailed report setting out any findings and outlining any further measures, within the parameters assessed in this EIAR, that should be employed in relation to the proposed development.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			This report will be submitted to the National Monuments Service (DHLGH).
			• **Construction Phase**
MM67	**General Overview of Works Mitigation Measures**	**15.15**	• No groundworks, construction vehicle movements or storage of materials will be carried out within the buffer zones around the recorded monuments and unregistered 19th century-built heritage structures identified closest to the site boundary. • The ruins of the historic farm buildings and 19th century structures identified within the windfarm site boundary, T1, T7 and T9 will be preserved in situ. • Upstanding historic field boundaries within the site will be preserved in situ wherever possible (this has already been achieved as part of embedded design mitigation). If a section of a historic field boundary must be removed to facilitate the construction then: o A representative cross-section of the boundary will be investigated and recorded by a suitably qualified archaeologist prior to removal • All major sub-surface groundworks associated with the proposed Project works will be subject to a programme of archaeological monitoring. These groundworks include: o turbine and substation locations o site access tracks through the site o off-road open-cut trenching along the chosen grid connection route option o Off-road groundworks required along the chosen turbine delivery route option o Groundworks associated with two sections of Horizontal Directional Drilling along the chosen Grid Connection Route o Groundworks associated with construction of the grid connection route along Ballyviniter Railway Bridge (131) o Groundworks associated with the construction of the grid Connection route under Grange Bridge (35) o Groundworks associated with the grid connection route and/or turbine delivery route along the public road adjacent to Knockaunavaddre ringfort (128)

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• The programme of archaeological monitoring will be carried out as follows: ○ This will be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004. ○ If significant archaeological material is encountered during the course of archaeological monitoring, then resolution of any such significant material will be determined in consultation with the National Monuments Service (DHLGH) and Cork County Council. ○ Where possible, every reasonable effort will be made to preserve in situ or reduce the impact on any identified archaeological material. Where preservation in situ cannot be achieved, either in whole or in part, then a programme of full archaeological excavation will be implemented to ensure the preservation by record of the portion of the site that will be directly impacted upon. This work will be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004. ○ A written report will be prepared detailing the results of all archaeological work undertaken.
EIAR Chapter 16 – Traffic and Transport			
Pre-Commencement & Construction Phase			
MM68	**Traffic Management - Main Wind farm site**	**16.7.1**	The CTMP in EIAR **Volume III, Appendix 5.2** will be updated and agreed with the road's authority and An Garda Siochána prior to commencing construction. This includes the following: • Traffic Management Co-Ordinator – A dedicated Traffic Management Coordinator will be appointed for the duration of the Project and this person will be the main point of contact for all matters relating to traffic management on the Project. • Roads and Routes: The Contractors CTMP will clearly identify roads that will be used to access the Project site and roads that are not to be used. In some

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			cases, the roads authority may wish that certain roads are not used for HGVs but can be used by LGV traffic. • One-way Systems: as some of the local roads are relatively narrow, the roads authority may want to introduce a system of one-way construction traffic movements during the construction of the development. Any such one-way systems will be identified in the construction phase CTMP in agreement with the roads authority. • Road Closures: with the use of the local roads network for the grid connection route, the narrow carriageway widths for some of the roads proposed may require full road closures. Any such road closures will be agreed with the roads authority in advance of construction and diversions will be incorporated into the CTMP. • Road Condition Survey: a pre-condition survey will be carried out on all public roads that will be used in connection with the development to record the condition of the public roads in advance of construction commencing. A post-construction survey will also be carried out after the works are completed. The specification and timing of the surveys will be agreed with the road's authority. Joint surveys shall be completed if the roads authority requests. • Road Reinstatement: All roads will be reinstated expeditiously on completion of the construction works. Roads will be reinstated to their pre-works condition or better and to the satisfaction of the road's authority. • Site Inductions: All workers will receive a comprehensive site induction which will include a section on traffic management and clear guidance on the routes to be used/not used to access the site. • 24-Hour Emergency Contact: a 24-hour emergency phone number will be maintained for the duration of the construction works and the number will be noted on temporary signage at each works area (for grid connection) and the site entrance for the wind farm site. • Traffic Management Guidance: all necessary temporary traffic management will be planned and executed in accordance with best practice, including Chapter 8 of the Traffic Signs Manual published by the Department of Transport. • Letter Drops: a letter drop will be carried out to notify members of the public living near the proposed site and cable route to advise them of any particular upcoming traffic related matters e.g., temporary lane/road closure or delivery of turbine components.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Signage: Clear signage relating to the development, both temporary and permanent, will be provided for accessing the site. • Road Sweeper: Appropriate steps will be taken to prevent soil/dirt generated during the works from being transported on the public road. When, if necessary, a road sweeper will be used to maintain the public roads in a clean condition during the construction activities of the Project. • Wheel Wash: In order to ensure no dirt or debris is brought onto the existing public road, the use of a wheel wash at the site entrance is proposed. • Site Entrances: The entrances to the site will be secured when the site is not in use. When necessary, a flagman will be used to assist traffic movements at the site entrance or in other areas as required. • Abnormal Load Deliveries: Abnormal loads will require an abnormal load permit prior to delivery and will be delivered at times and frequencies agreed with An Garda Siochána.
MM69	**Traffic Management - Grid Connection route**	**16.7.1**	• Road Opening Licence: The road works associated with the grid connection cabling will be completed in line with the requirements of a road opening license as agreed with the local authority. • Route Proofing: In advance of the main grid connection works an assessment will be carried out to define the precise alignment of the cable route within the corridor which has been assessed. The assessment may include investigative works such as non-intrusive GPR surveys and may be accompanied by the excavation of temporary trial-pits or slit trenches, where deemed necessary, to confirm existing services in the road. The purpose of the investigations is to minimise construction impacts associated with unforeseen complications arising from uncharted or inaccurately recorded existing services. Maintaining Local Access: reasonable access to local houses, farms and businesses will be maintained at all times during any road closures associated with the grid connection works. The details of this will be agreed with the road's authority in advance of the grid connection works commencing. • Road Cleanliness: Appropriate steps will be taken to prevent soil/dirt generated during the works from being transported on the public road. Road sweeping vehicles will be used, when necessary, to ensure that the public road network remains clean.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Temporary Trench Reinstatement: Trenches on public roads, once backfilled, will be temporarily reinstated to the satisfaction of the road's authority. • Haul Route Interface: Aggregates and other materials imported to the wind farm site will be managed to ensure they do not conflict with the grid connection works. Grid connection works will be planned to avoid conflicts with other major activities on the main construction site such as concrete foundation pours and large component deliveries. • Turbine Delivery Route Interface: the delivery of turbine components to the site will need to be managed to ensure there is no overlap with the grid connection works. Grid Connection works are to be scheduled so as not to conflict with turbine deliveries.
MM70	**Traffic Management - Turbine component delivery**	**16.7.1**	• Programme of Deliveries: a programme of deliveries will be submitted to the road's authority in advance of deliveries of turbine components to the site. The programme will include details of the dates and times of each component delivery along with the route to be taken. Turbine component deliveries will be carried out during off-peak times and will be done using a convoy and a specialist heavy haulage company. • Garda Escort: Turbine deliveries will be escorted by An Garda Siochána. This will ensure the impacts of the turbine deliveries on the existing road network are minimised. • Reinstatement: Any area affected by the works to facilitate turbine delivery will be fully reinstated to its original condition. • Consultation: Consultation with the local residents and Cork County Council will be carried out in advance to manage turbine component deliveries.
MM71	**Traffic Management - Met Mast Construction**	**16.7.1**	The construction site entrance will be used for construction of a new section of track to access the met mast location and for installation of the met mast.
EIAR Chapter 17 – Air Quality			
Pre-Commencement Phase			
MM74	**Dust Management**	**17.6.1**	Prior to commencement of construction activities, a final CEMP for the construction phase will be agreed with the local authority to ensure that the potential for adverse

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			environmental effects on local receptors is minimised. The CEMP will include measures for controlling dust and general pollution from site construction operations. Controls will be applied throughout the construction period to ensure that emissions are reduced or eliminated.
MM75	**Communications**	**17.6.1**	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Display the name and contact details of people accountable for air quality and dust issues with respect to the Project. This may be the environment manager/engineer or the site manager. • Display the head or regional office contact information.
Construction Phase			
MM76	**Dust Management**	**17.6.1**	• Implement a CEMP (and CTMP), which include measures to control other emissions, to be approved by the local authority. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority if requested. • Record any exceptional incidents that cause dust and/or air emissions, either on- or off site and the action taken to resolve the situation in the logbook. • Undertake regular on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary in agreement with the relevant homeowners / landowners. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations and duration (including baseline monitoring) with the local authority.
MM77	**Site Maintenance**	**17.6.1**	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Erect solid screens or barriers around dusty activities. • Avoid site runoff of water or mud (e.g., establish collector drains and/or soil berms to direct/divert surface water runoff from development areas) (Refer to EIAR **Chapter 9 Hydrology and Hydrogeology** and EIAR **Volume III, Appendix 5.1 Construction Environmental Management Plan, Appendix A Surface Water Management Plan**). • Keep site fencing, barriers and scaffolding clean. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • All temporary stockpiles will be positioned on established and existing hardstand areas or in designated areas which are appropriate for short term storage and will be managed in terms of potential for solids entrainment by runoff (Refer to EIAR **Chapter 10 Soils and Geology**).
MM78	**Operating Vehicles/Machinery and Sustainable Travel**	**17.6.1**	• Ensure all vehicles switch off engines when stationary - no idling vehicles. • Produce a construction logistics plan to manage the sustainable delivery of goods and materials.
MM79	**Construction Operations**	**17.6.1**	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, (e.g., suitable local exhaust ventilation systems). • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible. • Use enclosed chutes and conveyors and covered skips. • Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. **Specific to Earthworks** (management and mitigation for earthworks is covered in further detail in EIAR **Chapter 10 Soils and Geology**) • Re-vegetate earthworks to stabilise surfaces. *Specific to Construction*

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Avoid scabbling (roughening of concrete surfaces) if possible. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. *Specific to Trackout* • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. • Avoid any dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Inspect site tracks for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. • Record all inspections of haul routes and any subsequent action in a site logbook. • Install hard surfaced site tracks, which are regularly cleaned and damped down with fixed or mobile sprinkler systems, or mobile water bowsers. • Implement a washout station wheel washing system.
MM80	**Exhaust Emissions from Plants and Vehicles**	**17.6.1**	• Any emissions from Non-Road Mobile Machinery (NRMM) can be reduced by ensuring that any plant used on-site comply with the NOx, particulate matter and carbon monoxide emissions standards specified in the Regulation (EU) 2016/1628 (as amended) of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC as a minimum, where they have net power of between 37kW and 560kW. The emissions standards vary depending on the net power the engine produces.
EIAR Chapter 18 – Climate			
Construction Phase			

Ref No.	Reference Heading	Reference Location	Mitigation Measure
MM82	**Construction**	**18.8.1**	• Maximise opportunities for the reuse of excavated material and other materials which could be considered waste within the Project or at a local donor site in line with A Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020-2025. • Embed carbon reduction practices as a core principle for the design team. Where reduction ideas are suggested, they should be recorded, and potential impact quantified. Earlier engagement with carbon reduction allows for the greatest returns. This should include designing for decommissioning; enabling reuse and recycling at end of life. • Minimise transport-related inefficiencies, including with respect to business travel and staff commuting to and from site and other relevant locations. Where possible, transport should be avoided unless necessary, e.g., through proactive measures such as car-pooling etc. • Where technical specifications allow, maximise the recycled content of construction materials such as concrete and steel. • Maximise the specification of materials with an environmental product declaration with the aim of reducing embodied carbon emissions. • Incentivise use of local suppliers with a view to shorten project supply chains and environmental footprint. • Where grid connections are not possible hybrid generators using solar power or Hydrotreated Vegetable Oil (HVO) should be used to reduce consumption of fossil fuels. • Onsite mobile and non-mobile plant should conform to the latest emissions standards, with mobile vehicles conforming to EURO 6 standards (European Emissions Standards sixth iteration) as a minimum. • All plant should investigate the option of using HVO fuels or electric versions where possible. • Require main contractors to report on energy data, water usage and waste disposal and their GHG emissions as part of the Project's Construction Environmental Management Plan (CEMP). • Use of prefabricated options for on-site facilities during construction to minimise waste and reduce on-site construction activities. • Implement a proactive maintenance and monitoring regime to maximise the lifecycle of components.

Ref No.	Reference Heading	Reference Location	Mitigation Measure
			• Areas of high biodiversity, and areas for mitigation and enhancement should be agreed with the landowner (as per EIAR **Chapter 7 Biodiversity** and the Habitat Management Plan as presented in EIAR **Volume III, Appendix 7.3**).

APPENDIX D – RESOURCE AND WASTE MANAGEMENT PLAN

CONTENTS

1 INTRODUCTION

This Resource and Waste Management Plan (RWMP) forms part of the Construction Environmental Management Plan (CEMP) for the Tullacondra Green Energy Project (the Project) in Co. Cork.

The RWMP is intended to form the basis of providing information on the waste management required for the construction of the wind farm and grid connection during the construction phase of the Project.

- The RWMP should be considered a live document and is to be updated by the Contractor on a quarterly basis, or as more frequently as the need arises to ensure that it is current and has the most up to date information and contact details.

A copy of the RWMP and any updates shall be maintained on site as part of the Contractor's waste Management File.

An electronic copy of the RWMP and any updates shall be provided to the following:

- Tullaconrdra Green Energy Project office
- Environmental Clerk of Works
- Cork County Council Planning Department
- All sub-contractors working on the project.

The Contractor shall maintain a record of all versions of the RWMP issued and to whom on the Resource and Waste Management file to be maintained on site.

2 TRENDS IN WASTE MANAGEMENT

2.1 National Level

2.1.1 Construction Phase

It is only in recent years that comprehensive reports regarding the quantities of commercial and residential waste produced in Ireland have been compiled. The EPA (Environmental Protection Agency) have produced reports that provide estimates for waste generation and the level of recycling, recovery and disposal of waste material. Key Trends in the EPA waste data release of 10 August 2023 (Latest reference year 2021).

- The quantity of Construction and Demolition (C&D) waste generated and collected in Ireland in 2021 increased to 9 million tonnes from 8.2 million tonnes in 2020 an increase of 10%.
- The overall composition of C&D waste changed little between 2020 and 2021. At 85%, soil and stone waste remained dominant, followed by waste concrete, brick, tile and gypsum (7%) and mixed C&D waste (4%). The proportion of segregated (wood, paper, glass, plastic and metal) C&D waste collected remained small at just under 4% increasing from 3.1% in 2020.
- The vast majority (96 %) of C&D waste underwent final treatment in Ireland in 2021; only 4% was exported abroad for final treatment.
- Most C&D waste was backfilled (85%), with only 8% and 7% was recycled and sent for disposal, respectively. The dominance of backfilling as a treatment operation reflects the large proportion of soil and stones in C&D waste.
- Recycling was the main treatment operation for metals (100%), for segregated wood, paper, glass and plastic (77 %).
- For non-hazardous C&D waste other than soil and stone, Ireland achieved 85% material recovery, surpassing the 70% European target.

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) and as amended which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of the ‘waste hierarchy’, which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal).

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. The Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing, and recycling existing materials and products.

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for

a Circular Economy (WAPCE) – Waste Management Policy in Ireland[1], was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity – Waste Management Policy in Ireland, in 2015[2].

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021)[3] to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource Waste Management Plans for Construction & Demolition Projects' (2021)[4]. This sets out good practice approaches to prevent waste, reuse materials, reduce waste and better manage C&D wastes that cannot be prevented on development projects. Project developers are to implement these practices and document these activities into a project Resource and Waste Management Plan (RWMP) which will develop as the project progresses from design though to construction.

2.2 Regional Level

2.2.1 Construction Phase

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in December 2017 identifies that Ireland's current progress against this C&D waste target is at 85% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive.

Recent guidance in A Waste Action Plan for a Circular Economy 'Irelands National Waste Policy 2020-2025' states that the current national challenge regarding C&D waste is as follows;

- Promote waste prevention in the first instance.
- Follow best available techniques.
- Expand the range and use of recycled products.
- Create a market demand for recycled products and segregating more material on-site to allow for recycling.

[1] https://www.gov.ie/en/publication/4221c-waste-action-plan-for-a-circular-economy/

[2] https://www.gov.ie/en/publication/a9d98-a-resource-opportunity-waste-management-policy-in-ireland/

[3] https://www.gov.ie/en/publication/b542d-whole-of-government-circular-economy-strategy-2022-2023-living-more-using-less/

[4] https://www.epa.ie/publications/circular-economy/resources/best-practice-guidelines-for-the-preparation-of-resource--waste-management-plans-for-construction--demolition-projects.php

- Meet the target (from The Reginal Plan) of preparing for reuse, recycling and other material recovery (incl. beneficial backfilling operations using waste as a substitute) of 70% by weight of C&D non-hazardous waste (excluding natural soils & stone).

2.3 Local Authority Level

The Cork County Council Development Plan (CCC) (2022-2028) illustrates that waste management plan is a vital requirement in the advocating for sustainable development, enhancing good public health and for the protection of the environment. The CCC is strongly committed to both national and EU waste management goals and legislation.

The Development Plan has identified key policies applicable to supporting the Waste Action Plan for a Circular Economy and the Southern Region Waste Management Plan in objective BE 15-14: Waste Prevention and Management

2.4 Legislative Requirement

The primary legislative instruments that govern waste management (both hazardous and non-hazardous) in Ireland and applicable to the project are:

- Waste Management Act 1996 (Act No. 10 of 1996) as amended 2001 (Act No. 36 of 2001), 2003 (Act No. 27 of 2003) and 2011 (S.I. No 20 of 2011). Subordinate and associated legislation includes:
    - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
    - Waste Management (Collection Permit) Regulations 2007 (S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008) and 2016 (S.I No. 24 of 2016)
    - Waste Management (Facility Permit and Registration) Regulations, (S.I No. 821 of 2007) as amended 2008 (S.I No. 86 of 2008), 2014 (S.I No. 320 and No. 546 of 2014) and 2015 (S.I. No. 198 of 2015)
    - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004) and 2010 (S.I. No. 350 of 2010)
    - European Union (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended 2015 (SI No. 542 of 2015).
    - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
    - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015) o European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
    - Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended 2014 (S.I. No. 349 of 2014) and 2015 (S.I. No. 347 of 2015)
    - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009) as amended 2015 (S.I. 190 of 2015) and European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
    - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended 2000 (S.I. No. 73 of 2000)
    - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended by European Communities (Shipments of

Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)

- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. No. 121 of 1994)
- European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)

- Planning and Development Act 2000 as amended 2010 (Act No. 30 of 2010) and 2015 (S.I. No. 264 of 2015, S.I. 310 of 2015).
- Protection of Environment Act 1992 as amended (Act. No. 27 and S.I. 413 of 2003) as amended by the Planning and Development Act 2000 (Act No. 30 of 2000).
- Litter Pollution Act 1997 (Act No. 12 of 1997) as amended by the Litter Pollution Regulations 1999 (S.I. No. 359 of 1999) and Protection of the Environment Act 2003.

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the Waste Management (amended) Act 2001 and subsequent Irish legislation, is the principle of “Duty of Care”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of disposal.) As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is therefore imperative that occupants undertake on-site management of waste in accordance with all legal requirements and employ suitably permitted/licensed contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contractor handle, transport, and reuse/recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007 as amended or a waste or IED (Industrial Emissions Directive) licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3 PROJECT DESCRIPTION

3.1 Site Location and Plan

The Tullacondra Green Energy Project is located in County Cork in the townlands indicated in **Table 1** of and its location is provided in **Figure 1**.

Table 1: Townlands and Electoral Districts in which the proposed Project is located.

Proposed development	Townlands
Wind energy project inclusive of turbines, site access tracks, substation, and construction compound	Polnareagha and Ardskeagh (Templemary E. D.); and Tullacondra and Croughta, (Kilmaclenine E. D.).
Grid connection route from wind farm site to Mallow 110kV substation	Kilmaclenine, Croughta, Knockaunavaddreen, and Copestown (Kilmaclenine E. D.); Ballybeg (Buttevant E. D.), Baltydaniel East, Twopothouse, and Curraghkerry (Caherduggan E. D.); Ballyviniter Upper, Cloghlucas North, Curraghphadeen, Ballyviniter Middle, Ballyviniter Lower, Parkadallane, Carrigoon More and Carrigoon Beg (Mallow Rural E. D.).

The proposed wind farm is located approximately 2km south of Lisgriffin Cross, Co. Cork. The wind farm site for the proposed Project is located along the L5302 at Croughta and consists primarily of mixed farmland habitat with hedgerows and occasional areas of scrub, ponds and lakes, and man-made drains and ditches. The area in which the turbines will be located ranges in elevation from 133m above Ordnance Datum (AOD) in the south to 120m AOD in the north.

The proposed grid connection includes works in and alongside public roads to install cabling approximately 13.5km to connect the wind farm to the National Grid at the Mallow 110kV substation located in St. Joseph's Road, Mallow. The proposed wind farm site and the route of the proposed grid connection for which planning permission is sought includes a total area of 58.6 hectares (ha).

3.2 Description of the Development

A detailed description is included in EIAR **Chapter 5 Project Description.** In summary, the Project will consist of the following elements:

- nine wind turbines with a blade tip height of 175m, rotor diameter of 150m and hub height of 100m.
- turbine foundations and crane pad hardstanding areas and associated drainage.
- upgrade of existing site tracks and construction of new site tracks and associated drainage.
- access from the local public road L5302 at Croughta consisting of a new site entrance for the construction phase and upgrade of an existing entrance for the operational phase.

- an on-site 38kV electrical substation to Electricity Supply Board Networks (ESBN) specification to include control building with electrical infrastructure, welfare facilities supplied by rainwater harvesting and storage tank, a wastewater holding tank, car parking, security fencing and lighting, and all associated infrastructure, services, and site works including a temporary construction compound.
- all associated underground electrical and communications cabling connecting the turbines to the proposed electrical substation.
- a temporary construction compound and associated ancillary infrastructure including welfare services, office accommodation, parking, fencing, lighting, etc.
- areas for temporary storage of excavated materials.
- a permanent meteorological mast of 100m height above ground level on a concrete base.
- installation of 38kV underground electrical cabling, mainly within the public road, between the proposed on-site wind farm substation to the Mallow 110kV substation boundary at St. Joseph's Road, Mallow.
- all associated site works, including site clearance, and ancillary development including site drainage, security gates, fencing, permanent and temporary signage, and biodiversity mitigation and enhancements, including hedgerow planting.

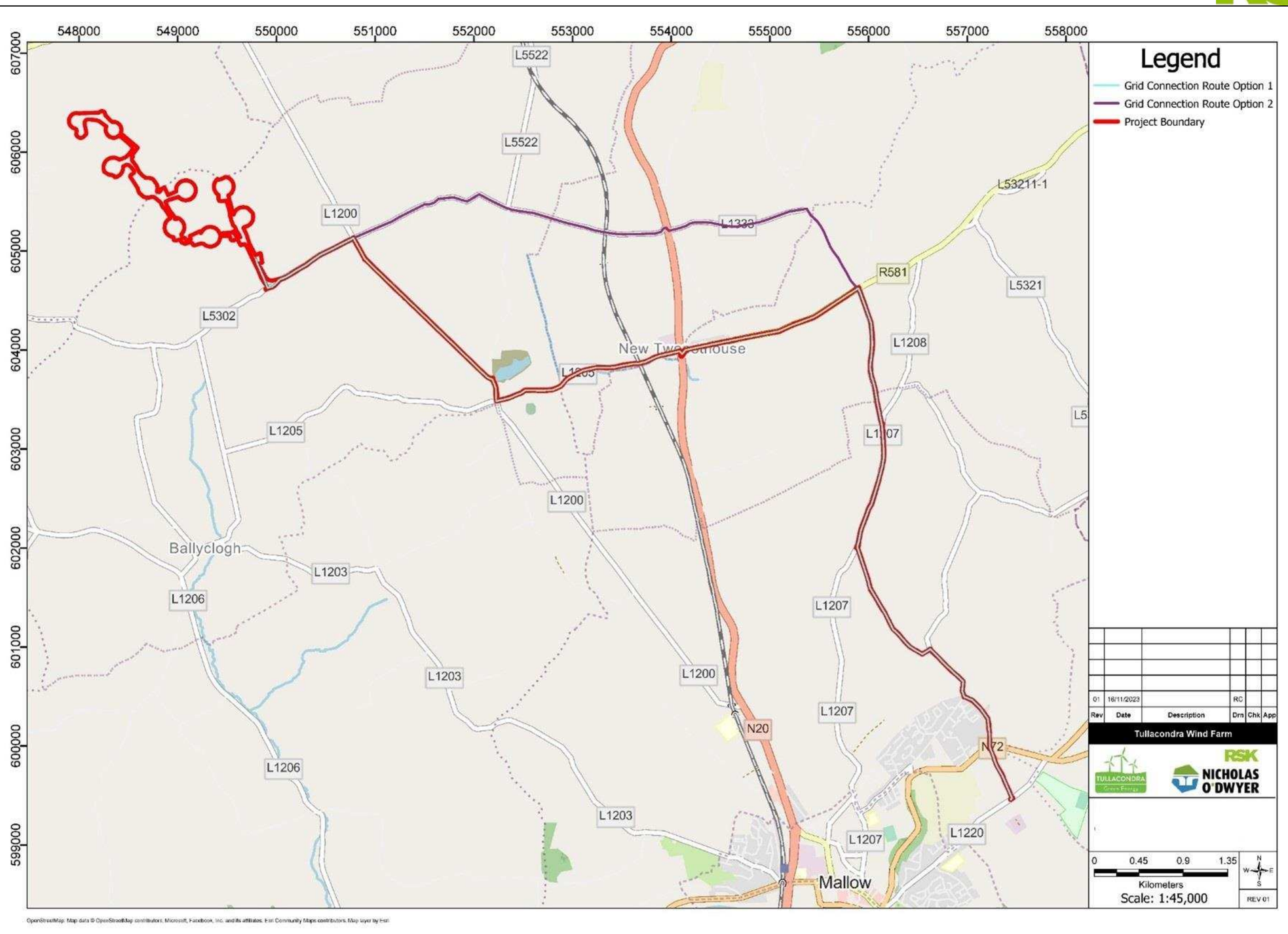


Figure 1: Wind Farm and Grid Connection Site Location Map

4 WIND FARM RESOURCE AND WASTE GENERATION

4.1 Construction and Demolition Phase

A high-level overview of the construction activities, with the potential to generate excess material involved is provided below. This list is not exhaustive and is provided to give an overview of the likely type of activities. Note also that the precise order in which these activities will take place is not known at this stage.

- Site compound, Site Offices / Staff Welfare Units and Storage Compound.
- Temporary staff parking.
- Vegetation removal, topsoil stripping and excavation.
- Subsoil excavation.
- Storage of topsoil and subsoil for future reuse, breakout and crushing of hardstanding.
- Removal of surplus material / spoil if required.
- Construction of the drainage network, drainage and silt control measures including stilling ponds.
- Importation of fill.
- Importation of steel.
- Importation of concrete.
- Construction of new units - foundation trenching, establishment of foundations, installation of utilities, SuDS, importation of building materials by HGV, storage of building materials, erection of units, erection of scaffolding, roofing, internal fit out and painting.
- Construction of access routes and parking areas - site levelling, earthworks, soil compaction, installation of road base, kerbing, road drainage, tarmacking and paving surface.
- Removal of hedgerows and reinstatement.
- Construction of site tracks and upgrade of water course crossing as required.
- Construction of turbine crane hardstanding's.
- Construction of turbine foundations and wind turbine assembly.
- Construction of control building/substation.
- Construction of meteorological mast foundations and erection of metmast.
- Internal site cabling installation.
- Construction of Control building and substation including:
    - Installation of switchgear/metering.
    - Installation of transformer and externals.
- Landscaping and Signage.
- Construction of the grid connection including:
    - Linear trenching, ducting along the road network to Mallow 110kV Substation.

- Construction of cable joint bays, along with two smaller communication link box chambers at intervals along the route.
- Cable pulling and interface with the wind farm substation and Mallow 110kV substation.
- Off-site remedial works associated.

4.1.1 Details of the Non-Hazardous Wastes to be Produced

No significant demolition is required at the site. Any non-hazardous waste generated will be reused where possible.

Any vegetation clearance required will generate significant quantities of green waste. This waste will be reused where possible. Examples include the creation of habitats for wildlife and the chipping of any vegetation to create mulch. Such examples of reuse may require the registration of an appropriate waste exemption. If reuse is not possible, then any green waste should be handled and transported from site by an appropriately registered contractor.

There will be soil and rock excavated to facilitate the construction of buildings on the site. Approximately **95,962m³** of spoil material will be generated on site. Of this, an estimated **530m³** will be rock and **95,432m³** will be spoil (topsoil/subsoil). Estimated reuse on the site will be c.**94,786m³** of soil and subsoil. The majority of rock excavated on site will be reused following removal from site, crushing and degrading and returned to site for use in formation of site tracks, under foundations etc.

All suitable non-hazardous excavated material will be reused on site where possible, i.e. to level out ground in specified areas and/or for landscaping. Any excavated waste that cannot be reused shall be handled and transported from site by an appropriately registered contractor.

A wide variety of non-hazardous waste will be generated during the construction phase. Typical waste types are listed within **Table 2** below.

4.1.2 Details of imported Materials for construction

Approximately c. **31,351m³** of aggregate will be imported to the site for construction purposes, approximately **6742m³** of concrete will be imported to the site for construction purposes and approximately **118m³** of sand will be imported to the site for construction purposes. Materials to be imported will be sourced from suitable licenced quarry facilities.

4.1.3 Details of the Hazardous Wastes to be Produced

4.1.3.1 Contaminated Soil

Environmental soil analysis will be carried out prior to construction on a number of soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability.

4.1.3.2 *Fuel/Oil*

Any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded (or stored in double-skinned tanks) and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

4.1.3.3 *Invasive Species*

Invasive non-native species have been identified at the Project and an Invasive Species Management Plan has been prepared for the site. Prior to any required vegetation removal, a biosecurity expert will be engaged to implement the management plan. This management plan will include how the removal of any identified invasive non-native plants will be undertaken in accordance with the latest guidance to prevent further growth or spread both within and beyond the site.

Should the further presence of any invasive non-native plants be identified prior to any required vegetation removal, then a biosecurity expert should be engaged to develop an appropriate management plan. This management plan should include how the removal of any identified invasive non-native plants will be undertaken in accordance with the latest guidance to prevent further growth or spread both within and beyond the site.

4.1.3.4 *Other known Hazardous Substances*

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum.

4.1.3.5 *Main C&D Waste Categories*

The main non-hazardous and hazardous waste streams that could be generated by the construction and demolition activities at a typical site are shown in **Table 2** below. The List of Waste (LoW) code (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

This section is also reflective of any repairs and maintenance works during the operational phase of the development.

Table 2: Typical waste types generated and EWCs.

Waste Material	EWC Code
Concrete, bricks, tiles, ceramic	17 01 01, 17 01 02, 17 01 03, 17 01 06* & 17 01 07
Wood, glass, and plastic	17 02 01-04
Bituminous mixtures, coal tar and tarred products	17 03 01-03
Metals (including their alloys)	17 04 01-07 & 09-10
Soil and stones	17 05 03-04
Gypsum-based construction material	17 08 02

Waste Material	EWC Code
Mixed C&D waste	17 09 04
Electrical and electronic components	20 01 35-36
Batteries and accumulators	20 01 33-34
Liquid fuels	13 07 01-03
Paints	08 01 12
Chemicals (solvants, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
*** Indicates a hazardous substance**	

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4.2 Site Clearance and Earthworks

Demolition works at the site can be classed as minimal, as the site is currently undeveloped. It is anticipated that significant vegetation clearance, vegetation maintenance, earthworks and ground preparation from cut and fill works will be required as part of the development. It is currently estimated that the quantity of excavated material, when bulked up, due to site clearance and preparation of foundations, access tracks and substation will be approximately **56,278m³** of topsoil**, 39,154m³** of subsoil and **530m³** of rock.

There is the potential for contaminants in any enabling works. In the event that there are any contaminated materials found in the area of hardstanding, these will be removed and disposed of, at an approved facility, in an environmentally sustainable and responsible manner.

Removal of the existing topsoil layer (approx. 300mm thick) will occur at the wind turbine locations, hardstand areas, drainage network, substation location, meteorological mast location, pond areas, contractors' compound and along the road network. Stripping and removal of the topsoil layer will be coordinated with the proposed staging for the development. The extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work area(s) and will be programmed to minimise soil handling / double soil movements. Stripped topsoil will be temporarily stockpiled and reused on site for roadside and hardstand berm construction. Topsoil will also be spread on site adjacent to the infrastructure to a depth of approximately **75mm**. Approximately**, 56,063m³** of topsoil will be reused on site for the purpose of berm construction and landscaping purposes. The residual topsoil material, approximately **215m³** will be stockpiled in designated areas for later use in site decommissioning.

Excavation of subsoil layers will be required as part of turbine foundation excavation, drainage, substation and meteorological mast installation. Disturbed subsoil layers will be stabilised as soon as practicable and reused in road construction for gradient purposes, in construction of berms, hardstand areas, underlying wind turbine foundations and for internal grid construction. An estimated **38,722m³** of subsoil will be reused for this purpose. This will leave an estimated residual **432m³** to be stockpiled on site for decommissioning purpose.

An estimated **530m³** of weathered rock and bedrock will be excavated and transported off site where it will be crushed and graded and then reused on site.

All suitable non-hazardous excavated material will be reused on site where possible. Any excavated material that cannot be reused shall be handled and transported to designated stockpile areas on site.

4.3 Grid Connection

Tullacondra Green Energy Limited proposes to connect into the Mallow 110kV substation at St. Joseph's Road, Mallow. The grid connection from the wind farm site to the substation will be approximately 13.5km (Option 1) to 14.2km (Option 2) via a 38kV cable which will be underground and constructed primarily within the existing road corridor. Approximately 0.5km of the cable route will be off road. The design of the grid connection and connection into the Mallow 110kV substation will comply with ESBN / EirGrid specifications and technical and operational requirements.

The grid connection cabling will be installed in trenches (c.1.2m deep and 0.6m wide), which will be laid with five cable ducts through which the three electrical cables, communications cables, and copper cables (if required), will be pulled. The ducts will be laid on bedding sand and then surrounded by concrete, red cable protection strip and yellow warning tape and steel protective plates, if required at the location, will be placed in the trench before the top of the trench is backfilled and reinstated.

The cables will be pulled through the ducts and joined together at joint bays located along the route. The Joint Bay will comprise three underground pre-cast concrete chambers – a joint bay chamber (4.5m long, 2.03m wide and 0.96m deep), along with two smaller communication link box chambers. Cable pulling, jointing and testing will be carried out at the start and end point at each Joint Bay. Once the cables have been jointed and commissioned, the entry and exit and joint bay chamber will be filled with sand and a concrete cover fitted on top, see Planning Drawing Number **20910-NOD-XX-XX-DR-C-08242**.

A man-hole type cover will be fitted over the start and end points of the grid connection cable route and over the Joint Link Bay chambers. Over-ground identification marker posts and marker plates will be installed along the route. The manhole covers and marker plates/posts will be the only surface expression of the cabling when works are completed.

An estimated **13,995m^3** (including bulking factor) of material will arise from the excavation of the cable trench along the road and offroad. The cable ducting lay will require approximately **4,445m^3** of CBM4 cement for cable protection and the trench will be backfilled with **4,860m^3** of excavated material. The surface finishing layer will be reinstated to a depth of approximately 0.1m, circa **810m^3** of imported top layer will be required. The excess material from cable trench construction, approximately **2,430m^3** will be removed from the linear construction site to a licensed waste handling facility.

Cable joint bays associated communication chamber boxes will be constructed along the cable route. This will require the excavation of approximately **1,725m^3** of material. Construction and backfilling around the joint bays will require some concrete and imported sand. It is anticipated that **1,725m^3** of excavated material will be removed from the construction site to a licensed waste handling facility.

4.4 Management of Surplus Material

It is envisaged that material excavated to construct all infrastructure elements of the wind farm (foundations, tracks, hardstands, etc.) will be used as backfill, berm construction, for site reinstatement and landscaping purposes.

The majority of spoil generated on site will be of topsoil and subsoils with some rock excavated at foundation locations. The majority of rock excavated on site will be reused following removal from site, crushing and degrading and returned to site for use in formation of site tracks, under foundations etc. A summary estimate of materials excavated at the wind farm site and reused in construction is provided in **Table 3** below:

Table 3: Balance of Materials Generated, Reused

Balance of materials following reuse on site	Generated with bulking factor (m^3)	Reused on site (m^3)	Imported to site (m^3)	Balance of material (m^3)	Balance of surplus material on site with bulking factor (m^3)
Topsoil	56278	56,063	-	215	215
Subsoil	39,154	3938,772	-	432	432
Aggregate/rock on site	530	530	-	-	-
Aggregate imported	-	-	31,351	31,351	-
Concrete	-	-	6,742	6,742	-
Sand	-	-	118	118	-

The balance of surplus material will used on site for landscaping purposes.

The location and dimension of the stock pile areas is shown in **Table 4** together with the estimated percentage breakdown of surplus material at each location.

Table 4: Location and dimensions of stockpile areas within the wind farm site

Percentage Stockpile Distribution across Site	Near T1	8%
	Near T2	8%
	Near T3	10%
	Near T4	24%
	Near T5	0%
	Near T6	9%
	Near T7	0%
	Near T8	8%
	Near T9	11%
	Near Met mast	0%
	Near Compound	9%
	Near Substation	6%
	Near Site Entrance	7%

The material excavated for the construction and upgrade of site access tracks will be placed mainly in berms alongside the wind farm access tracks and/or stockpiled in designated temporary storage areas.

In relation to excavated material removed during the grid connection network installation, any earthen (sod) banks to be excavated will be carefully removed and stored separately, maintained and used during reinstatement. Surplus excavated material from roadways will be reused if suitable or disposed of to a licenced waste facility.

If any requirement arises to remove soil or stone from site to a specific waste permitted site then prior to this the available data should be submitted to the permit holder to confirm the suitability of the material for the transfer to a waste facility.

5 WASTE MANAGEMENT

5.1 Construction Phase

5.1.1 Waste Management

Waste is to be segregated on site where practical. Where the on-site segregation of certain waste types is not practical, off-site segregation will be carried out. The site waste storage area will have skips and recycling receptacles for all recyclable wastes. Collections for these will be as usage required. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Cork Region that provide this service.

All waste arising's will be handled by an approved waste contractor holding a current waste collection permit. All waste arising's requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required. Written records will be maintained by the contractor(s) detailing the waste arising throughout the construction phase, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR/permit or licence for the receiving waste facility for all waste removed and disposed off-site.

The above information will be retained for a minimum of 3 years and will be made available for review by the regulating authorities should they request it.

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc., if required.

Soil:

The Waste Management Hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option of prevention and minimisation is not an option. Therefore, excavated soil will be reused where possible.

It has been estimated that the total volume of topsoil and subsoil material to be cut will be c. **95,433m^3**. The majority of this material will be reused on site for construction purposes in berms and backfilling with any excess (214m^3) topsoil and (432m^3) subsoil used for landscaping purposes.

If testing of the material indicates that the material is deemed to be a waste, soil disposal will be carried out by contractors licensed under the Waste Management Act 1996, the Waste Management (Permit) Regulations of 1998 and the Waste Management (Collection Permit) Regulations of 2001. All soil will be classified in accordance with Council Decision 2003/33/EC and disposed of in accordance with its hazard category in fully EPA/local authority licensed disposal facilities.

Bedrock:

The estimate of rock excavated is, 530m^3 with all of this reused on site.

Concrete Block, Bricks, Tiles, Hard Plastic, Glass, Plasterboard and Ceramics:

If undamaged and in a suitable condition for reuse, these materials will be cleaned and segregated for recycling and stored in suitably covered skips for collection by licensed contractor. Damaged/unsuitable materials may be further processed offsite for use as a recycled aggregate at a permitted/licensed site.

Metal: Metals will be segregated into mixed ferrous, aluminium cladding, high grade stainless steel, low grade stainless steel etc., where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Timber: Any uncontaminated timber, i.e. free from paints, preservatives, glues etc., will be segregated for recycling and stored in suitable covered skip for collection by licensed contractor. Contaminated wood will be stored in a separate skip.

Waste Electrical and Electronic Equipment (WEEE):

Any WEEE will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

Other Recyclables:

Other recyclables including, but not limited to, soft plastics, cardboard, and packaging will be segregated for recycling and stored in suitably covered skips for collection by licensed contractor.

Non-Recyclables:

Construction waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. At regular intervals and prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the site staff to ensure that there are no recyclable wastes.

Hazardous Waste:

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each waste stream. Prior to commencement of development and removal of any waste offsite, details of the proposed destination of each waste stream will be provided to CCC by the project team.

5.1.2 Tracking and Documentation for Off-Site Waste

All waste will be weighed (on-site or at receiving facility) and documented prior to leaving site. Records will be kept at the site and at the relevant waste facility. Movement of waste will be in accordance with relevant guidelines.

Construction municipal waste will be separated and stored wherever possible and monitored / inspected by the site foreperson at regular intervals and prior to removal to ensure that site protocol for recycling is being adhered to.

5.1.3 Roles / Training for Waste Management and Site Crew

5.1.3.1 Waste Manager

A dedicated waste manager will be appointed to ensure commitment efficiency and site protocols upheld during construction phase. The role of the waste manager will be to record, oversee and manage everyday handling of waste on the site.

Their training will be in setup and maintaining record keeping systems and how to produce an audit to ensure waste management targets are being met. They shall also be trained in the best methods for segregation and storage of recyclables. They will also be familiar with the suitability of material reuse and know how to implement the RWMP.

5.1.3.2 Site Crew

This will be the responsibility of the competent waste manager/representative and a training programme will be organised, incorporated into typical onsite inductions to give an awareness of waste segregation on the site. This will outline how best to manage waste produced on site to ensure it is being handled in compliance with the RWMP, relevant legislation and in manner that prevents any impact to human health or the environment.

Toolbox talks with site staff and contractors that remind staff of their waste responsibilities should be regular. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

5.1.4 Record keeping

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the construction waste arising's on site. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times.

The waste manager or delegate will record the following;

- Waste taken for reuse off-site.
- Waste taken for recycling.
- Waste taken for disposal.
- Reclaimed waste materials brought on-site for reuse.

For any movement of waste, a docket and chain of custody shall be signed and recorded by waste manager, detailing type and weight of material and source or destination. This will be readily comparable with all delivery records to site, so a waste generation percentage for each material can be determined.

5.1.5 Outline of Waste Audit Procedure

It is recommended that the appointed Waste Manager should be responsible for conducting waste audits of the site during the construction / demolition phase.

The audit should consist of a review of all records for waste generation on site and the transportation of waste on and off site.

All waste movements should be recorded, and the details of these transfers should be compared with the established recovery / reuse / recycling targets for the site.

In the event of waste that is unaccounted for and / or targets for the site are not being met, the Waste Manager shall undertake a detailed review of how waste is managed on site to identify the cause. The Waste Manager will then be responsible for implementing any required appropriate actions to resolve any identified issues.

Upon competition of the construction phase of the works, a final report will be prepared which details how waste was managed over the course of the project and that summarises the overall performance of the site against the established targets.

5.1.6 Consultation with Relevant Bodies

5.1.6.1 Local Authority

Once a construction contractor has been appointed and prior to removal of any waste materials offsite, details of the proposed destination of each waste stream will be provided to Cork County Council upon request.

Cork County City Council will also be consulted, as required, throughout the excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

5.1.7 Recycling/Salvage Companies

Companies that specialise in construction waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held.

In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

5.1.8 Waste from Site Preparation

A significant quantity of the potential waste generated on site can be reduced by specifying the reuse of certain materials generated during excavation works.

It is currently anticipated that over the course of the development approximately **95,962m^3** of material will need to be cut, and that in order to prepare the ground to proposed Finished Ground Levels, approximately **127,313m^3** of fill material will be required. The net fill therefore required is approximately c. **31,351m^3**.

All suitable non-hazardous excavated/cut material will be reused on site where possible, i.e. to level out ground in specified areas and/or for landscaping. Any excavated waste

that cannot be reused shall be handled and transported from site by an appropriately registered contractor.

Where excavated waste may not be immediately suitable for reuse, any treatment to make this waste suitable for reuse will be undertaken through an appropriately permitted/licensed mobile plant waste processing facility that complies with the relevant legislation.

5.1.9 Waste Management Conclusions

Waste generated on site will be managed in an appropriate manner and in a sustainable way. The principles of the waste hierarchy will be complied with to ensure the environmental risks are minimised and the policies of Cork County Council are adhered to.

This Resource Waste Management Plan is an outline strategy only at this stage of the development. As each phase of the development progresses, more detailed Site Waste Management Plans and Material Management Plans will be developed.

This strategy has taken into account the need to lessen the overall impact of waste generation through minimisation, reuse and recycling of materials from both the construction phase.

5.2 Operational Phase

5.2.1 Waste Management

Traditionally, local authorities have rolled out blanket schemes for recycling and food waste collection. This means that a single type of scheme is unlikely to provide the most effective recycling solution for this development. The developer will therefore provide the most appropriate facilities for waste and recycling management based on the needs of each block.

RSK recommends the following regarding this development;

- Waste storage issues should be considered at the initial design stage to ensure access for all (including people with disabilities) in a brightly lit (a minimum Lux rating of 220 is recommended), safe and well-designed area, spacious enough for easy manoeuvrability, good ventilation and ready access if required for the control of potential vermin.
- Where storage is provided in a basement area, sufficient access and egress must be provided to enable receptacles to be moved easily from the storage area to an appropriate collection point on the public street nearby. i.e. Passageways and doors to be wide enough, no steps between waste storage area and collection point and as small an incline as possible to allow easy movement of containers. As short a distance as possible between storage area and collection point.
- Suitable wastewater drainage points should be installed in the receptacle storage area for cleaning and disinfecting purposes. There should be a floor sloped to a central foul drain and a hot and cold-water supply to facilitate cleaning and disinfection of bins. This is standard practice and should be included.

In addition, the following will be considered:

- A weekly collection of waste will be undertaken. The maximum length of time between any two collections will be 7 days.

- Special consideration around the waste storage facilities may be required for any expected ageing staff or for those with limited mobility.
- Floors within waste storage areas will be fitted with a non-slip floor surface;
- There will be suitable access and egress to waste storage areas to enable bins to be moved easily to/from collection point with no steps and minimal incline ramp (the gradient should not be steeper that 1:12).
- Bins will comply with IS EN 840 1997. The bin dimensions outlined within the table 10.2.1 below will be considered when planning waste storage areas. In addition to the bins listed, further consideration will be required for the storage of the additional containers and bags for other recyclables.
- All surfaces that containers need to move over shall be of a smooth continuous finish and free from steps or other obstacles. Steps shall incorporate a drop-kerb.
- Any waste area should ideally be located clear of any road, pavement and cycleway.
- Bin store doors must be lockable with access only available to authorised people. Bin store doors should be wide enough to allow bins to be removed for emptying and with doors that can be secured in the open position to allow safe movement of bins. Arrangements will need to be agreed with the council/waste contractors with regards to collection.
- Provision will be provided for the collection of glass within the development. 660 litre containers have been suggested. Should a bottle bank be required then considerations for the total footprint of each bank required will need to be considered. The guidance suggests the footprint to be 4 metres by 2 metres wide and they must be located externally with sufficient access and clearance for servicing using a crane.

5.2.2 Waste Collection

Only companies who are approved and hold a waste collection permit from Cork County Council will be considered for the collection of the waste stored in the Waste Storage Area (WSA). This will ensure that wastes are collected and disposed of at an approved facility.

Non-recyclable waste, dry recyclable waste and organic waste will all be collected weekly, with a period no greater than 7 days between each collection. All waste storage bins will be presented for collection in a manner that will not create a hazard to traffic. Records of the waste collections will be maintained by the facilities management company for the development.

The size, design and bin type may vary depending on the waste storage receptacles provided by the appointed waste contractor(s). However, typical dimensions of waste receptacles used in the WSAs are shown in **Table 5** below.

Table 5: Waste Container Dimensions

Container Type	Size (litres)	Dimensions (height x width x depth in mm)
1100 litre 'Euro' bin (4-wheel bin)	1,100	1380 x 1270 x 1000
660 litre bin	660	1340 x 1200 x 700
240 litre standard bin	240	1075 x 580 x 715

Figure 2: Typical Waste Receptacles

Each bin/container will be clearly labelled and/or colour coded to avoid cross contamination of the different waste streams. Signage will be posted above and/or on the bins to show exactly which waste types can be placed in each bin. Dry Recyclable, non-recyclable, organic and glass waste bins will be required to be collected/emptied twice a week.

Access for vehicles will be designed in accordance with the requirements laid out by BS 5906:2005 Waste management in buildings — Code of practice. This will be dealt with at the detailed design stage.

Access to the waste storage area should be restricted to tenants and facilities management only. The areas will be suitably screened from public view and restricted to access by authorised personnel only. Access by the appointed waste contractor will need to be arranged.

6 CONCLUSIONS

6.1 Construction Phase

6.1.1 Conclusions from the Construction Phase

It is recommended that the main construction contractor with responsibility for the overall scheme register with the “Considerate Contractors Scheme”.

A more detailed Resources and Waste Management Plan will be produced prior to development taking place that provides further details around how waste will be managed on site. RWMP demonstrate appropriate waste management controls during the different construction phases of the Project.

Good practice measures in relation to on-site storage and security of raw materials and waste should be implemented, specifically for the segregation of waste to aid recycling, and for waste and materials to be safely and securely stored on site.

Opportunities to further reduce waste arisings and increase recycling rates from the Project have been identified to ensure it contributes to an improved waste management performance.

It is estimated that approximately 1,609 tonnes (excluding excavation waste) of waste will be generated from the construction phase of the development.

Appropriate targets should be set in relation to the minimisation and recycling of any construction waste materials to be agreed between the developer and main construction contractor with agreed methodologies for waste quantification and monitoring.

APPENDIX E – WATER QUALITY MONITORING PLAN

CONTENTS

1 INTRODUCTION

1.1 This Water Quality Monitoring Plan (WQMP) forms part of the Construction Environmental Management Plan (CEMP) for the Tullacondra Green Energy Project (the Project) in Co. Cork.

1.2 The WQMP sets out the minimum monitoring requirements which must be implemented during construction of the Project.

1.3 The WQMP should be considered a live document and is to be updated by the Contractor at the commencement of the Project and on a quarterly basis thereafter, or as more frequently as the need arises to ensure that it is current and has the most up to date information.

1.4 A copy of the WQMP and any updates shall be maintained on site as part of the Environmental Clerk of Works (ECoW's) Environmental Management System.

1.5 An electronic copy of the ERP and any updates shall be provided to the following:

- Tullacondra Green Energy Project office
- Cork County Council Planning Department
- Inland Fisheries Ireland
- Contractor
- All sub contractors working on the Project.

1.6 The EnvCoW shall maintain a record of all versions of the WQMP issued.

2 PROJECT DESCRIPTION

Site Location and Plan

2.1 The Tullacondra Green Energy Project is located in County Cork in the townlands indicated in **Table 1** and its location is provided in **Figure 1.**

Table 1: Townlands and Electoral Districts in which the proposed Project is located

Proposed development	Townlands
Wind energy project inclusive of turbines, site access tracks, substation, and construction compound	Polnareagha and Ardskeagh (Templemary E. D.); and Tullacondra and Croughta, (Kilmaclenine E. D.).
Grid connection route from wind farm site to Mallow 110kV substation	Kilmaclenine, Croughta, Knockaunavaddreen, and Copestown (Kilmaclenine E. D.); Ballybeg (Buttevant E. D.), Baltydaniel East, Twopothouse, and Curraghkerry (Caherduggan E. D.); Ballyviniter Upper, Cloghlucas North, Curraghphadeen, Ballyviniter Middle, Ballyviniter Lower, Parkadallane, Carrigoon More and Carrigoon Beg (Mallow Rural E. D.).

2.2 The proposed wind farm is located approximately 2km south of Lisgriffin Cross, Co. Cork. The wind farm site for the proposed Project is located along the L5302 at Croughta and consists primarily of mixed farmland habitat with hedgerows and occasional areas of scrub, ponds and lakes, and man-made drains and ditches. The area in which the turbines will be located ranges in elevation from 133m above Ordnance Datum (AOD) in the south to 120m AOD in the north.

2.3 The proposed grid connection includes works in and alongside public roads to install cabling approximately 13.5km to connect the wind farm to the National Grid at the Mallow 110kV substation located in St. Joseph's Road, Mallow. The proposed wind farm site and the route of the proposed grid connection for which planning permission is sought (indicated by the red line planning boundary) is shown in **Figure 1** and includes a total area of 58.6 hectares (ha).

Description of the Project

2.4 A detailed description is included in EIAR **Chapter 5 Project Description.** In summary, the Project will consist of the following elements:

- nine wind turbines with a blade tip height of 175m, rotor diameter of 150m and hub height of 100m.
- turbine foundations and crane pad hardstanding areas and associated drainage.
- upgrade of existing site tracks and construction of new site tracks and associated drainage.
- access from the local public road L5302 at Croughta consisting of a new site entrance for the construction phase and upgrade of an existing entrance for the operational phase.

- an on-site 38kV electrical substation to Electricity Supply Board Networks (ESBN) specification to include control building with electrical infrastructure, welfare facilities supplied by rainwater harvesting and storage tank, a wastewater holding tank, car parking, security fencing and lighting, and all associated infrastructure, services, and site works including a temporary construction compound.
- all associated underground electrical and communications cabling connecting the turbines to the proposed electrical substation.
- a temporary construction compound and associated ancillary infrastructure including welfare services, office accommodation, parking, fencing, lighting, etc.
- areas for temporary storage of excavated materials.
- a permanent meteorological mast of 100m height above ground level on a concrete base.
- installation of 38kV underground electrical cabling, mainly within the public road, between the proposed on-site wind farm substation to the Mallow 110kV substation boundary at St. Joseph's Road, Mallow.
- all associated site works, including site clearance, and ancillary development including site drainage, security gates, fencing, permanent and temporary signage, and biodiversity mitigation and enhancements, including hedgerow planting.

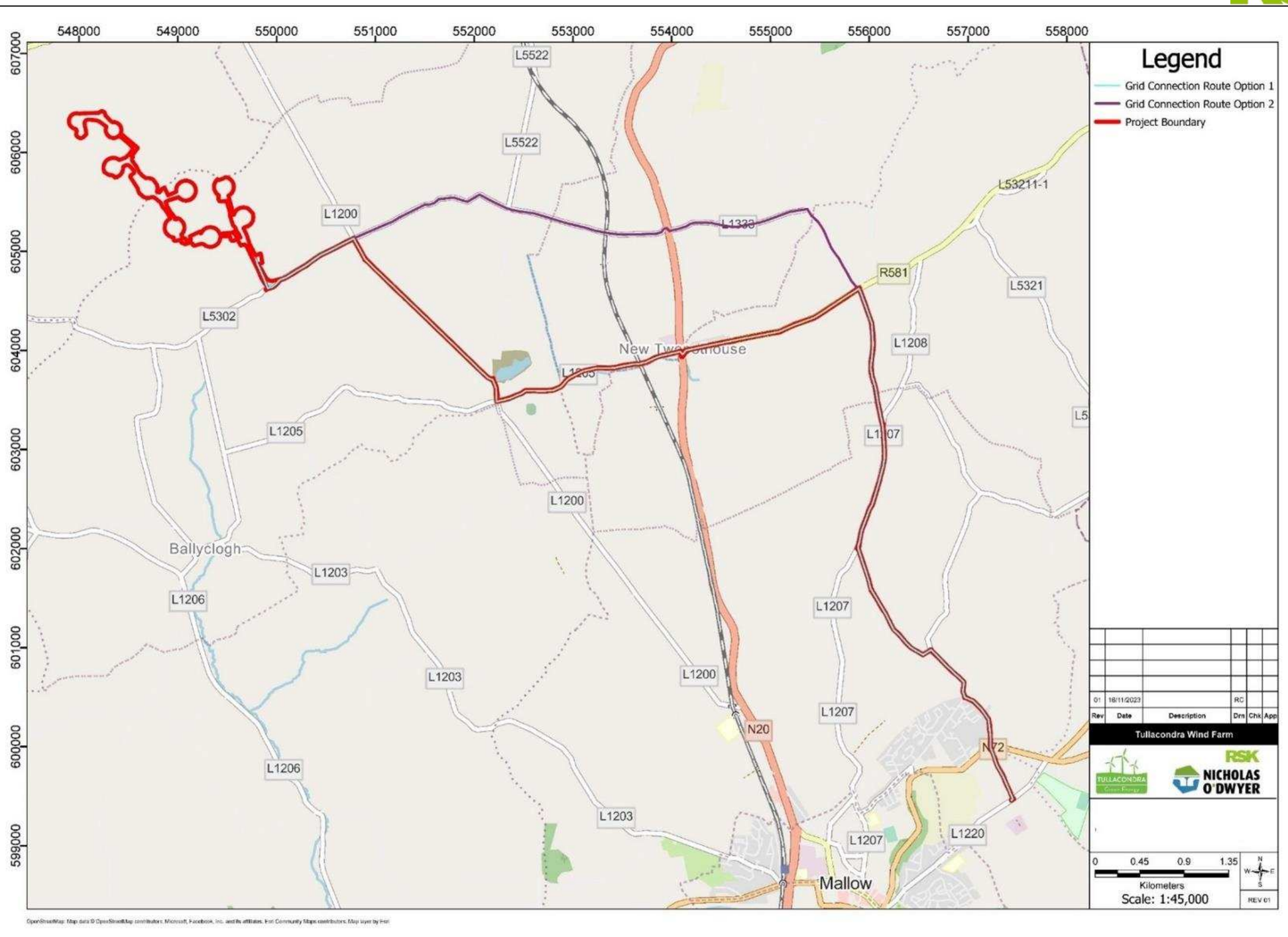


Figure 1: Tullacondra Green Energy Project and Grid Connection Site Location Map

3 MONITORING & ENVIRONMENTAL CLERK

Environmental Clerk of Work

3.1 To ensure effective implementation of mitigation measures, environmental auditing, and monitoring of environmental obligations of the Developer, an Environmental Clerk of Works (EnvCoW) will be assigned by the Developer to carry out monitoring at the Site during the construction and operational phases of the Project.

3.2 The EnvCoW role will be to actively and continuously monitor site conditions and advise on environmental issues and monitoring compliance, and will not be responsible for implementing measures, the due duty of implementing measures will be held by the Developer / contracted construction operator.

3.3 The EnvCoW will have the authority to temporarily stop works in a particular area of the site to ensure corrective measures are implemented and adverse environmental impacts are minimised if not avoided.

3.4 Monitoring of pollution prevention and mitigation undertaken by the EnvCoW assigned by the Developer will include:

- Monitoring site pollution prevention plan.
- Water quality monitoring.
- Advising on required pollution prevention measures (as described in this EIAR) and monitoring their effectiveness.
- Liaison with local authorities in relation to pollution instances if applicable.
- Considering EnvCoW will be responsible for monitoring a broad range of environmental factors at the Site, technical monitoring and advice will be sought such as from specialist consultants as the need arises e.g., installation and website for telemetry.

Monitoring Requirements

3.5 The following measures set out in **Table 2** and **Table 3** will be implemented for Site and GCR monitoring in relation to the hydrological and hydrogeological impacts:

Table 2: General Surface Water Monitoring Requirements

Activity	Wind farm Construction
Monitoring Frequency	**General Monitoring Requirement**
Prior to Commencement of Construction	• A programme of water quality monitoring outlining the selected parameters and monitoring frequency will be agreed with Inland Fisheries Ireland and Cork County Council prior to the commencement of construction.
Daily during Construction Quarterly during Operation	• During the construction phase of the Project, the development areas and adjacent receiving drainage systems will be monitored daily for evidence of erosion and other adverse effects to natural drainage channels and existing degraded areas whereby soils/subsoils are exposed and prone to enhanced degradation. • This monitoring will continue at a reasonable frequency during the operational phase of the Project; however it is envisaged that any potential issues in this regard will be identified and rectified during the construction phase.
Equipment on site	• Handheld meters (Turbidity / Total Suspended Solids (TSS)) will used by the EnvCoW / competent operators during construction works. This will be done with a view to managing water treatment and anticipating potential surcharges in water or TSS loading within the treatment train. • Handheld meters will also be used to monitor outfall/discharge quality in the event telemetry systems fail or during system maintenance. • A handheld turbidity meter will be available and used to accurately measure the quality of water discharging from the site at any particular location. • The meter will be maintained and calibrated frequently (per the particular unit's calibration requirements / user manual) and will also be used to check and calibrate remote sensors if they are employed.
Continuous	• Rainfall will be monitored (one rainfall gauge required). This unit will be connected with and displayed with other site water quality telemetry data via the telemetry website.
Weekly during construction	• Surface water runoff control infrastructure will be checked and maintained on an ongoing basis, and stilling ponds and check dams will be maintained (de-sludge / settle solids removed)

Activity	Wind farm Construction
Monitoring Frequency	**General Monitoring Requirement**
	on an ongoing basis, particularly during the construction phase of the Project.
Continuous	• Telemetric Monitoring Systems will be used a key part of Active Management of runoff and construction water at the site, as presented in EIAR **Volume III, Appendix 9.4** – Tiles 8 to 10. • Continuous monitoring systems will be in place, particularly in principal surface water features draining the site. For example, remote sensing, or telemetric monitoring sensors (turbidity) will be employed in this regard. • Continuous Monitoring Locations or Telemetric Monitoring Stations (TMS) will use probes to monitor the following parameters: o Electrical Conductivity o Turbidity (Data obtained can be equated to estimated Total Suspended Solids (TSS) through calibration) o pH o Temperature o Capacity for additional probes. • TMSs will be self-powered and will be comprised of the following components at a minimum: • Remote Telemetry Unit (RTU) – Modem / data hub and transmission. o Solar panel o Sensor – pH o Sensor – Turbidity o Sensor – Electrical Conductivity o Sensor Cleaning Device (SCD)(Turbidity probe) o Power Management Unit (PMU) o Power Bank (PB) o Website – presenting data trends over time. o Metal stand / frame and protective fencing. o The TMS will have capacity for additional parameters. • Telemetric continuous monitoring sampling frequency is generally set at one data point per 15 minutes, however considering the intensive nature of the proposed works, particularly drilling activities, if possible it is recommended that sampling frequency is set at 5 minutes or less with a view to escalating responses to potential discharge quality issues in good time.

Activity	Wind farm Construction
Monitoring Frequency	**General Monitoring Requirement**
	• Data is to be transmitted to a project website which will display data trends over time. • Access to the website is to be provided via a website link.
	• Monitoring of potential hydrological effect of the Project, particularly during the operational phase will be inherently linked to the ecological health of the site (as a functioning ecosystem) and therefore both hydrology and ecology will be considered and monitored in tandem. For example, effects to the hydrological regime at the site can potentially effect on the ecological health or characterisation of the site, and vice versa. Ecological indicators can potentially provide useful data in relation to the long-term effect of changes to the hydrological regime at the site. However, changes to the management of runoff and in turn the hydrological regime at the site will lead to a positive effect overall when compared to the baseline conditions associated with the site e.g. introduction of intermittent dirty water interception ditches along the length of the drainage network is in contrast to baseline, this will promote a more even distribution runoff, attenuate runoff and reduce the hydrological response to rainfall, enhanced potential for recharge to ground, and in various areas of biodiversity enhancement.
Duration of construction and post construction for a 12 month period on a monthly basis	• Similar to the wind farm site baseline monitoring, baseline surface water samples will be obtained at upstream and downstream sampling locations at each significant construction location over mapped rivers. • Baseline surface water samples will be obtained at accessible locations such as existing bridges on public roads. Where upstream access is poor, the upstream baseline sampling location will be directly/immediately upstream of the construction location (e.g., existing bridge / culvert).

Table 3: Specific Surface Water Monitoring Requirements

Activity	Wind Farm Site Construction
Monitoring Frequency	**Specific Monitoring Requirement**
Monthly	• The baseline monitoring undertaken at the Site as part of this study, see surface water sampling sites SW1 to SW4 on **Figure 2**, will be repeated periodically before, during and after the construction phase of the Project to monitor any deviations from baseline water quality that occur at the Site. This monitoring along with the detailed monitoring outlined below will ensure that the mitigation measures that are in place to protect water quality are working.
Daily	• Daily inspection of silt traps, dirty water interception ditches and drainage channels
Daily	• Daily measurement of total suspended solids, electrical conductivity, and pH at selected water monitoring locations on the Site (locations close to active working zones).
Continuous	• Monitoring of total suspended solids, electrical conductivity, and pH during times when excavations are being dewatered (likely high in solids) will be done in real time. • In this regard, physiochemical properties will be monitored in real time by means of alarmed telemetry e.g., telemetric monitoring at baseline sampling locations and alarm thresholds established in line with water quality reference concentrations/limits which will be set using relevant instruments for example, Surface Water Quality Regulations, <25mg/l Total Suspended Solids (TSS)
Continuous	• Continuous Monitoring will be carried out as part of Active Management of construction water management and treatment (**Figure 3**). • These monitoring systems will travel with the active construction areas / remain with the Active Management infrastructure. • The purpose of this is to recycle water if quality is unfavourable and adjust the dewatering and treatment train accordingly until discharge quality is observed to be acceptable. • A small degree of tolerance above reference concentrations is acceptable at this location but only if the discharge from the Active Management train discharges to another Passive Management system or to a non-sensitive vegetated area.

	• If discharging within sensitive areas or buffer zones, the quality of discharge from the Active Management train will be in line with prescribed reference limits (e.g., 25mg/l TSS)
Continuous during the Construction Phase Continuous during the Operational Phase until stable conditions reached	• Continuous Monitoring at downstream Baseline SW Monitoring Locations (SW1 to SW 4 as shown in **Figure 2**) will be carried out using telemetry during the construction phase. • Triggering of the threshold at these locations will trigger emergency response and escalation of measures including immediate full site inspection to ascertain to the potential unknown source (bearing in mind that the quality of managed runoff at the site will be known by means of live telemetry and handheld meters). • Continuous monitoring at Baseline SW Monitoring Locations will continue into the operational phase until stable conditions are observed e.g., stable conditions in line with baseline conditions for 6 months.
Daily during Construction Weekly during Operation	• During the construction phase of the Project, the developed areas will be monitored daily for evidence of groundwater seepage, water ponding and wetting of previously dry spots, and visual monitoring of the effectiveness of the constructed drainage and attenuation system so that it does not become blocked, eroded or damaged during the construction process. • This monitoring will continue at a reasonable frequency (weekly initially gradually reduced based on observed stability of conditions) during the operational phase of the Project, however it is envisaged that any potential issues in this regard will be identified and rectified during the construction phase
Daily during Construction Weekly during Operation	• During the construction phase of the Project, the receiving drainage systems will be monitored daily for evidence of erosion and other adverse impacts to natural drainage channels and existing degraded areas whereby soils/peat are exposed and prone to enhanced degradation. • This monitoring will continue at a reasonable frequency during the operational phase of the Project, however it is envisaged that any potential issues in this regard will be identified and rectified during the construction phase

Continuous during Construction	• Site water runoff quality at all surface water monitoring locations will be monitored on a continuous basis during the construction phase of the Project. • Monitoring will continue into the operational phase until such time that the Site and water quality have stabilised (stable conditions in line with baseline conditions for e.g. 8 consecutive quarterly monitoring events). This monitoring will be carried out at the downstream surface water baseline sampling location (**Figure 2**)
Activity	**Horizontal Directional Drilling**
Monitoring Frequency	**Specific Monitoring Requirements**
Continuous	• At construction areas requiring drilling (HDD) and/or significant excavations (launch pits, cable joint bays), and in the management of general excavations, arisings will be managed carefully with a view to containing and treating all drained water and runoff which will likely be laden with suspended solids. • Active continuous monitoring will be required at these locations**.** • The monitoring location will be at the outfall or discharge point of the treatment train at any respective location. Continuous monitoring will include telemetry
Monthly during construction and for a period of 12 months post construction	• At Horizontal Directional Drilling (HDD) locations, any mapped wells identified in HDD groundwater buffer zones (250m) will be monitored to establish baseline, and routinely monitored during the construction and for a period into the operational phase of the Project.
Activity	**Watercourse Crossings**
Monitoring Frequency	**Monitoring Frequency**
Daily during Construction Weekly/Monthly during Operation	• During both the construction and operational phases of the Project watercourse crossings will be monitored frequently (daily during construction and intermittently during operational phase i.e., weekly / monthly inspections initially and reduced gradually in line with observed stability and confidence in longer term data obtained. • The water course crossings will be monitored in terms of structural integrity and in terms of their impact on respective watercourses.
Activity	**Grid Connection Route**
Monitoring Frequency	**Specific Monitoring Requirements**

	• Monitoring will be carried out at each significant construction location (HDD, any excavation >2.0m) and at significant environmental receptors including the following Environmental Monitoring Locations;
	  ○ Upstream and downstream of surface water crossings on mapped rivers.
	  ○ Groundwater abstraction points within buffer zones (mapped wells, source protection areas, and/or associated Regionally Important Karst Aquifer).
	• Monitoring proposed will be specified relative to the particular activity and associated risk at respective locations.
	• The grid connection route passes through two Source Protection Areas as mapped by the GSI (2022); the Mountnorth Regional Water Supply Scheme (SI) c. 1km southeast of the redline boundary of the proposed development and the Oliver's Cross Public Water Supply Scheme SPA(SO) and (SI) c. 7.4km.
	• All abstraction points associated with groundwater source protection areas and within Regionally Important Karst aquifers associated with the Project will be monitored with the same frequency.

Activity	**Monitoring Under Licence**
Monitoring Frequency	**Specific Monitoring Requirement**
Likely Daily or Weekly if required.	• Where a discharge licence is required, the conditions of the licence will stipulate monitoring requirements in line with licence parameters with associated emission limit values. • The frequency of sampling will likely be daily or weekly. Sampling will include obtaining physical samples at an agreed discharge sampling point and will be sent an accredited laboratory for analysis. • Where discharge licence is required, monitoring in line with the licence will be done in addition to the other monitoring regimes undertaken as described above. Monitoring under licence conditions will not negate the requirement for the other regimes described.
Activity	**Post Construction**
Monitoring Frequency	**Specific Monitoring Requirements**

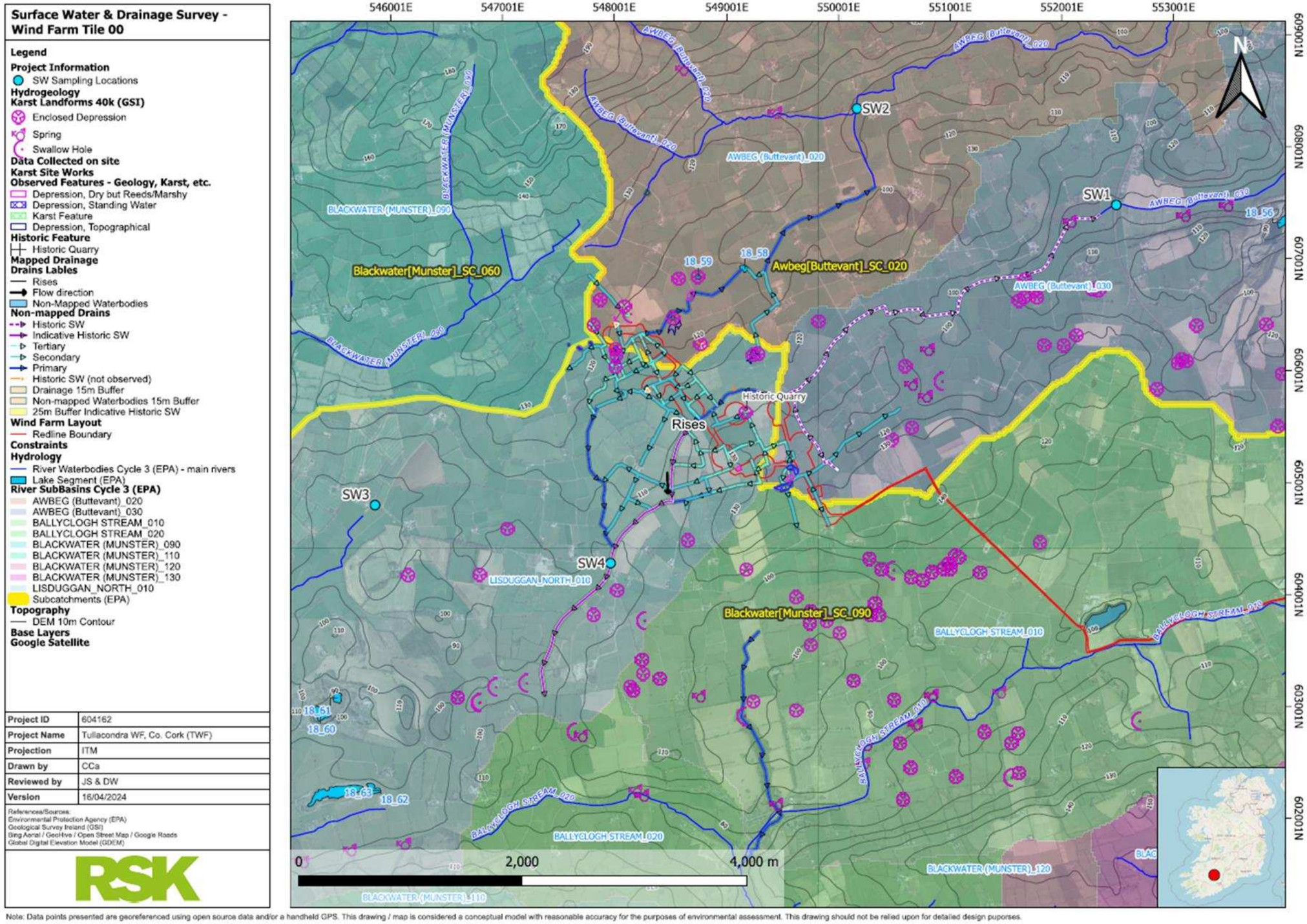
Monthly or after heavy rainfall events (defined as >10mm rain	• Post construction: at a monthly or after heavy rainfall events (>10mm of rain) inspection of silt traps, dirty water interception ditches and drainage channels, measurement of total suspended solids, electrical conductivity, and pH at selected water monitoring locations at the site. • During the operational phase of the Project the stilling ponds and dirty water interception ditches will be periodically inspected during maintenance visits to the site.
Weekly during Operation	• During the operational phase of the Project the stilling ponds and dirty water interception ditches will be periodically inspected e.g., weekly during maintenance visits to the Site initially and gradually reduced based on observed stability of conditions.

Managing & Reporting Environmental Incidents

3.6 Environmental incidents including accidental spillages on soils (e.g. fuel), breeches of thresholds (environmental quality standards – TSS exceeding 25mg/l), and significant environmental incidents will be reported to the Local Authority as part of emergency responses to such incidents. Incident notification will be escalated to relevant third parties where relevant e.g. Inland Fisheries Ireland (IFI) if surface water receptors are intercepted.

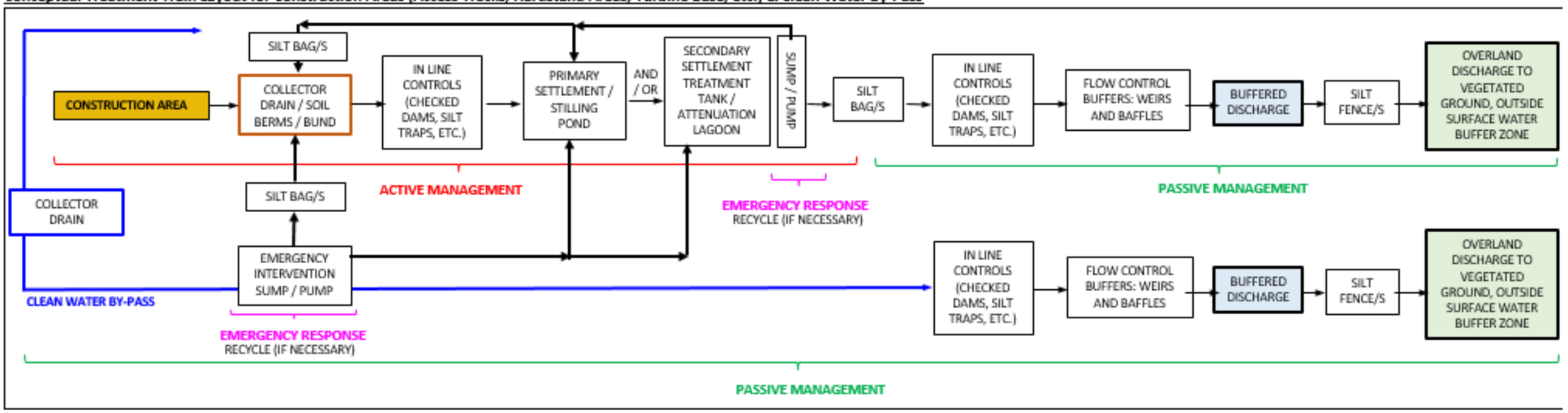
3.7 Continuous Monitoring at downstream baseline Surface Water (SW) monitoring locations (**Figure 2**) will be carried out using telemetry during the construction phase. Triggering of the threshold at these locations will trigger emergency response and escalation of measures including immediate full site inspection to ascertain to the potential unknown source (bearing in mind that the quality of managed runoff at the site will be known by means of live telemetry and handheld meters).

3.8 Conceptual and information graphics presented in **Figure 3** presents indicative layout and specification for both passive treatment trains (e.g., clean water and or storm water interception drains), active management treatment trains (management and treatment of construction water) and emergency response and intervention.



Note: Data points presented are georeferenced using open source data and/or a handheld GPS. This drawing / map is considered a conceptual model with reasonable accuracy for the purposes of environmental assessment. This drawing should not be relied upon for detailed design puporses.

Figure 2: Location of SW Monitoring Locations (SW1, SW2, SW3 and SW4).



NOTES:

- Wherever possible, outfalls will be positioned outside of Surface Water Buffer Zones.
- For areas of the development footprint within Surface Water Buffer Zones, in line measures such as silt screens will be over specified e.g. double / triple silt screens, and access to emergency intervention sump / pumps will be facilitated through design and/or emergency response.
- Quality of runoff entering buffer zones will be good i.e. suspended solids <25mg/l. Where runoff quality is poor, emergency response will be to use an intervention sump / pump and pump divert runoff to an area of the drainage network where it will be treated before redistribution and discharge.

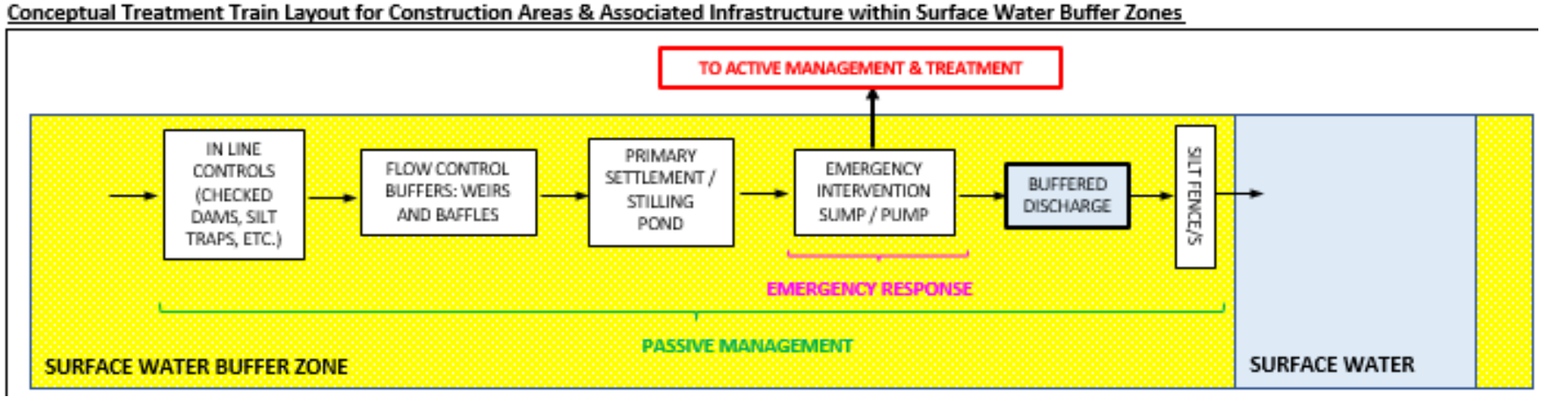


Figure 3: Conceptual model of Water Treatment Train

4 EMERGENCY RESPONSE PROTOCOLS

4.1 Prior to commencement of construction, the EnvCoW will prepare a register of corrective action and emergency response sub-contractors that can be called upon in the event of an environmental incident, and/or to give training on escalating incident where useful, including e.g., specialist hydrocarbon spill response, specialist hydrological and/or water quality response.

4.2 Mitigation will set out to minimise any potential for contaminants to reach sensitive receptors identified during the construction phase of the Project are encompassed in passive management of construction water, however, there remains the risk of accidental spillages and or leaks of contaminants, and excessive loading of surface water mitigation infrastructure.

4.3 EnvCoW will monitor the efficiency of mitigation measures applied, and were failing to achieve the objectives set, emergency response and mitigation measures are escalated until such time as the site stabilises and objectives of mitigation are being achieved once more.

4.4 A risk of accidental chemical spillages, sediment overloading of control measures or leaks of contaminants from plant or equipment remains a possibility. If there are any issues, active construction water management will then take place. There is a series of steps for Emergency response protocols and they are as follows.

- Monitoring by EnvCoW – threshold triggered
- Investigate and identify sources of contaminate
- Isolate the area – insert straw bales (temporary measure)
- Divert water – Pump out of drain
- Discharge to vegetated area through silt screen or stilling pond before vegetated area

4.5 All activities that could trigger an emergency response protocol are listed below, however it should be noted that each response is dependent on two key items.

- Severity of contaminant
- Volume of water

4.6 The following is a non-exhaustive list of potential emergency scenarios where corrective action may be required, and proposed corrective mitigation measures are included:

- Potential issue; Elevated concentrations of suspended solids in runoff during excavation activities during an unforeseen or low probability storm event, for example a 1 in 100-year event. Proposed measure; cover exposed stockpiles in plastic sheeting and placement of straw bales and silt fences in associated drainage channels.
- Potential issue; Failure or degradation of stone check dam during a storm event with associated elevated runoff volumes. Proposed measure; Introduction of straw bales and silt fences in order to regain attenuation capacity of the drainage channel until the maintenance can be completed, (**Figure 4)**.

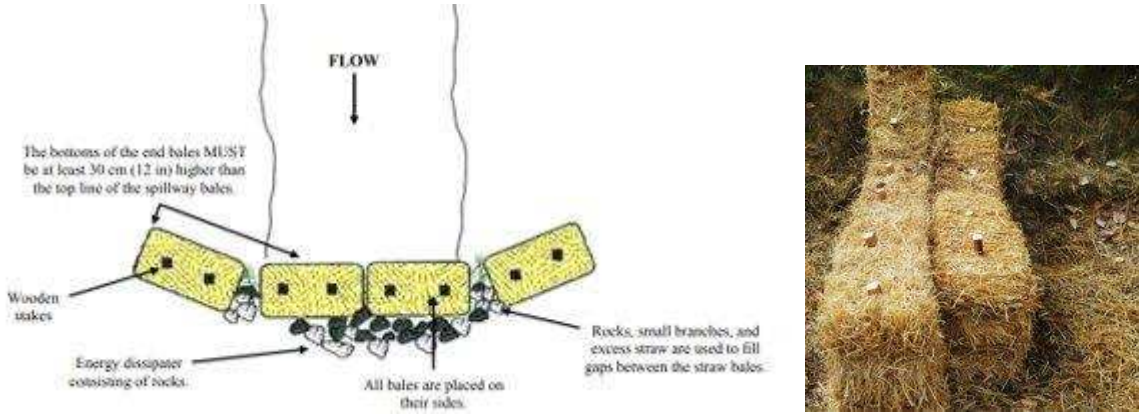


Figure 4: Straw bale retention feature

- Potential issue; Localised stability issue leading to deposit of soils/subsoils within an active drainage channel. Proposed measure; Introduction of straw bales and silt fences directly downstream, of the area in order to attenuate gross solids isolate the area and over pump until remedial works and maintenance can be completed, divert all runoff from the area to Active Management area of the treatment train (**Figure 3**).
- Potential issue; Management of unexpected runoff patterns leading to excessive drying or wetting in a particular area, potentially leading to enhanced erosion. Proposed measure; This type of issue will require assessment on a case by case basis. Solutions might include; decommission, modification, introduction or relocation of dirty water interception ditch, or diversion of runoff volumes to or away from the area. In regard to the potential for erosion and similar physical processes, any such issues will become apparent through monitoring relatively rapidly, whereas effects to ecological sensitivities will become apparent relatively slowly in comparison. It is noted that much of the Site is effected as part of baseline in this regard e.g. existing artificial drainage networks.

4.7 Potential emergencies and respective emergency responses include:

- Hydrocarbon spill or leak – Hydrocarbon contamination incidents will be dealt with immediately as they arise. Hydrocarbon spill kits will be prepared and kept in vehicles associated with the construction phase of the Project. Spill kits will also be established at proposed construction areas, for example, a spill kit will be established and mobilised as part of the turbine erection materials and equipment. Suitable receptacles for hydrocarbon contaminated materials will also be at hand.

- Significant hydrocarbon spill or leak – In the event of a significant hydrocarbon spillage, emergency responses will be escalated accordingly. Escalation can include measures such as installation of temporary sumps, drains or dykes to control the flow or migration of hydrocarbons and contaminated runoff will be contained, managed and pumped to a controlled area in line with active management including treatment through a suitably equipped treatment tank and Granular Activate Carbon (GAC) vessels. This process will be managed by the EnvCoW in conjunction with a preidentified consultant (EnvCoW) specialist register, in regard to effective remediation, treatment and

removal of hydrocarbon contaminated water and soils excavation and appropriate disposal of contaminated soils will be required in this instance.

- If a significant hydrocarbon spillage does occur, the contractor on behalf of the developer will have an approved and certified clean-up consultancy available on 24-hour notice to contain and clean-up the spill. The faster the containment or clean-up starts, the greater the success rate, the lower the damage caused and the lower the cost for the clean-up.

- Cementitious material – Cement / concrete contamination incidents will be dealt with immediately as they arise. Spill kits will also be established at proposed construction areas, for example a spill kit will be established and mobilised as part of the turbine erection materials and equipment. Suitable receptacles for cementitious materials will also be at hand.

- In the event of a significant contamination or polluting incident the relevant authorities will be informed immediately.

Contingency Plan for HDD

4.8 In the event that a drilling fluid spill or 'breakout' occurs, the contractor shall cease drilling immediately, notify the Environmental Clerk of Works (EnvCoW).

4.9 Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

4.10 The contractor will draft and apply a Contingency Plan highlighting the principal HDD risks. At minimum, the contractor will have equipment and materials on standby to mitigate against the following risks associated with HDD:

- Hydro-lock (loss of fluid flow)
- A hydro-fracture incident (loss of fluid pressure)
- Fluid spill over
- Hydrocarbon/fuel spill
- Drill pipe rupture
- Borehole path failure
- Major workplace safety events in remote areas.

4.11 The HDD operators will be equipped with necessary emergency containment equipment e.g. oil booms, silt fences, sandbags, shovels, pumps, and any other materials or equipment necessary to contain and clean up and properly dispose of unintentional releases.

APPENDIX F – EMERGENCY RESPONSE PLAN

CONTENTS

1 INTRODUCTION

1.1 This Emergency Response Plan (ERP) forms part of the Construction Environmental Management Plan (CEMP) for the Tullacondra Green Energy Project (the Project) in Co. Cork.

1.2 The ERP is intended to form the basis of providing information on the emergency responses required should, emergency situations, pollution incidents or serious accident occur on the site during construction of the Project.

1.3 The ERP should be considered a live document and is to be updated by the Contractor on a quarterly basis, or more frequently as the need arises to ensure that it is current and has the most up to date information and contact details.

1.4 A copy of the ERP and any updates shall be maintained on site as part of the Contractor's Health and Safety File.

1.5 An electronic copy of the ERP and any updates shall be provided to the following:

- Tullaconrdra Green Energy Project office
- Cork County Council Planning Department
- All sub-contractors working on the Project.

1.6 The Contractor shall maintain a record of all versions of the ERP issued and to whom in the Health and Safety file on site.

2 PROJECT DESCRIPTION

Site Location and Plan

2.1 The Tullacondra Green Energy Project is located in County Cork in the townlands indicated in **Table 1** of and its location is provided in **Figure 1**.

Table 1: Townlands and Electoral Districts in which the proposed Project is located

Proposed development	Townlands
Wind energy project inclusive of turbines, site access tracks, substation, and construction compound	Polnareagha and Ardskeagh (Templemary E. D.); and Tullacondra and Croughta, (Kilmaclenine E. D.).
Grid connection route from wind farm site to Mallow 110kV substation	Kilmaclenine, Croughta, Knockaunavaddreen, and Copestown (Kilmaclenine E. D.); Ballybeg (Buttevant E. D.), Baltydaniel East, Twopothouse, and Curraghkerry (Caherduggan E. D.); Ballyviniter Upper, Cloghlucas North, Curraghphadeen, Ballyviniter Middle, Ballyviniter Lower, Parkadallane, Carrigoon More and Carrigoon Beg (Mallow Rural E. D.).

2.2 The proposed wind farm is located approximately 2km south of Lisgriffin Cross, Co. Cork. The wind farm site for the proposed Project is located along the L5302 at Croughta and consists primarily of mixed farmland habitat with hedgerows and occasional areas of scrub, ponds and lakes, and man-made drains and ditches. The area in which the turbines will be located ranges in elevation from 133m above Ordnance Datum (AOD) in the south to 120m AOD in the north.

2.3 The proposed grid connection includes works in and alongside public roads to install cabling approximately 13.5km to connect the wind farm to the National Grid at the Mallow 110kV substation located in St. Joseph's Road, Mallow. The proposed wind farm site and the route of the proposed grid connection for which planning permission is sought (indicated by the red line planning boundary) is shown in **Figure 1** and includes a total area of 58.6 hectares (ha).

Description of the Project

2.4 A detailed description is included in EIAR **Chapter 5 Project Description**. In summary, the Project will consist of the following elements:

- nine wind turbines with a blade tip height of 175m, rotor diameter of 150m and hub height of 100m.
- turbine foundations and crane pad hardstanding areas and associated drainage.
- upgrade of existing site tracks and construction of new site tracks and associated drainage.
- access from the local public road L5302 at Croughta consisting of a new site entrance for the construction phase and upgrade of an existing entrance for the operational phase.
- an on-site 38kV electrical substation to Electricity Supply Board Networks (ESBN) specification to include control building with electrical infrastructure, welfare

facilities supplied by rainwater harvesting and storage tank, a wastewater holding tank, car parking, security fencing and lighting, and all associated infrastructure, services, and site works including a temporary construction compound.

- all associated underground electrical and communications cabling connecting the turbines to the proposed electrical substation.
- a temporary construction compound and associated ancillary infrastructure including welfare services, office accommodation, parking, fencing, lighting, etc.
- areas for temporary storage of excavated materials.
- a permanent meteorological mast of 100m height above ground level on a concrete base.
- installation of 38kV underground electrical cabling, mainly within the public road, between the proposed on-site wind farm substation to the Mallow 110kV substation boundary at St. Joseph's Road, Mallow.
- all associated site works, including site clearance, and ancillary development including site drainage, security gates, fencing, permanent and temporary signage, and biodiversity mitigation and enhancements, including hedgerow planting.

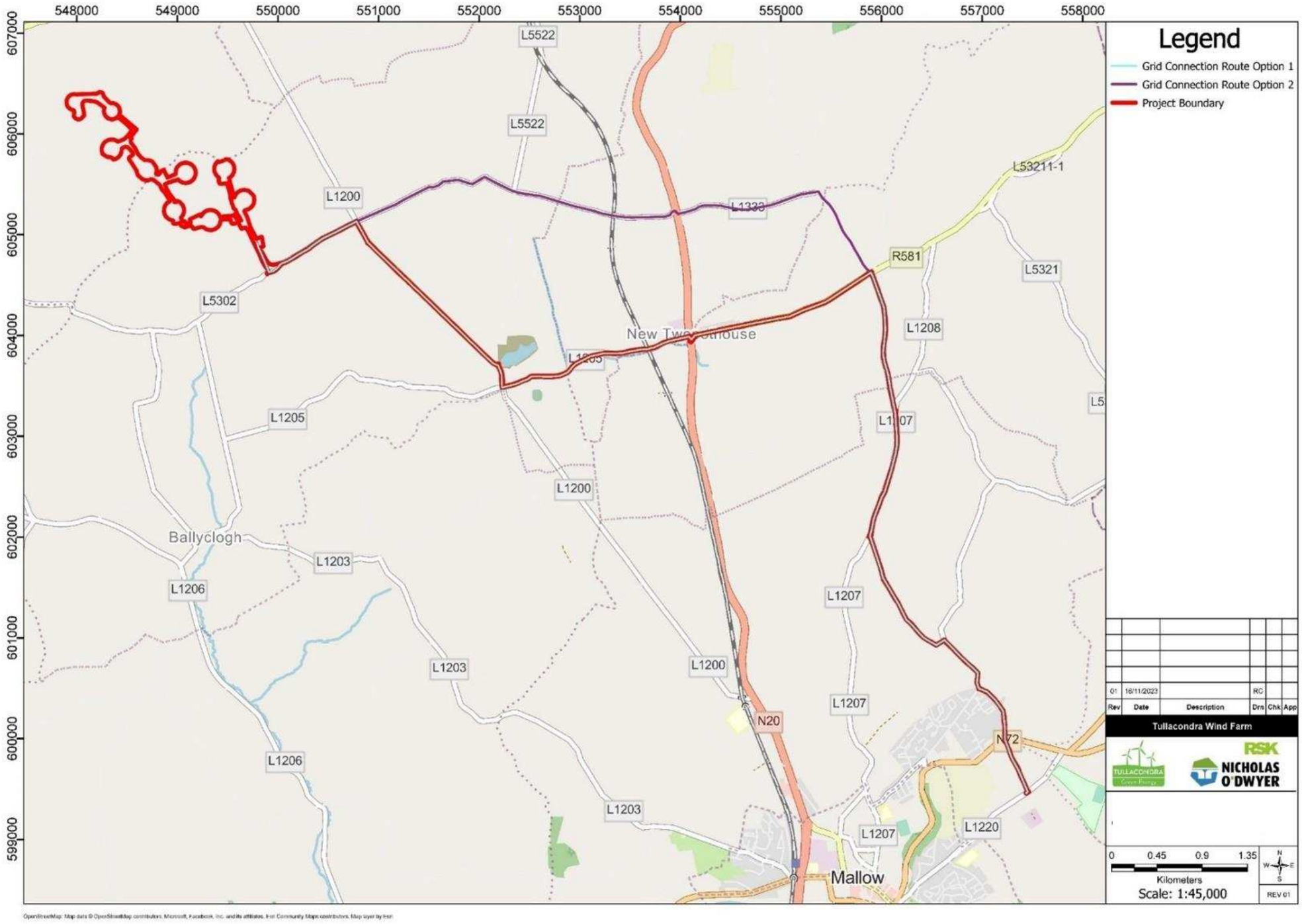


Figure 1: Tullacondra Green Energy Project and Grid Connection Site Location Map

3 EMERGENCY PREPAREDNESS AND EMERGENCY RESPONSE

3.1 Prior to commencement of construction, the Environmental Clerk of Works (EnvCoW) will prepare a register of corrective action and emergency response sub-contractors that can be called upon in the event of an environmental incident, and/or to give training on escalating incident where useful, including e.g. specialist hydrocarbon spill response, specialist hydrological and/or water quality response.

3.2 Although mitigation measures provided in the EIAR (EIAR **Chapter 9 Hydrology and Hydrogeology**) and CEMP will reduce the potential for contamination of waters during the construction phase of the Project, there remains the risk of accidental spillages and/or leaks of contaminants, and excessive loading of surface water mitigation infrastructure. For this reason, emergency preparedness is required.

3.3 Potential emergencies and respective emergency responses include:

- Hydrocarbon spill or leak – Hydrocarbon contamination incidents will be dealt with immediately as they arise. Hydrocarbon spill kits will be prepared and kept in vehicles associated with the construction phase of the Project. Spill kits will also be established at proposed construction areas. For example, a spill kit will be established and mobilised as part of the turbine erection materials and equipment. Suitable receptacles for hydrocarbon contaminated materials will also be at hand.
- Significant hydrocarbon spill or leak – In the event of a significant hydrocarbon spillage, emergency responses will be escalated accordingly. Escalation can include measures such as installation of temporary sumps, drains or dykes to control the flow or migration of hydrocarbons and contaminated runoff will be contained, managed and pumped to a controlled area in line with Active Management including treatment through a suitably equipped treatment tank and Granular Activate Carbon (GAC) vessels. This process will be managed by the EnvCoW in conjunction with a preidentified consultant (EnvCoW specialist register) in regard to effective remediation, treatment and removal of hydrocarbon contaminated water and soils. Excavation and appropriate disposal of contaminated soils will be required in this instance.
- If a significant hydrocarbon spillage does occur, the contractor on behalf of the developer will have an approved and certified clean-up consultancy available on 24-hour notice to contain and clean-up the spill. The faster the containment or clean-up starts, the greater the success rate, the lower the damage caused and the lower the cost for the clean-up.
- Cementitious material – Cement / concrete contamination incidents will be dealt with immediately as they arise. Spill kits will also be established at proposed construction areas, for example a spill kit will be established and mobilised as part of the turbine erection materials and equipment. Suitable receptacles for cementitious materials will also be at hand.

- In the event of a significant contamination or polluting incident the relevant authorities will be informed immediately.

Managing and Reporting Environmental Incidents

3.4 Environmental incidents including accidental spillages on soils (e.g. fuel), breeches of licence limits if applicable (discharge of trade effluent), and significant environmental incidents will be reported to the Local Authority as part of emergency responses to such incidents. Incident notification will be escalated to relevant third parties where relevant e.g. Inland Fisheries Ireland (IFI) if surface water receptors are intercepted.

Emergency Response Plan

3.5 The ERP provides procedures to be followed in the event of an emergency in terms of site health and safety and environmental protection.

3.6 The ERP is a working document and will require updating and submissions from the contractor/PSCS throughout the various phases of the project. Where sub-contractors that are contracted on site are governed by their own emergency response procedure, arrangements will be made to allow for inclusion of the sub-contractor's ERP within this document.

Roles and Responsibilities

3.7 The Site Manager will be responsible for activating and coordinating the emergency response procedure. 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.

Horizontal Directional Drilling (HDD) break out

3.8 In the event that a drilling fluid spill or 'breakout' occurs, the main construction contractor shall cease drilling immediately, notify the EnvCoW and Emergency Service Management Personnel.

3.9 Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

3.10 The Contractor will draft and apply a **Contingency Plan** highlighting with the principal HDD risks.

3.11 At minimum, the Contractor will have equipment and materials on standby to mitigate against the following risks associated with HDD[1]:

- Hydro-lock (loss of fluid flow)
- A hydro-fracture incident (loss of fluid pressure)

[1] MDM (2018) "Rockabill System Specifications for Cable Installation", McMahon Design & Management Ltd. Consulting Engineers and Project Managers, Job no. 1319

- Fluid spill over
- Hydrocarbon/fuel spill
- Drill pipe rupture
- Borehole path failure
- Major workplace safety events in remote areas

3.12 The HDD operators will need to be equipped with straw bales, stakes to secure bails, oil booms, silt fences, sandbags, shovels, pumps, and any other materials or equipment necessary to contain and clean up and properly dispose of unintentional releases.

Spill Kits

3.13 Spill kits capable of dealing with hydrocarbon and chemical spills shall be available at appropriate locations on site. Each storage location shall be clearly visible to the workforce, for instance by deploying clear signage.

3.14 The spill kit contents shall include absorbent pads, absorbent booms, absorbent granules and hazardous waste disposal sacks as a minimum. Regular checks of the spill kits shall be completed to ensure they remain adequately stocked to deal with environmental incidents.

3.15 Spill drills shall be performed periodically to confirm that the workforce can effectively contain and clear up potentially polluting spillages. All drills will be documented, and details kept on record for the duration of the works.

Fire Prevention

3.16 Means to raise the alarm in the event of a fire such as a siren or foghorn shall be available at the points of work. An assembly point marked with a sign shall be designated a safe distance from the active works locations and will be communicated to all members of the workforce before works commence.

3.17 The workforce shall assemble at the point for a rollcall to be carried out by the Site Security Officer. The Site Manager will decide the appropriate course of action and will advise all personnel accordingly.

3.18 All individuals on site, including visitors, will be obliged to immediately sign in on arrival.

Extreme Weather

3.19 The Site Manager shall register to receive Met Eireann weather warnings. All warnings issued by Met Eireann with the potential to impact upon the works shall be communicated by the Site Manager to the workforce in a timely manner so that measures can be implemented where necessary.

3.20 The Contractor shall maintain provisions to deal with extreme hot weather events. Measures shall include provision of safe drinking water and adequate shade.

3.21 Seasonable variations will be monitored to take account of potential wet weather when planning stripping of topsoil and excavations to minimise soil erosion and run off.

Incident Reporting and Investigation

3.22 All incidents, including near misses, shall be classified according to the categories outlined below. All categories of environmental incident shall be reported by the Contractor to The Project Team as outlined in **Table 2** below.

Table 2: Incident Reporting and Investigation

Incident Classification	Definition
Near Miss	An event, controlled through implementation of an effective incident control measure (e.g., drip tray used, effective use of noise barrier).
Minor Environmental Incident	Incidents that have caused minor harm or damage to the environment e.g. • a minor fuel spill below 20 litres onto ground which is immediately cleared. • a minor spill of a chemical not classified as presenting an ecotoxic risk. • exceeding noise levels. • silt runoff from site which does not enter into a surface water feature. • excess dust emissions.
Major Environmental Incident	Incidents that have caused or may cause significant harm or damage to the environment e.g. • a minor fuel spill which impacts a sensitive land feature, a water body, or drains. • a major fuel spillage over 20 litres. • any spillage of a chemical which is classified as presenting an ecotoxic risk. • silt runoff from site which enters a water feature. • receipt of a nuisance complaint.

3.23 The Contractor shall prepare an investigation report for all environmental incidents. The report is to include:

Summary of the environmental incident, describing the:

- nature of the incident.
- details of any pollutant released including the type and quantity of pollutant released.
- location for the incident (e.g., grid reference).
- Receptors that were or could have been impacted.
- An analysis of what led to the incident occurring.
- Summary of immediate actions taken to mitigate the incident.
- Summary of any remedial action required.
- Lessons learned and future measures or actions to be implemented.

3.24 The Contractor shall report all environmental incidents that are required to be reported to the relevant statutory or regulatory bodies.

3.25 The Contractor will verify the incident investigation and agree with their contractors any further actions which are to be implemented to prevent a reoccurrence of comparable incidents. A timeline for the implementation of all actions shall be established and the Contractor shall provide details of when they have been implemented.

3.26 An incident investigation shall be complete when all details have been recorded on file.

Emergency Contacts

3.27 In the event of an emergency occurrence at the Site, the Contractor shall determine the relevant statutory and regulatory bodies that must be notified. Notification shall be in accordance with the measures outlined above.

3.28 A list of emergency contacts is presented in **Table 3**. A copy of these contacts will be included in the Site Safety Manual and in the site office.

Table 3: List of emergency contacts

Emergency Contacts	
Contact	Contact details
Client – The Tullacondra Green Energy Project	TBC prior to commencement
Project Supervisor Construction Stage (PSCS)	TBC prior to commencement
Project Supervisor Design Stage (PSDS)	TBC prior to commencement
Cork County Council Environmental Incident Report	021 4532700
Cork County Council Roads and Transportation Emergency Number (only to be used after 5.00 pm and before 9.00 am, at weekends and Public Holidays	021 4800048
Inland Fisheries Ireland (Incident Reporting)	0818 34 74 24
Inland Fisheries Ireland Macroom Offices, Cork (9.00 to 1.00pm and 2.00pm to 4.30pm on Mondays to Fridays)	026 41222
EPA Incident Hotline Number (outside of business hours (09.00 – 17.00 Monday to Friday)	0818 33 55 99
EPA (Dublin)	01 268 0100
EPA Regional Inspectorate Cork	021 4875540
National Parks and Wildlife Service's regional office	076 100 2557
National Environmental Complaints Line (NECL)	1850 365 121
Health and Safety Authority	1890 289 389
Irish Water	1800 278 278
Emergency Services – Ambulance, Fire, Gardai	999 / 112
Bord Gáis Emergency	1850 20 50 50
ESB Networks Emergency (Overhead Wires)	1800 372 999
Mallow Garda Station	022 31450

Incident Response

3.29 All pollution incidents should be managed through the STOP - CONTAIN - NOTIFY concept.

3.30 As soon as an incident is identified, the first action should be to STOP and prevent further discharge to drainage/river/ground.

3.31 **CONTAIN** may constitute control of discharge in the event of a spill, or cessation of works if it is the works that are resulting in the incident, e.g., halting excavations until silt runoff is contained. It is recognised that due to personal health and safety risks it may not always be safe to stop the source of the spill, for instance if a significant volume of an unidentified substance has been released.

3.32 **NOTIFICATION** should take place as soon as practicable, and frequently can take place while further release is being stopped or while a spill is being contained.

3.33 Oil, fuel or chemical spill to ground

i. Wear protective clothing, prevent further release at source e.g., switch off tap/ valve, correct leaking drum and make safe the area.

ii. If the spill is migrating, create a temporary bund to prevent further spread by using spill kit materials / sandbags.

iii. If drains or field ditches are located nearby, install drain seals/ deploy additional spill kit materials to prevent the spill discharging to the drain or ditch.

iv. Apply absorbent granules or pads (available from spill kit) to the affected area.

v. Contractor will notify the local authority regarding the nature and scale of incident. The following information should be included in the notification:

- Time of discharge.
- Type/quantity of material discharged.
- Location of discharge.
- Site contact details.

vi. Contractor will notify The Project Team of the incident and communicate the information provided to the local authority.

vii. Containment measures should remain in place until the nature and extent of the contamination can be assessed and a remediation strategy must be prepared.

All impacted materials shall be disposed of in accordance with relevant legislative and regulatory requirements and Duty of Care requirements.

3.34 Discovery of unexpected contamination

i. On the discovery of unexpected contamination, the Contractor will immediately halt works in the area.

ii. If impacted materials have already been removed, they shall be returned to the excavation or placed on to a membrane, e.g., terram, to prevent migration of the contaminant to another area.

iii. Contractor to report the situation to The Project Team.

iv. Arrangements will be made between the Contractor and The Project Team for samples of the contamination to be collected and tested on fast turnaround.

v. Contractor to only continue with works in the area once the test results have confirmed the contaminant and a safe means of working has been established.

The Contractor shall be free to continue works in areas unaffected by the contamination but will not speculatively continue to excavate material to find the extent of the contamination without supervision from a geo-environmental engineer.

All impacted materials will be disposed of in accordance with relevant legislative and regulatory requirements as well as relevant Duty of Care requirements.

3.35 Oil, fuel or chemical spill to surface water feature

i. Wear protective clothing, prevent further release at source e.g., switch off tap/ valve, correct leaking drum and make safe the area.

ii. If source not readily identifiable, contain first (see below) then identify and prevent further release at source.

iii. Immediately deploy appropriately sized boom from nearest spill kit across affected surface water feature. Use stakes to attach it to the sides of the surface water feature. Tie booms together to increase length if required.

iv. Supplement with additional booms across the surface water feature, as required, to contain any migration of the spill not halted by the first installation.

v. Contractor shall notify the local authority regarding the nature and scale of incident. The following information should be included in the notification:

- Time of discharge.
- Type/quantity of material discharged to surface water feature.
- Location of discharge.
- Site contact details.

vi. Contractor shall notify The Project Team of the incident and communicate the information provided to the local authority.

All impacted materials will be disposed of in accordance with relevant legislative and regulatory requirements and relevant Duty of Care requirements.

3.36 Oil, fuel or chemical spill to drainage system

i. Wear protective clothing, prevent further release at source e.g., switch off tap/ valve, correct leaking drum and make safe the area.

ii. If source is not readily identifiable, contain the visible pollutant first, then identify and prevent further release at source.

iii. Immediately deploy appropriate drain cover(s) to affected gullies.

iv. Supplement with booms around the gully to contain any migration of the spill.

v. The Contractor shall notify the local authority and the relevant water company regarding the nature and scale of incident. The following information should be included in the notification:

- Time of discharge.

- Type/quantity of material discharged to the drain.
- Location of discharge, specifically which drain.
- Site contact details.

vi. The Contractor shall notify The Project Team of the incident and communicate the information provided to the local authority.

All impacted materials shall be disposed of in accordance with relevant legislative and regulatory requirements and relevant Duty of Care requirements.

3.37 Explosion / Fire Procedure

Explosion/fire incidents should also be dealt with through health and safety procedures. In the event that a fire is detected, or an explosion occurs:

i. Notify the emergency services and evacuate the area.

ii. Only attempt to tackle the fire with site equipment if trained to do so.

iii. Ensure that pollution of nearby water bodies including surface water drainage from fire control water or other substances is minimised. Where possible and safe to do so, any site drainage systems should be protected through the deployment of drain seals/ spill kit materials to ensure any firefighting waters are captured and can be disposed of appropriately.

iv. At a time when it is acceptable to do so, the local authority shall be notified regarding the nature and scale of incident. The following information should be included in the notification:

- Nature of the incident.
- Time and date of the incident.
- Quantity of fire control water discharged to surface water feature/drainage, where relevant.
- Location of discharge.
- Site contact details.

3.38 Discharge of Silt

In the event of an unexpected discharge of silty water, then:

i. Prevent further release at source e.g., cease dewatering the excavations.

ii. Contain silt and protect sensitive receptors from further discharge:

- If a drain is located nearby, install drain seals or deploy spill kit materials to prevent discharge.
- If silt flow is in the direction of surface water features deploy hay bales around surface the feature.
- If silt is being generated by runoff from stockpiles deploy spill kit materials, silt fencing or move soil to form a bund at the base to prevent further silt laden runoff from the stockpile.

iii. If silt is discharged without prior approval the Environment Protection Agency shall be notified. If the silt discharge enters the drainage system, the relevant water company shall also be notified regarding the nature and scale of incident. The following information should be included in all notifications:

- Time of discharge.

- Type/quantity of material discharged.
- Location of discharge, e.g., which drain or surface water feature.
- Site contact details.

3.39 Contamination of or by waste materials

i. Assess whether the area needs to be evacuated, such as if fumes are being given off.

ii. Assess whether the damage can be undone through segregation.

iii. Complete a risk assessment for the task including consideration of any COSHH risks.

iv. If it is safe to do so segregate the waste. If it is not safe to do so, then the full waste quantity is to be consigned as hazardous waste.

v. Contractor to report the incident to the client.

vi. Waste to be collected from site in accordance with normal practice.

3.40 Discovery of archaeological artefact or heritage feature

i. Immediately stop works in the area of the artefact or feature.

ii. Ensure the area is isolated from interference by erecting fencing around the discovery. Prevent vehicles from navigating through this area.

iii. Provide a safe means for pedestrians; and if possible, vehicles, to move around the isolated area.

iv. Contractor shall report the find to the client.

v. Client to arrange for the find to be assessed by a qualified heritage or archaeological specialist. Contractor to prevent tampering with the find until it has been assessed.

vi. Works to proceed in accordance with the recommendations given by the heritage or archaeological specialist.

3.41 Ecological discovery or damage

i. Immediately stop works in the area.

ii. Contractor to immediately report the incident to the client.

iii. Client to arrange for a qualified ecologist to assess the discovery or damage caused.

iv. Works to proceed in accordance with the advice received from the ecologist.

3.42 Vandalism/theft procedure

Acts of theft and vandalism present the risk that damage may be caused to equipment containing hazardous substances that could cause pollution, or damage may be caused to measures which have been installed to prevent the release of pollution. On identifying an act of vandalism or theft:

i. The Contractor shall notify Garda Síochána of the incident.

ii. Inspect all fuel storage tanks/drums and equipment to ensure there has been no release of the fuel or other hazardous substances, e.g., hydraulic fluid.

iii. If a spill is identified follow the procedures for Oil, fuel or chemical spills.

iv. Inspect pollution protection measures, e.g., drainage or silt protection, to ensure it has not been interfered with. Where it is possible, correct any issues identified without causing further release.

v. Inspect site boundaries to identify the access point if not immediately clear and secure the site.

EIAR VOLUME III
Appendices

CHAPTER 5 – PROJECT DESCRIPTION

Appendix 5.2: Construction Traffic Management Plan

PINNACLE
CONSULTING ENGINEERS

TULLACONDRA GREEN ENERGY, CO. CORK.

PIN-RP-00-C001-V5

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

- BUILDING INFORMATION MODELLING (BIM)
- CIVIL DESIGN & ENGINEERING
- DUE DILIGENCE
- OFFSHORE & ONSHORE ENGINEERING
- PRE-DEVELOPMENT
- STRUCTURAL ENGINEERING
- TRANSPORTATION & HIGHWAYS

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DOCUMENT CONTROL SHEET

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Document Title	Construction Traffic Management Plan					
Document Number	P23040039-PIN-RP-00-C001-V5					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No of Appendices
	1	1	8	0	0	2

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APPROVALS

	Name	Position	Date
Prepared by	Ronan Kearns	Associate Transportation Planner	20/07/2023
Reviewed by	Ronan Kearns	Associate Transportation Planner	20/07/2023
Approved by	James Mayer	Director	20/07/2023

REVISIONS

Revision By	Date	Context
V1	28/04/2023	Draft
V2	02/06/2023	Updated draft
V3	20/07/2023	Issued for legal review
V4	24/07/2023	Minor revisions

V5	27/07/23	Updated figures
V6	02/11/23	General update

Table of Contents

CONTENTS

1 Introduction

1.1 Introduction

This Construction Traffic Management Plan (CTMP) has been prepared in consultation with Tullacondra Green Energy Ltd. It is a key construction document, the implementation of which aims to reduce possible traffic impacts may occur during the construction of the proposed Tullacondra Green Energy Project consisting of a 9-turbine wind farm and associated grid connection.

Tullacondra Green Energy Ltd will be responsible for ensuring construction activities are managed in accordance with this CTMP.

Objectives and measures are also included for the management, design and construction of the project to control the traffic impacts of construction insofar as it may affect the environment, local residents and the public in the vicinity of the construction works.

This CTMP is being submitted by Tullacondra Green Energy Ltd. The appointment of the Main Contractor to carry out these works is the responsibility of Tullacondra Green Energy Ltd. and is not covered by the scope of this CTMP works. For the purposes of clarity, Tullacondra Green Energy Ltd have engaged Pinnacle to prepare this CTMP. The appointed Main Contractor will be responsible for its implementation.

1.2 Implementation

Key to the implementation of this CTMP is the appointment of on-site construction manager who will regularly liaise with and update Tullacondra Green Energy Ltd and associated team on all environmental and construction programming issues relating to the site. All site personnel are charged with following good practice and encouraged to provide feedback and suggestions for improvements. All site personnel are also required to ensure compliance with the requirements of the site's CTMP.

1.3 Scope

A CTMP and Traffic Management Plan (TMP) are two separate documents.

A CTMP details how construction traffic will access and egress this development site. It will also address the impact of construction related traffic on the surrounding road network during the construction phase.

A TMP details what traffic control measures that are required for scenarios where normal vehicle and pedestrian traffic flow is interrupted by construction activities.

The objective of this CTMP is to ensure that the residual impacts to the public road network during the construction phase of the project which have been identified in the application documentation are minimised and that transport related activities are carried out as safely as possible and with minimum disruption to other road users.

The CTMP has also been prepared for the purpose of identifying appropriate and safe methods of access for construction traffic to the proposed development. This CTMP describes the traffic management for the transportation of materials, equipment and personnel along the public road network to facilitate the construction of the proposed development. Light vehicles, such as cars and vans, will be used by site operatives travelling to and from the site. For the sake of clarity

Heavy Construction Vehicles/Heavy Goods Vehicles will be referred to as HGVs. These will be required to deliver general construction materials, such as concrete, to the site.

This CTMP remains a live document that will be reviewed by the Main Contractor and expanded upon, where necessary, throughout the construction phase of the project. However, this version is considered to be wholly relevant for the expected works.

Temporary Traffic Management (TTM) is to be utilised at work sites on public roads to warn, instruct and guide road users in a safe progression through or around a work site. It also describes the signs to be used at roadworks. It will be complied by the Main Contractor carrying out works on the public highway.

1.4 Consultation

The measures contained in this CTMP are subject to detailed design and the appointment of a Main Contractor.

This document will form part of the tender discussions that will be held with shortlisted Main Contractors. Feedback from these Main Contractors will be captured and included in an updated document to ensure that a holistic approach has been taken when the appointed Main Contractor drafts the final CTMP.

2 PROJECT DESCRIPTION

2.1 Introduction

The proposed Tullacondra Green Energy Project consists of the following project elements:

- nine wind turbine generators (WTG) with a maximum blade tip height of 175 m, rotor diameter of 150 m and hub height of 100 m;
- turbine foundations and crane pad hardstanding areas and associated drainage;
- upgrade of existing site tracks and construction of new site tracks and associated drainage;
- access from the local road L5302 at Croughta consisting of a new temporary site entrance for the construction phase and upgrade of an existing entrance for the operational phase;
- an on-site 38 kV electrical substation to Electricity Supply Board Networks (ESBN) specification to include control building with electrical infrastructure, welfare facilities supplied by rainwater harvesting and storage tank, a wastewater holding tank, car parking, security fencing and lighting, and all associated infrastructure, services, and site works including a temporary construction compound;
- all associated underground electrical and communications cabling connecting the turbines to the proposed electrical substation;
- a temporary construction compound and associated ancillary infrastructure including welfare services, office accommodation, parking, fencing, lighting, etc.;
- areas for temporary storage of excavated materials;
- a permanent 100 m meteorological mast l on a concrete base;
- installation of 38 kV underground electrical cabling, mainly within the public road, between the proposed on-site wind farm substation to the Mallow 110 kV substation boundary at St. Joseph's Road, Mallow; and
- all associated site works, including site clearance, and ancillary development including site drainage, security gates, fencing, permanent and temporary signage, and biodiversity mitigation and enhancements.

The proposed temporary accommodating works along the turbine delivery route options, from ports at either Foynes or Ringaskiddy to facilitate the delivery of large components to the wind farm site is considered in the assessments in this EIAR but does not form part of the application for planning permission. Of the two grid connection route options examined in the EIAR (as displayed in EIAR Chapter 1 Introduction, Figure 1.1), only one option route (Option 1) is included in the application for planning permission.

The site layout plan of the proposed wind farm is shown in Figure 1.4, in EIAR Chapter 1 Introduction.

Figure 1 Site Layout

2.2 Construction Programme

The construction of the project in its entirety is expected to take 18 months.

There are a number of items which will be conducted in parallel, but the basis of the construction programme will involve site establishment, site access road and drainage construction, hardstanding construction and substation works.

The grid connection works are likely to be done in parallel with the site works and the turbine installation works will be completed before commissioning, reinstatement and landscaping.

However, it is also possible that the grid route could commence prior to the on-site infrastructure or after the construction of the on-site infrastructure. Programming of these works will be essential to avoid buildup of construction traffic especially on section close to the site.

An indicative construction programme upon which vehicle trip distribution calculations are based is shown in the figure below.

Activity	Month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mobilisation and site setup																		
Site Clearance, Tree Felling and Fencing																		
Internal Access Tracks and Drainage																		
Turbine Hard Standings																		
Turbine / Metmast Foundation																		
Onsite Substation																		
On-site Cable Installation																		
Grid Route cable works (off site section only)																		
Turbine / Metmast Installation																		
Energisation, Commissioning & Testing																		
Biodiversity Enhancement																		
Landscaping, Fencing, Reinstatement, Demobilisation																		

Figure 2 Indicative Construction Programme

2.3 Site Access

Tullacondra Wind Farm will have one permanent site entrance, which will be used for both operation and maintenance.

A second temporary entrance will be used during the construction phase and for exceptional use during the maintenance and operation of the wind farm, such as the delivery or removal of wind turbine components.

On completion of works, the secondary entrance will be reinstated in full. The location of this site entrance is shown on Figure 3.

Figure 3 Site Location

Both the permanent and temporary site entrances have been designed in accordance with TII design guidelines DN-GEO-03060. Vehicles approaching the junction from the minor road or direct access shall have unobstructed visibility of the junction from a distance corresponding to the desirable minimum SSD for the design speed of the minor road, as described in DN-GEO-03031.

The permanent access and temporary access locations are illustrated in the figure below.

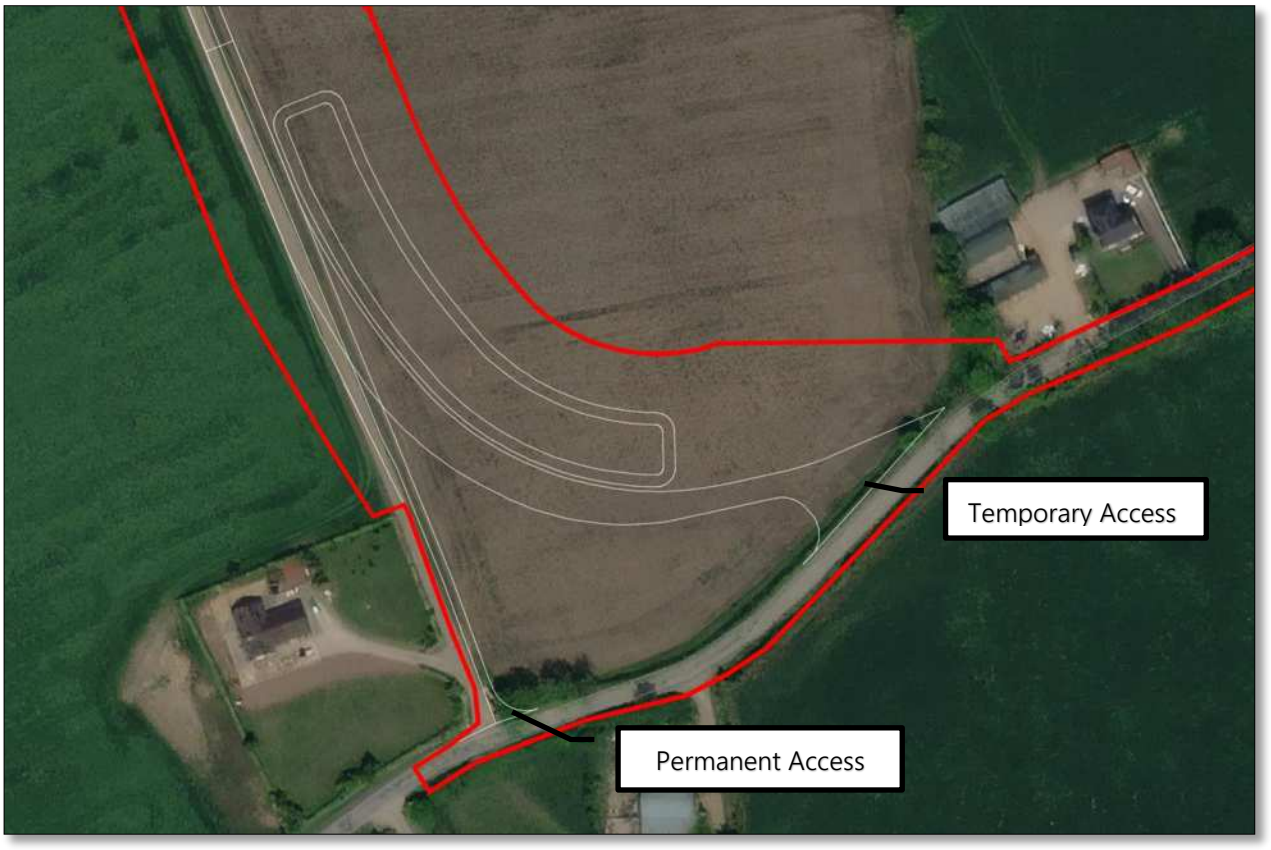


Figure 4 Site Access

The permanent and temporary site access are located c. 120m apart. Each access will have a sight line measuring 3.0m x 80m (y-distance). With overlapping sight lines, vehicles exiting either the permanent or temporary access can do so while observing the vehicle at the other access. At this point a driver can assess traffic on the major road taking into account the presence of vehicle at the other access and make a decision to egress or not.

Forward visibility is the distance along the road ahead which a driver of a vehicle can see. The minimum level of forward visibility required along a road for a driver to stop safely, should an object enter its path i.e. a vehicle exiting either the permanent or temporary access, is based on the Stopping Sight Distances (SSD).

The Y distance along the visibility splay should correspond to the SSD for the design speed of the major arm. At 80m, the corresponding design speed is of c. 55.8km/h using a reaction speed of 2 seconds and a declaration rate of 2.45 m/s2 based on NRA DMRB TD 9.

Based on the existing geometric and forward visibility constraints, it is anticipated that the 85th percentile of driver speeds would be similar to the design speed of 55.8km.h, and therefore there is sufficient SSD to approach to both the permanent and temporary access.

The grid connection for this project will consist of a 110kV new on-site substation connected to the Mallow 110kV substation boundary.

Underground grid route connection works to on-site substation will involve the installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables predominantly along the existing road network. This will require delivery of plant and construction materials, followed by excavation, laying of cables and subsequent reinstatement of trenches.

On public roads, it is expected that full road closures will be put in place to facilitate cabling works in combination with lane closures, partial road closures and stop/go systems. This will enable the works to be completed as quickly and as safely as possible, with minimal disruption time especially in built up areas.

These works shall be undertaken on a rolling basis with short sections closed for short periods before moving onto the next section.

It is anticipated that there will be two cables laid in parallel in one trench in some areas.

There will be no overlap of the cable works in the public road with the turbine deliveries or construction of onsite infrastructure utilising the same section of the route.

The minimum road width requirement for 2 lane traffic is between 4.8m and 6.0m meters depending on vehicle mix. Using a minimum of 3.0m for a lane, there will sections of the route that will require lane closure to allow for passing traffic. This is likely to be done using a stop/go system along the works area.

The proposed grid connection trench will be 600 mm wide and 1200 mm deep. Where the proposed grid connection cable route encounters minor culverts, the ducts will be installed above or below the culvert depending on its depth in accordance with current construction methodologies

2.4 Overview

The construction site will be organised so that, where possible, vehicles and pedestrians using site routes are segregated and can move around safely. The access routes need to be suitable for the persons or vehicles using them, in suitable positions and sufficient in number and size, this is so that incidents can be prevented by the effective management of transport operations throughout the construction process.

Pedestrians and vehicles can be kept apart by management of the following:

- Entrances and exits - provide separate entry and exit gateways for pedestrians and vehicles.
- Walkways - provide firm, level, well-drained pedestrian walkways that take a direct route where possible.
- Crossings - where walkways cross roadways, provide a clearly signed and lit crossing point where drivers and pedestrians can see each other clearly.
- Visibility - make sure drivers driving out onto public roads can see both ways along the footway before they move on to it; the existing entrance has a visibility splay to enable this.
- Obstructions – do not block walkways so that pedestrians have to step onto the vehicle

route; and

- Barriers – Barriers will be installed between the roadway and walkway.

Vehicle movement will need to be minimised on site due to the restricted areas in which the Main Contractor will have to work. This can be minimised by management of the following:

- Provide car and van parking for the workforce and visitors away from the work area within the site compound.
- Control entry to the work area.
- Plan storage areas so that delivery vehicles do not have to cross the site within the site compound.
- People who direct vehicle movements (banksmen) must be trained and authorised to do so.
- Make sure that all drivers and pedestrians know and understand the routes and traffic rules on site.
- Use standard road signs where appropriate.
- Provide induction training for drivers, workers and visitors and send instructions out to visitors before their visit.

The safe movement on the construction site will be greatly assisted by utilising the following:

- Banksmen - who can be appointed to control manoeuvres and who are trained in the task.
- Clothing - pedestrians on site should wear high-visibility clothing as well as other relevant P.P.E.
- Gatekeeper- The site compound will be self-contained, and it is unlikely that a gate keeper be required. A site operative will be appointed to direct/summon banksmen should one be required.
- Speed limits- speed limits to be restricted on site for all vehicles.

3 ENVISAGED CONSTRUCTION TRAFFIC GENERATION

3.1 Introduction

There are multiple factors that influence the traffic generation as a result of construction activities. These factors include, but are not limited to:

- Market conditions
- Detailed design/final cut and fill models
- Program
- Availability of materials
- Availability of staff
- Improvements in construction methodologies i.e., the use of soil stabilisation rather than the importation of suitable material.

An estimate of the construction traffic generation is outlined in Section 4.0 of this report. In the final CTMP, the traffic generation will be calculated based upon final scheme design and construction program. Staffing levels, material deliveries, envisaged plant requirements, and the associated access and traffic and transport impacts, will be calculated based on similar project activities.

3.2 Days and Hours of Construction/Deliveries

All deliveries will be notified to the Site Manager in advance with specific times identified. These will be collated and held in a diary by the Co-ordinator who will manage the deliveries on a daily basis. The Co-ordinator will highlight any clashes and anticipated busy periods to streamline the processing of deliveries.

On arrival to the site entrance drivers will contract the gatekeep and await instruction before moving onto site. They will then be escorted to the appropriate location for unloading by the Main Contractor's Banksmen.

Unloading will be carried out at one of the material storage areas. All deliveries, where possible, must be able to be unloaded by forklift, teleporter or mechanical means.

Site development and building works shall be carried out only between the hours of 0700 to 1900 Mondays to Fridays inclusive, between 0800 to 1400 hours on Saturdays and not at all on Sundays and public holidays (unless otherwise agreed with the local authority).

There may be occasions where it is necessary to make certain deliveries or component erection works outside these times, for example, where large loads e.g., turbine component deliveries are limited to road usage outside peak times. These will be kept to a minimum.

Turbine deliveries and other abnormal loads will be subject to abnormal load licenses.

All access roads used by Main Contractors will be monitored for mud and any construction materials and cleared using a shovel and broom and if required a mechanical road sweeper.

There is a singular temporary construction entrance proposed for the site during construction, onto the Croughta (L5302), as shown in Figure 5. No construction traffic or operative parking will be

permitted along this route, to ensure the environment within the locality is not impacted by the construction activities.

Figure 5 Permanent Site Access

Figure 6 Temporary Site Access

3.3 Public Transport Options for Site Operatives

The site is not accessible by public transport.

Figure 7 Bus Stop Location

The nearest bus stop is located at New Twopothouse Village located c. 5.0km southwest of the proposed development, as indicated by the blue line.

Route No. 522 services Stop No. 631061 and No. 335321. Route No. 522 provides a service between Charleville – Mallow with up to four services per day.

3.3.1 Summary

The site is not accessible by public transport.

3.4 Car pooling

It is well recognised that construction workers tend to make greater use of carpooling than traditional '9-5' workers, possibly due to shared accommodation and travelling from further afield/lower levels of car ownership, which results in a greater level of shared journeys.

Notwithstanding this it is proposed that within the site offices or on the staff welfare notice board there will be information on car sharing and a contact number for the Main Contractor welfare officer who will have a list of site operatives and their willingness to share journeys so that opportunities for car sharing can be maximised. In the event that a lift to work or home becomes unavailable a registered member of the scheme will be offered an alternative lift home or failing that a taxi/public transport ticket will be provided.

For staff that choose to travel to site using cars or other motorised vehicles, a vehicle a pooling system will be put in operation by the Main Contractor. Such measures shall be adopted in order to reduce traffic levels on the local road networks.

3.5 Construction Parking

It is not envisaged that works for this project will have a significant effect on any parking facilities in the surrounding area.

Due to the linear nature of wind farms, it is normal for operatives and plant operatives to drive and park up close to their work area within the site compound, at either the crane hardstands or on layby areas along the internal access roads.

In addition, sufficient parking facilities will be made available for operatives and visitors at the temporary site compounds within the site during the construction of the wind farm and at the substation compound.

Operatives will be prohibited from parking on any public road outside of the site throughout the construction phase. However, set down areas/parking of construction vehicles will be required on public roads along the Grid Connection Route in order to facilitate the grid connection works.

Some parking restrictions may be required on public roads in order to facilitate the delivery of wind turbine components to site. These restrictions will be short in duration with appropriate notice given in advance.

During the construction of the Grid Connection Route, site compounds will be mobilised around the construction area. The site works area will be sized to accommodate the equipment to carry out the work and the vehicles required for transport of equipment and works personnel.

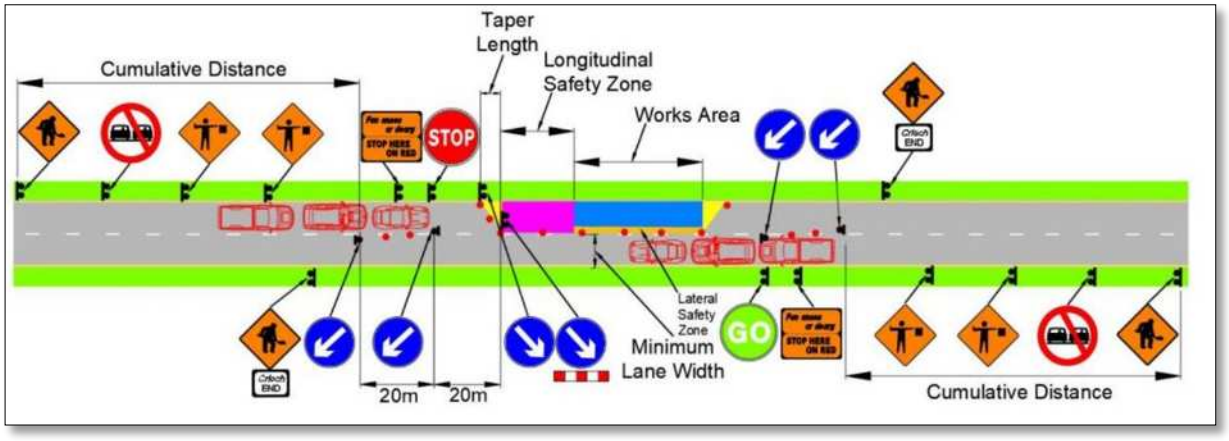


Figure 8 Works Area for GCR

3.6 Grid Connection Routes (GCR)

Local roads associated with the grid connection are located between the Mallow 110kV substation and the proposed on-site substation compound to the south of the site boundary.

The Option 1 grid connection utilises the L5302 road for approximately 1 km before turning right onto L1200 for approximately 2.2 km. From here, the connection turns left onto L1205 for approximately 2 km at which point it crosses the N20 and continues along R581 for approximately 2 km. Here the grid connection turns right onto L1207 for approximately 2.7 km where it turns left onto L53201. It continues along L53201 for approximately 1.4 km and then turns right and continues along

L5320 for approximately 1.2 km. Here it crosses the N72 and continues along L12201 for approximately 0.6 km where it reaches the Mallow 110kv Substation.

The Option 2 grid connection utilises the L5302 before continuing on to the L5523, crossing the N20 onto L5568, the L5566, crosses the R581 onto L1207 and then follows the same path as Option 1 to Mallow 110kV Substation.

3.7 Construction Haul Routes

3.7.1 Background

Materials such as steel and concrete required in the construction of the proposed development are likely to be sourced from manufacturers that are not situated within the immediate vicinity of the proposed development.

Where possible, and to avoid double handling, materials will be transported to their source destination e.g., steel deliveries will generally be delivered directly to the turbine hardstanding area.

The total number of vehicular traffic movements between site location and suppliers will be determined by the Main Contractor based on the phasing of the proposed development. The use of local roads will be minimised as much as possible, particularly to avoid / minimise the encountering of narrow road widths, poor visibility and unsuitable bearing capacities.

Vehicles will access the road network from the site using Croughta (L5302) via the N20 and the L1200 via Lisgriffin Cross (R580) as illustrated in Figure 10.

3.7.2 Construction Source

In constructing the wind farm, materials and plant will need to be delivered to the site. The material haul routes will include some of the surrounding road network which will need to cater for the additional traffic associated with the project. Some of the expected haul routes are shown in Figure 10.

This is not an exhaustive list of potential haul routes as this will be determined by where materials are supplied from.

Traffic associated with the construction phase include:

- HGVs carrying turbine parts such as turbine blades, nacelles, etc.
- HGVs carrying aggregates, pipes and other materials associated with construction of the internal access tracks, hard standings and drainage infrastructure.
- HGVs (Concrete wagons) carrying concrete for turbine foundations and substation foundations.
- HGVs carrying building materials for the substation as well as electrical equipment and cabling.
- HGVs carrying plant and fuel.
- HGVs exporting site waste.
- Cranes and associated elements for erecting the turbines; and

- Private cars and vans for the commuting workforce.

Material required for the construction of the wind farm roads, crane hardstands, substation compound and grid connection options are expected to come from local quarries.

Material to be delivered to site will mainly consist of stone aggregate for the construction of access roads and hardstands, limestone capping material for roads and hardstands, and concrete for the construction of the 9 no. turbine bases and substation infrastructure.

There are number of local licenced quarries that may supply materials to the site. The surrounding quarries currently in operation have been identified shown in the figure below. The nearest supplier of quarry stone (TII Class 6 products):

- O'Flynn Quarries - Scart, Ballyclough and Kilgilky South, Cecilstown, Mallow, Co. Cork. Located approximately 2km.
- Buttevant Limestone Products Limited. - Farrancotter, Co. Cork. Located approximately 5.5km.
- Ballyhest Quarry - Ballyhest East, Co. Cork. Located approximately 7km.
- Shane Foley Plant Hire Ltd - Ballyhea, Co. Cork. Located approximately.
- Lagan Cement - Danesfort, Upper Dromahane, Co. Cork. Located approximately 20km.
- Roadstone - Lackanamona, Mallow, Co. Cork. Located approximately 20km.

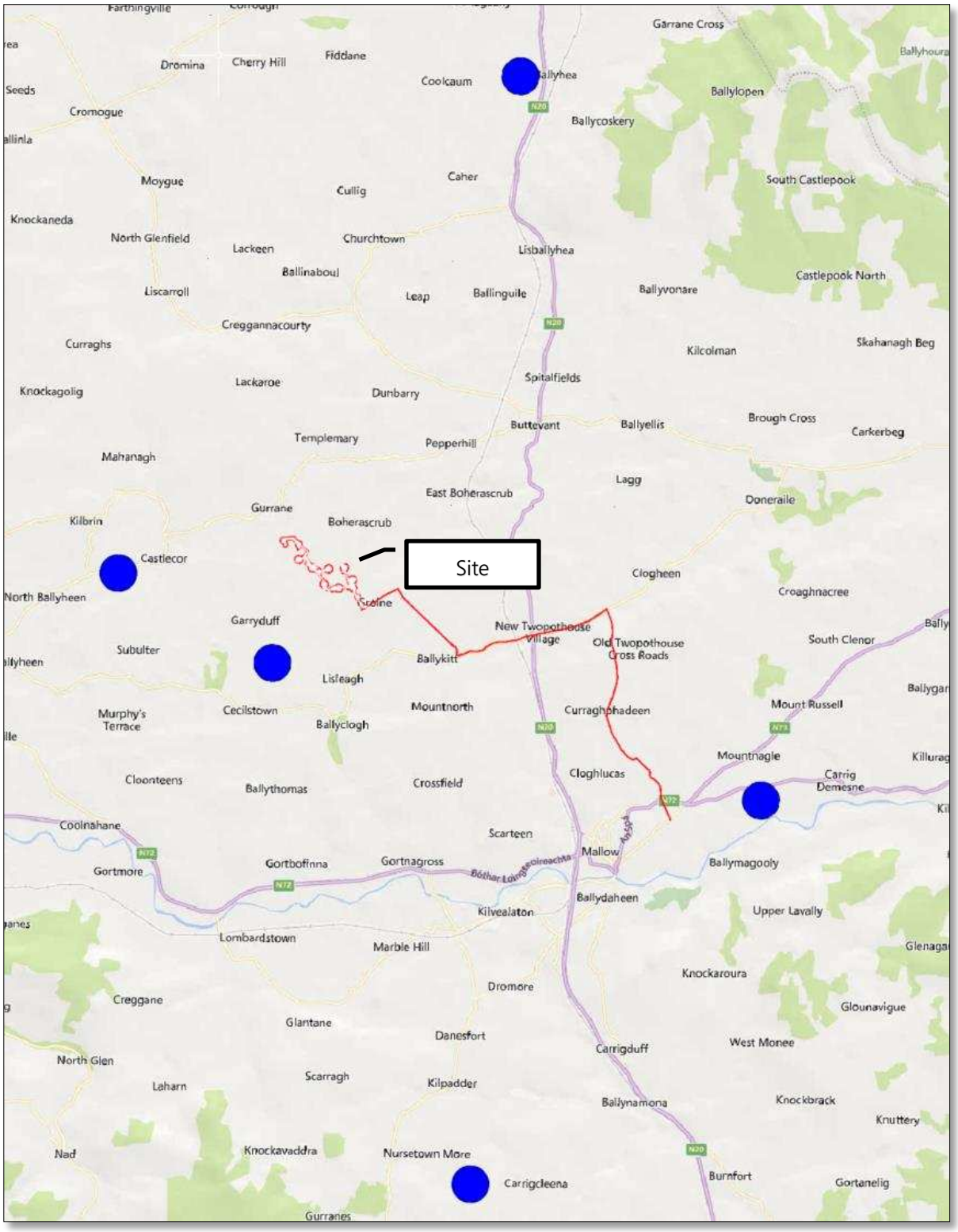


Figure 9 Local Quarries

Authorised waste management facilities have been identified in the greater County Cork area as listed on the Local Authority Waste Facility Register by the National Waste Collection Permit Office.

The authorised waste facilities utilised during the construction and decommissioning of the proposed project will depend on the Main Contractors appointed and will depend on the capacity of the various facilities at the time of construction and decommissioning. A list of existing licensed waste facilities in proximity to the wind farm site is presented in Table 1 below.

Authorisation Reference	Name	Trading As	Address
COR-CK-13-0060-02	Enva Organics Ltd		Fiddane North Mallow Co Cork
COR-CK-19-0126-01	Enva Organics Ltd		Ballynageehy Mallow Co Cork
WFP-CK-19-0198-01	Christy O'Leary Plant Hire Ltd		Lower Road Knocknagree Mallow Co Cork P51 V12D
WFP-CK-19-0199-01	John O'Flynn		Baltydaniel East Mallow Co.
WFP-CK-09-0032-04	Abbeyross Manufacturing Company Limited t/a Munster Waste Management	Munster Waste Management	Spa Road Mallow Co Cork
WFP-CK-18-0184-01	John Shanahan		Killuragh Ballygriffin Mallow Co Cork
WFP-CK-15-0153-02	Irohaul Limited		Unit 1 Intertrade House Kilvealaton West Newberry, Mallow, Co Cork P51 DE22
WFP-CK-11-0091-06	Joe O'Sullivan.		Cloonbannin West Dernagree Mallow Co Cork P51 NY07

Table 1 Waste Management Facilities

3.7.3 Construction Haul Routes

The following roads will be used for the importation of construction material and the exportation construction waste from the construction site.

There may also be overlap with the Turbine Delivery Routes. Refer to the Turbine Delivery Route Assessment (Appendix 16.1) for an overview of the Turbine Delivery Routes.

Motorways

The nearest motorway to the site is the M20 which connects to the N20 and the M7. The M7 is the arterial route for traffic connecting Limerick to Dublin. The M20 is located approximately 44 km to the North of the wind farm site. As part of the turbine delivery route (Option 1), it is proposed to utilise the M20 motorway for approximately 10 km.

As part of the alternate turbine delivery route (Option 2), no motorways would be utilised.

National Primary Routes

5 km to the east of the site, the closest national primary route is the N20 which connects the M20 at Limerick to Cork City. It is proposed that approximately 44 km of this road will be part of the Option 1 turbine delivery route.

Another primary road which is along the Option 1 turbine delivery route is the N18 which is located Northeast of the site near Limerick, the delivery route continues from the N69 along the N18 for approximately 4 km before joining the M20.

Option 1 turbine delivery route starts along the N69 and continues for approximately 30 km until it joins the N18.

Option 2 delivery route starts along the N28 at Ringaskiddy and continues for approximately 12 km until it joins the N40.

Option 2 turbine delivery route continues along N40 for approximately 3.5 km from where it joins the N27 and continues for approximately 3.5 km. From here, it connects onto N8 for less than a kilometre and then joins into N20 going North for approximately 41 km towards the site.

National Secondary Routes

The closest national secondary route to the south of the site is the N73. The N73 runs from the M8 motorway to Mallow and is located approx. 14 km from the site boundary.

Regional Roads

The closest regional road is the R580 which is located approximately 2.5 km to the north of the proposed wind farm site. The R580 connects the R576 to the N20 at Buttevant. This regional road will not be used for delivery of turbine components. However, it may be used as a haulage route for building materials.

Local Roads

There are several local roads in the vicinity of the proposed project. Option 1 delivery route proposes the use of two of the local roads to the South of the site, the local road which connects Kilmaclenine to the N20 (L5523) and the local road which connects the proposed site entrance to Kilmaclenine at Croughta (L5302).

Option 2 delivery route proposes the use of either the same two local roads mentioned above, or the local road L1200 which connects Knockane to the N20 from the south of the site and the local road which connects the proposed site entrance to Kilmaclenine at Croughta (L5302).

Access Via the R580

Access to/from the R580 is shown in Figure 11.

Construction traffic coming from the R580 will turn south at Lisgriffin Cross towards Kilmaclenine Cross. At Kilmaclenine Cross, traffic will turn right towards the site.

Return trips will be in the opposite direction.

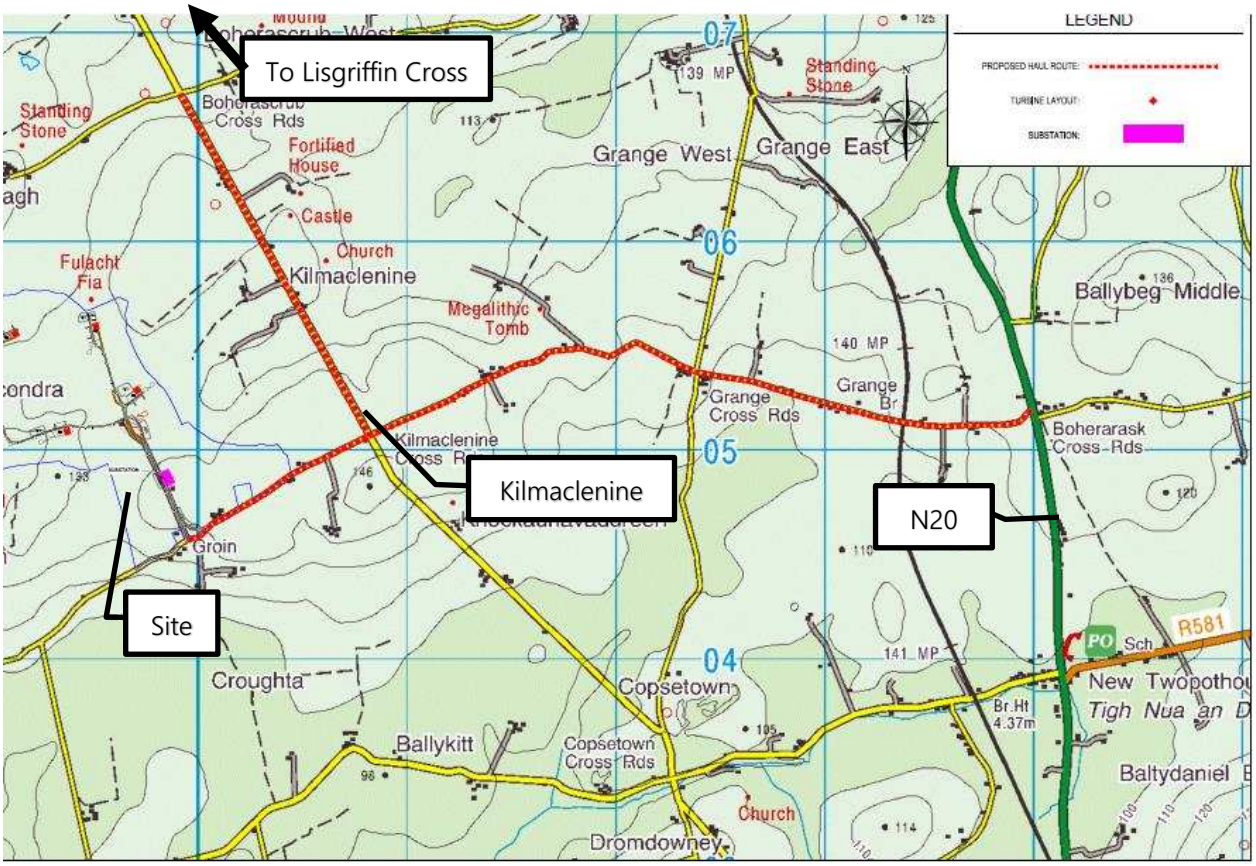


Figure 10 Local Haul Routes

Access from N20 from the North

Access to/from the N20 from the north of the site is shown in the figure below. The haul route on local roads is indicated in blue. The N20 is highlighted in green.

Construction traffic will exit the N20 at Buttevant and travel westbound on R580. At Lisgriffin Cross, traffic will turn left towards Kilmaclenine Cross. At Kilmaclenine Cross, traffic will turn right towards the site.

Return trips will be in the opposite direction.

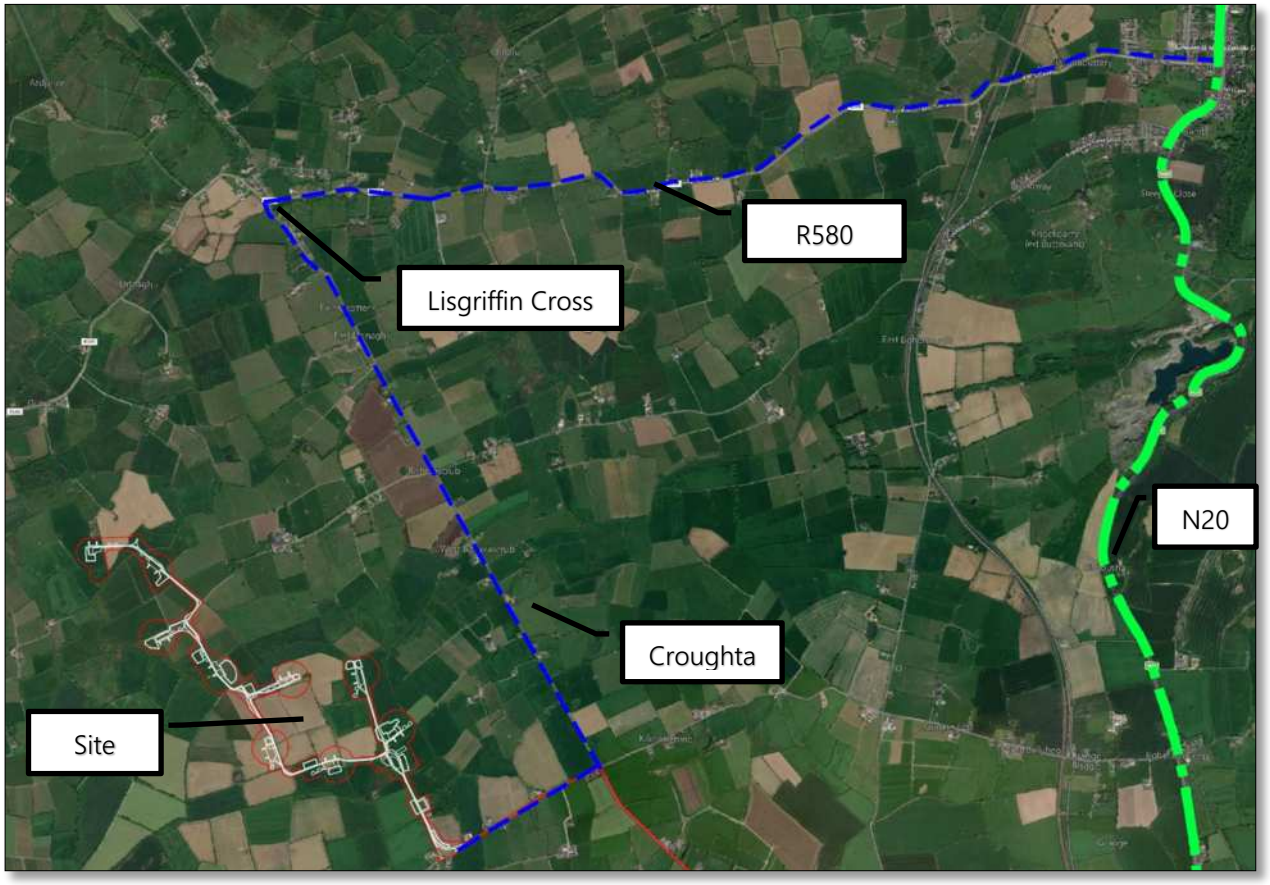


Figure 11 Access from the N20 from the North

Access from N20 from the South

Access to/from the N20 from the south of the site is shown in the figure below. The haul route on local roads is indicated in blue. The N20 is highlighted in green.

Construction traffic will exit the N20 at Boherash Cross. It will travel west bound along Groine towards the site.

Return trips will be in the opposite direction.

Figure 12 Access from the N20 from the South

The proposed haul routes passes by two schools (see Figure 16). HGV deliveries will avoid passing schools at opening and closing times where it is reasonably practicable.

It is important to note that no construction traffic will be permitted west bound on the local road at Croughta (L5302) after the site access. No construction traffic will be permitted to travel from the west along the Croughta (L5302) to the site access. All construction traffic will be required to adhere to the haul routes identified in Figure 10.

4 Traffic Generation

4.1 General

It should be noted that the majority of such vehicle movements would be undertaken outside of the traditional peak hours, and it is not considered this level of traffic would result in any operational problems on the local road network.

Where impacted by construction actives i.e., during turbine delivery or whilst constructing the grid connection, care will be taken to ensure existing pedestrian and cycling routes are suitably maintained or appropriately diverted as necessary during the construction period, and temporary car parking is provided within the site for Main Contractor 's vehicles. It is likely that construction will have a negligible impact on pedestrian and cycle infrastructure.

The envisaged traffic generated during construction will depend on the phasing which will be determined by Tullacondra Green Energy Ltd.

The majority of traffic generated delivering materials during the project are envisaged to occur during the construction activities as highlighted in Section 3.7.2.

For the construction of the proposed development, it will be necessary to transport the construction materials, equipment and personnel to and from the work sites.

This includes (but is not limited to):

- Establishing the construction site compounds.
- The importation of relevant construction materials and equipment.
- The exportation of C&D Waste and C&D Waste Demolition.
- Transportation of workers to and from the site.

4.2 Background

It is estimated that construction of this will start in 2026/2027.

A number of the construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicle movements associated with the appointed Main Contractors and their staff. The proposed development will have a dedicated loading and unloading area within the curtilage of the site.

Excavated material generated from the construction activities will be removed from site if no use is found for it on site. This spoil will be mounded to create a berm and in turn will allow for the material to be deposited onto the Lorries by excavator should there be a need to export it off site.

The Lorries will only drive onto site to a hard-standing area, receive the load and leave site. This negates the need for vehicles to drive into site to the dig site and receive the load from the point of excavation and in turn reduce unnecessary spoil being brought onto the public road. The haulage Main Contractor will be required to organise the lorries in an efficient manner to prevent the build-up of vehicles waiting outside the curtilage of the site.

The road marshal appointed will be responsible to ensure that there is no disruption to traffic or pedestrians and that roadways and paths are kept clean and free of debris.

4.3 Construction Activities

The following construction activities are included within this Construction Traffic Management Plan.

4.3.1 On Site Wind Measurement Mast

1 no. permanent meteorological (Met) mast will be erected on site. The mast will consist of a 100m high free standing lattice steel mast with a shallow concrete foundation. The mast will include a concrete base measuring approximately 8m by 8m and will be up to 3m in depth.

The mast will be accessed from the south of the site via the new construction site entrance. A section of new track will lead from the existing agricultural track to the met mast location. A turning head will be constructed adjacent to the mast site. The met mast access track will be 3.5m in width and will include drainage.

4.3.2 Turbine Erection

The components for the 9 no. turbines will be delivered by cargo ships to Foynes Port in County Limerick or Ringaskiddy, Cork.

A Delivery Route Selection and Assessment was carried out to identify the optimum delivery route to site and is presented as an Appendix to Chapter 16 Traffic and Transport of the EIAR.

Large components associated with the wind farm construction will be transported to site via the identified turbine delivery route (TDR). The Option 1 TDR access route to site is as follows:

- Loads will depart Foynes Port and travel West-East via the N69 for approximately 30km until it joins the N18.

- Loads will travel south along the N18 for approximately 4km before exiting onto the M20.
- Loads will continue west on the M20 and then join the N20.
- Loads will continue to travel south on the N20 before turning off onto L5523.
- Loads will continue west on the L5523 to the proposed site entrance.

The components for each turbine will be delivered in separate loads, some of which will be abnormal in terms of their width and length.

The components will be transported from Foynes Port to the site along the National, Regional and Local Road network.

Pre- and post-construction surveys will be carried out to ensure the structural integrity of the selected haulage route.

Repairs will be carried out on the public road network, as necessary, during the construction phase, to ensure that the condition does not deteriorate below a standard that could affect the driver or Vulnerable Road User (VRU) safety, as required.

Following completion of construction, the condition of the public road network will be of at least the same standard as it was prior to commencement of construction.

A permit for moving abnormal loads to the wind farm site will be sought from An Garda Síochána and the applicable local authorities on the selected haulage route with a transportation plan for the time of deliveries established at construction phase.

The delivery of turbine components normally takes place overnight due to the oversize nature of some of the components such as tower sections and blades. Haulage vehicles will be escorted by An Garda Síochána during these operations.

Turbine delivery normally consists of three trucks in convoy with their escorts. The convoy will proceed along the local access roads at speeds approximate to conditions encountered along the route but such that they will not cause any undue delay to local traffic.

Turbine erection is entirely weather dependant with the scheduling of component delivery being entirely subject to wind conditions. Advance notice of delivery to residents is difficult in this circumstance but component delivery is a highly controlled low impact activity of very short duration to any local traffic.

All temporary accommodation works associated with the project shall be fully reinstated following the construction phase.

Where necessary, overhead utilities and obstructions will need to be removed at several locations to provide adequate overhead clearance. The modification or removal of overhead utilities may involve temporary disconnections. Such works will be carried out by the utility providers in advance of turbine delivery to site.

Temporary accommodation works will only be required during the operational phase in the unlikely event of a major turbine component replacement. It is expected that these temporary accommodation works will not be required for the decommissioning phase as turbine components can be decommissioned on site and removed using standard HGVs.

4.3.3 Grid Connection

The grid connection for this project will consist of a 38kV new on-site substation connected to the Mallow 110kV substation boundary located approximately 10 km southeast of the site, via underground cable. The Grid Connection Route consists of approximately 13.5km of underground cabling.

This includes 0.5 km of underground cabling in private lands and approximately 13 km of cabling to be installed predominantly in the public road.

The proposed grid route will be contained within onsite access tracks and will leave the project site at the existing site entrance. The grid route then proceeds east along the L5302 local road where it turns south at Knockavadeen onto the local road through Knockane. It then turns onto L1205 and continues east across the N20 and through R581 to turn south at Fountainville onto L1207 heading south. It diverts onto a Local Road at Carhue, continuing south along the road to the east of Ballyvinter. The route continues south across the N72 to meet the Mallow 110kV substation.

A substation is proposed on-site which will collect the electricity produced by the wind farm. The substation has been located at the south of the wind farm site.

Underground grid route connection works to on-site substation will involve the installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables predominantly along the existing road network. This will require delivery of plant and construction materials, followed by excavation, laying of cables and subsequent reinstatement of trenches.

The proposed grid connection trench will be 600 mm wide and 1200 mm deep, in accordance with ESBN specifications. Where the proposed grid connection cable route encounters minor culverts, the ducts will be installed above or below the culvert depending on its depth in accordance with current construction methodologies.

A temporary road closure, carried out on a rolling basis, will be required by the appointed Main Contractor to facilitate the installation of a trench for the cable across the public road. Temporary guarding of this crossing may also be erected. The appointed Main Contractor will endeavour to complete these works within the shortest timeframe and the traffic management plan will be updated at construction phase to take account of the nature and timing of these works.

The appointed Main Contractor will develop a site-specific Temporary Traffic Management Plan for each phase of the trenching works. The goal of a Temporary Traffic Management Plan is to provide a safe working environment for cable workers and efficient passage of traffic and other road users through the cable works site along the public road network.

The procedures to be implemented by the appointed Main Contractor will include the provision of facilities for the safe passage of pedestrian and vehicular traffic and measures to separate them from the construction work.

4.4 Construction Workers

An average workforce of 30 persons is anticipated, increasing to 46-49 persons during peak periods. This will vary over the lifetime of the project.

Again, a number of the construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicle movements associated with the appointed Main Contractors and their staff.

Arrivals and departures to the sites are to be carried out in as few vehicle movements as possible to minimise parking requirements and potential impacts on the local road network.

There is only one proposed site access point, as shown in Figure 4, onto Croughta (L5302). No construction traffic or operative parking will be permitted on Croughta (L5302) to ensure the environment within the locality is not impacted by the construction activities.

It is important to note that no construction traffic will be permitted west bound on the Croughta (L5302) after the site access. No construction traffic will be permitted to travel from the west along the Croughta (L5302) to the site access. All construction traffic will be required to adhere to the haul routes identified in Figure 10.

Where possible, construction traffic will be encouraged to use the most direct route to site avoiding sensitive nodes such as schools.

Material scheduling will dictate the timely delivery of supplies to site during off peak periods when traffic flow has eased, and pedestrian numbers are lower.

All offloading of deliveries to site will occur within the curtilage of the site boundaries.

All scheduled deliveries will be supplied with the appropriate site location details in advance. A dedicated gate keeper will be appointed to ensure that delivery vehicles securely access and vacate the site. The site marshal shall also be responsible to ensure that clean road and pathway conditions are maintained for the public users.

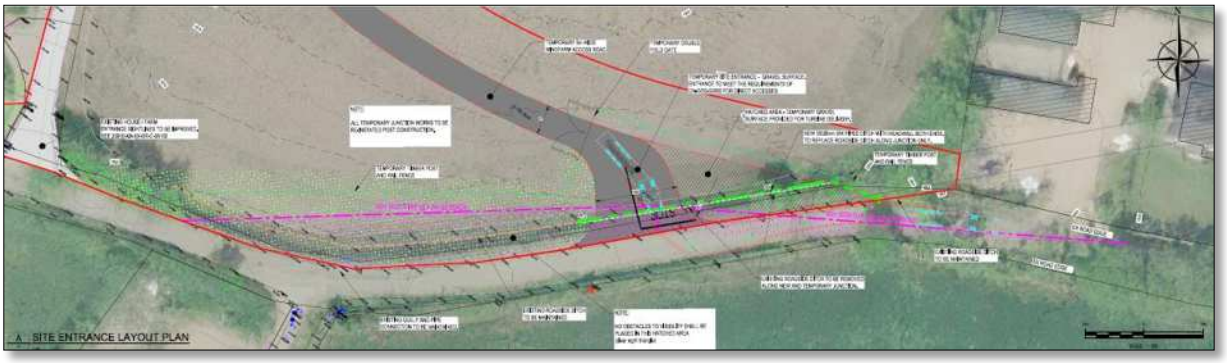


Figure 13 Temporary Construction Access

4.5 Traffic Generation

4.5.1 Background

The construction phase traffic generated by the project on the surrounding road network has been calculated by estimating the number of vehicles required during the construction phase.

This assessment was completed by estimating the amount of traffic, in the form of heavy goods vehicles (HGV) and light goods vehicles (LGV) that will be generated during the construction phase and then distributing it over the duration of the construction programme. Some key assumptions taken when preparing the trip generation estimates include:

- An average ready mix concrete truck carries a load of approximately 8-10m3 of concrete.
- An average tipper truck carries approximately 13 m3 of soil/rock/aggregate.
- A construction period of 18 months is expected based on the nature and scale of the proposed works.
- It has also been assumed that cable trenching works associated with the construction of the grid connection, which is expected to take 5 months to complete.

Project related traffic will vary over the course of the construction programme. Activities can be broken up into the following main categories:

- Mobilisation and site setup
- Site clearance and felling
- Internal access tracks
- Turbine hard standing.
- Turbine foundations
- Turbine Installation
- Onsite substation
- Grid connection cable works
- Private electrical network.
- Landscaping, reinstatement, demobilisation.

Figure 14 illustrates the anticipated average daily trips of the 18-month construction period.

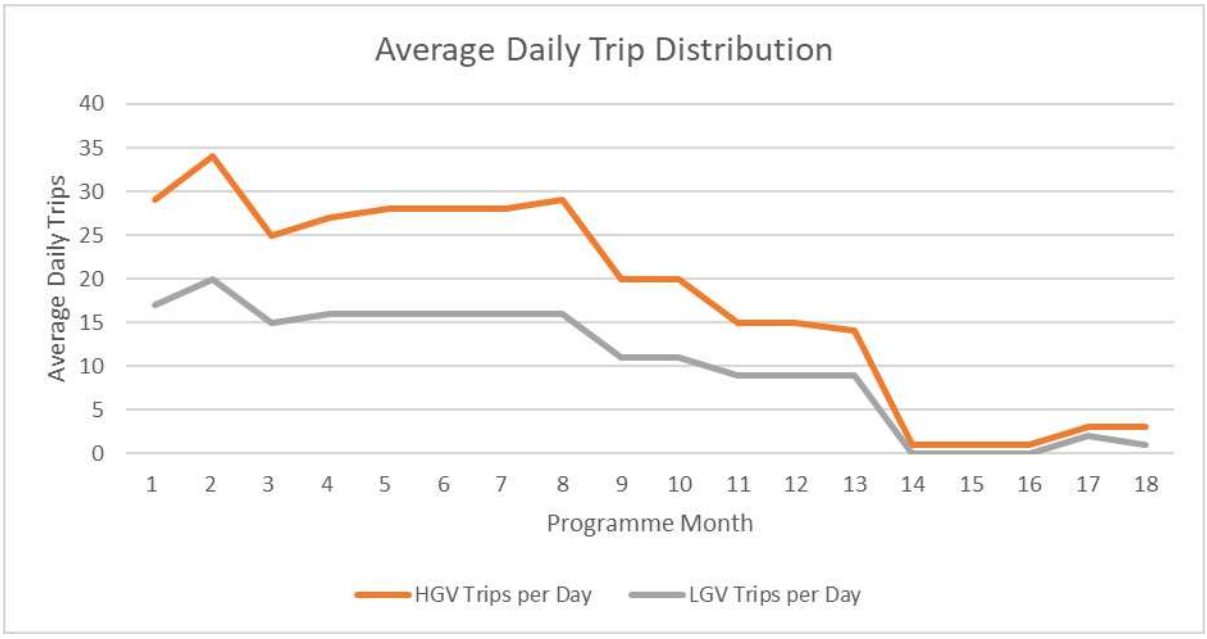


Figure 14 Average Daily Trips

The construction phase for the entire project will lead to 11625 additional LGV & HGV trips (two-way) over the duration of the construction works. This consists of 8017 HGV trips and 3608 LGV

trips. This results in an average increase of 28 vehicles per day with a maximum increase of 54 vehicles during the busiest month.

Calculations of HGV movements associated with the construction of the project indicate an average daily increase of 18 HGV trips per day over a construction period of 18 months. This increases to an average of 34 HGV trips per day during the peak month which occurs in month 2 of the programme for HGV traffic.

Calculations of LGV movements associated with the construction of the project indicate an average daily increase of 10 LGV trips per day over a construction period of 18 months. This increases to an average of 20 LGV trips per day during the peak month which occurs in month 2 of the programme for HGV traffic.

4.5.2 Material Removal / Waste Management During Demobilisation

The information contained in Table 2 has been extracted from the Construction Environmental Management Plan.

Overall	Rock (m3)
Total for removal offsite for crushing and screening before being returned to site for reuse	530

Table 2 Total Natural Materials Exported from Site

Based on the following HGV carrying capacities:

- Rock – 13 cubic meters

The development will generate 40 HGV movements for the exportation of rock generated as a result of construction activities.

4.5.3 Material/Equipment Import to Site

The information contained in Table 3 has been extracted from the Construction Environmental Management Plan.

Material	Volume
Concrete	6,742 m3
Sand	118 m3
Total Rock	31,350 m3
Turbine Equipment	9 No. sets of blades, drive train, nacelle, hub and tower sections) + meteorological equipment

Table 3 Movements associated with the import of equipment/materials to site.

Based on the following HGV carrying capacities:

- Soil/Rock – 13 cubic meters
- Concrete – 6 cubic meters

The development will generate 2,412 HGV movements for the import of rock, 10 HGV movements for the importation of sand, 1,124 HGV movements for the import of concrete and 100 HGV movements for the importation of wind turbine equipment.

In total, it is expected that the development will generate up to 3,646 HGV movements to the development over the construction period.

4.5.4 Turbine Delivery Route

Impacts along the TDR will be limited to specific locations where temporary accommodation works are required and on occasions where large turbine component deliveries are brought to the site. Temporary accommodation works are at isolated locations and will not generate significant construction traffic.

Negative or adverse effects on the receiving environment associated with the TDR are considered to be temporary in duration and slight to moderate in significance without appropriate mitigation.

5 CONSTRUCTION TRAFFIC MANAGEMENT PLAN

5.1 Introduction

Upon appointment of the Main Contractor, the Main Contractor shall adopt this plan and associated monitoring measures based on the following headings:

- Site Access & Egress.
- Traffic Management Signage.
- Routing of Construction Traffic / Road Closures.
- Timings of Component and Material Deliveries to Site.
- Traffic Management Speed Limits.
- Road Cleaning.
- Road Condition.
- Road Closures.
- Enforcement of Construction Traffic Management Plan
- Details of Working Hours and Days.
- Details of Emergency plan.
- Communication.
- Construction Methodologies; and
- Particular Construction Impacts

These items are explained in detail in the remainder of this section of the report.

5.2 Site Access and Egress

Site access will be provided at the location of the temporary entrance at Croughta (L5302). Future development access will be via an existing entrance approximately 120m to the west. Access to the site from the temporary (construction phase) entrance will be gated with access only granted to operatives and site deliveries. The gate will be set back from the external public road network to ensure that vehicles entering the site can do so without causing an obstruction on the main carriageway.

The Main Contractor shall provide advanced warning signs, in accordance with Chapter 8 of the Department of the Environment's Traffic Signs Manual 2019, on the approach to proposed site access locations a minimum of one week prior to construction works commencing at the site.

Access to the construction site will only be to authorised persons. Outside of working hours, security will be employed by the main Contractor to ensure no unauthorised access.

5.3 National Road Network

Access to the site along the National Road Network will be via the N8, N20, N22, N28, N72/N73, N40 AND M8 in both directions.

From the north, the site can accessed via the N20 which will also accommodate deliveries from Foynes.

From the south, the site can be accessed via the N20 and the N28 which will also accommodate delivers from Ringaskiddy.

From the east, the site can be access via the N8, M8 and N20.

From the west, the site can be accessed via the N40, N22 and N20.

It is anticipated that the majority of construction related traffic will travel along the N20, N72/N73, N40 and M8 at which point construction traffic will enter the regional/local road network i.e. Croughta (L5302)

5.4 Regional & Local Road Network

Access to the site will be via the Croughta (L5302). Sight lines appropriate to local speed limits will be provided to allow safe access to/from the site. A single access point is proposed off the Croughta (L5302) which will be access via N20.

Figure 15 Site Access

For the grid connection works multiple work zones will be mobilised on the local road network. To mitigate against possible restrictions in visibility requirements, it is proposed that the Main Contractor shall use a safe system of permanent flag men for the control of traffic during all access / egress operations at these work zones, if required.

5.5 Access

Access to the site will be in the location of the proposed development access i.e., via Croughta (L5302). The Main Contractor will ensure that is a visibility splay is appropriate for the local speed limit. Provision has been made for 3m x 80m sight line at each access.

5.6 Local Schools.

There are four schools/creches that are located along the potential haul routes as follows:

1. Lisgriffin National School
2. Baltydaniel National School
3. Donna's Monterssori School and Child Care
4. Scoil Mhire Na Trocaire

Cork County Council have advised the works on the Grid Connection Route outside Baltydaniel school should be done outside of school term.

The location of these schools is illustrated in the figure below.

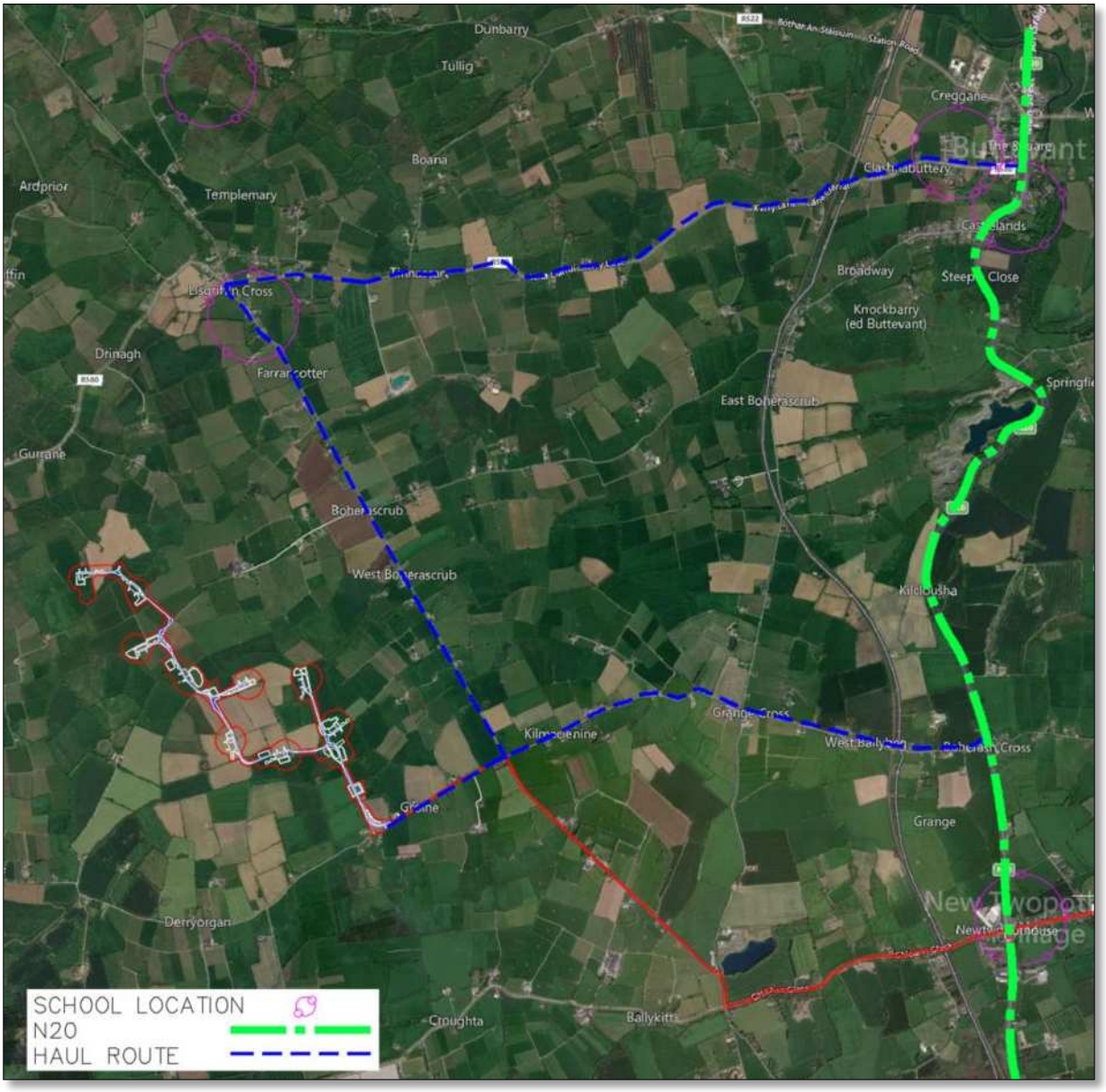


Figure 16 Local Schools

Construction traffic accessing the site via the N20, the R580 and Lisgriffin Cross passes by four schools. HGV deliveries will avoid passing schools at opening and closing times where it is reasonably practicable.

5.7 Traffic Management

5.7.1 Signage

The Main Contractor shall undertake consultation with the relevant authorities for the purpose of identifying and agreeing signage requirements. Such signage shall be installed prior to works commencing on site.

Proposed signage may include warning signs to provide warning to road users of the works access / egress locations and the presence of construction traffic. All signage shall be provided

in accordance with the Department of Transport's Traffic Signs Manual, Chapter 8 – Temporary Traffic Measures and Signs for Roadworks (2019).

5.7.2 Traffic management for road works.

In accordance with plans and drawings submitted to the Planning Authority, and in agreement with the Roads and Transport Department of the Cork County Council, road works are required to facilitate the construction of the site access, temporary site access, the Turbine Delivery Route and the Grid Connection Route

If work has to be done in the Public Highway (i.e., in relation to utility services or drainage), a road opening licence will be requested from Cork County Council. The Main Contractor will procure street works accredited and approved Main Contractors to carry out any utility works.

A specific Traffic Management Plan (TMP) will be required by the Local authority in conjunction with the application for a road opening licence, in advance of carrying out these road works. The TMP design and service will be provided by an independent specialist and will deal with the efficient management of traffic and pedestrians, mitigating all potential safety risks to users, whilst maintaining effective operation of the carriage way.

5.7.3 Pedestrians

There are no local pedestrian facilities located adjacent to the main site access. The Main Contractor will take care to ensure that the existing carriageway is maintained to ensure that local pedestrian activity can continue uninterrupted manor.

For the TDR, remedial works required to accommodate the delivery of turbines may impact pedestrian facilities/routes. This may require pedestrians to divert around the works. Such works will be temporary in nature and will return to their original status when no longer needed.

For the GCR, pedestrians will be directed around the work zones in accordance with Chapter 8 of the Traffic Signs Manual.

5.8 Recommended Traffic Management Speed Limits

Adherence to posted / legal speed limits will be emphasised to all staff / suppliers and Main Contractors during induction training.

Drivers of construction vehicles / HGVs will be advised that vehicular movements in locations, such as local community areas, shall be restricted to 50 km/h. Special speed limits of 30 km/h shall be implemented for construction traffic in sensitive areas such as school locations. An additional special speed limit of 25km/h will be applicable to abnormal load deliveries.

Such recommended speed limits will only apply to construction traffic and shall not apply to general traffic. It is not proposed to signpost such speed limits in the interest of clarity for local road users.

5.9 Spoil

A Spoil Management Plan (Contained in Appendix 5.1, Construction Environmental Management Plan (CEMP) submitted with the planning application) has been prepared which deals with how spoil will be managed on site. This includes the management of vegetation and trees that will be removed during construction.

Demolition and construction waste will be brought off site by a licenced waste contractor.

5.10 Road Condition

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

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

The Main Contractor shall ensure that:

- Demolition and construction waste leaving each site will be evaluated and covered if considered necessary to minimise potential dust impacts during transportation.
- The haulage contractor shall take all reasonable measures while transporting waste or any other materials likely to cause fugitive loses from a vehicle during transportation to and from site, including but not limited to:
    - Covering of all waste or material with suitably secured tarpaulin/ covers to prevent loss; and
    - Utilisation of enclosed units to prevent loss.
- The roads forming part of the haul routes will be monitored visually throughout the construction period and a truck mounted vacuum mechanical sweeper will be assigned to roads along the haul route as required.

In addition, the Main Contractor shall, in conjunction with the local authority:

- Undertake additional inspections and reviews of the roads forming the haul routes one month prior to the construction phase to record the condition of these roads at that particular time.
- Such surveys shall comprise, as a minimum, a review of video footage taken at that time, which shall confirm the condition of the road corridor immediately prior to commencement of construction. This shall include video footage of the road wearing course, the appearance and condition of boundary treatments and the condition of any overhead services that will be crossed. Visual inspections and photographic surveys will be undertaken of bridges and culverts that are along the haul roads.
- Where requested by the local authority prior to the commencement of construction operations, pavement condition surveys will also be carried along roads forming part of the haul route. These will record the baseline structural condition of the road being surveyed immediately prior to construction.
- Throughout the course of the construction of the proposed development, on-going visual inspections and monitoring of the haul roads will be undertaken to ensure any damage caused by construction traffic is recorded and that the relevant local authority is notified. Arrangements will be made to repair any such damage to an appropriate standard in a timely manner such that any disruption is minimised.

Upon completion of the construction of the proposed development, the surveys carried out at preconstruction phase shall be repeated and a comparison of the pre and post construction

surveys carried out. Where such comparative assessments identify a section of road as having been damaged or as having deteriorated as a result of construction traffic, the construction related damage will be repaired.

5.11 Vehicles

The following is a non-exhaustive list of possible vehicles that will be used:

- Abnormal Load Vehicle
- 4x4 Pick up.
- HGV
- Rigid Truck
- Box Van
- Panel Van
- Concrete Truck
- Concrete Pump Truck
- Mobile Crane (various sizes)
- JCB (various sizes)
- Excavators (various sizes)
- Dump Truck
- Specialist vehicles maybe required on occasion e.g., abnormal load vehicle.

Details of size and weights of vehicles will be confirmed following appointment of a Main Contractor.

5.12 Dust and Dirt Control

Nuisance dust emissions from construction activities are a common and well recognised problem. Fine particles from these sources are recognised as a potential significant cause of pollution.

The main Contractor will be required to demonstrate that both nuisance dust and fine particle emissions from the site are adequately controlled and are within acceptable limits.

Dust and fine particle generation from construction and demolition activities on the site can be substantially reduced through carefully selected mitigation techniques and effective management. Once particles are airborne it is very difficult to prevent them from dispersing into the surrounding area. The most effective technique is to control dust at source and prevent it from becoming air borne, since suppression is virtually impossible once it has become air borne.

The following are techniques and methods which are widely used currently throughout the construction industry, and which may be used in the proposed development.

- Vehicles travelling on any unsurfaced site roads should have their speed restricted to 20 kph.

- A regime of 'wet' road sweeping can be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.
- At the site access, Vehicle waiting areas or hard standings can be regularly inspected and
- Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
- Servicing of vehicles and plant should be carried out regularly, rather than just following breakdowns.
- Internal combustion plant should not be left running unnecessarily.
- Exhaust direction and heights should be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.
- Where possible fixed plant such as generators should be located away from residential areas.
- The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.
- The transport of dusty materials and aggregates should be carried out using covered / sheeted lorries.
- Material handling areas should be clean, tidy and free from dust.
- Vehicle loading should be dampened down and drop heights for material to be kept to a minimum.
- Dust dispersal over the site boundary should be minimised using static sprinklers or other watering methods as necessary.
- Stockpiles were necessary, should be sheeted or watered down.
- No burning of materials will be permitted on site.
- Earthworks excavations should be kept damp where necessary and were reasonably practicable.
- Cutting on site should be avoided where possible by using pre-fabrication methods.
- Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc, which minimise dust emissions and which have the best available dust suppression measures, should be employed.
- Prior to commencement, the main Contractor should identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions, utilising the methods highlighted above. Furthermore, the Main Contractor should prepare environmental risk assessments for all dust generating processes, which are envisaged.
- The Main Contractor should allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.

- The name and contact details of a person to contact regarding air quality and dust issues should be displayed on the site boundary, this notice board should also include head/regional office contact details.

The Main Contractor will be obliged to implement the mitigation measures outlined in the EIAR in respect of dust / dirt control.

5.13 Refuelling

Construction plant and equipment will only be parked over-night within the site compound. Construction plant and equipment will be checked daily for any visual signs of oil or fuel leakage, as well as wear and tear.

Fuel will be stored on site for the duration of the construction phase. Fuel will only be brought to site via mobile fuel bowser. For any liquid other than water, this will include storage in suitable tanks and containers which will be housed in the designated area surrounded by bund wall of sufficient height and construction so as to contain 110 percent (110%) of the total contents of all containers and associated pipework. The floor and walls of the bunded areas will be impervious of all containers and associated pipework. The floor and walls of the bunded area will be impervious to both water and oil. The pipes will vent downwards into the bund.

Where Main Contractor/s are required to refuel vehicles, this will only be carried out at the designated refuelling location within the site storage compound, which must employ pollution control mechanisms to prevent escape of fluids to the river.

The local authority will be informed immediately of any spillage or pollution incident that may occur on-site during the construction phase.

All small plant such as generators and pumps bunded and stood in drip trays capable of holding 110% of their tank contents,

Waste oils, empty oil containers and other hazardous wastes will be disposed of in accordance with the requirements of the Waste Management Act, 1996.

5.14 Monitoring, Inspection and Record Keeping

The Main Contractor will supervise the sampling of suspended solids downstream prior to commencement of works, and weekly during remediation works. Samples will be analysed onsite. Should results show a 10% increase in suspended solids downstream of the site, suitable contingency measures will be instigated.

Routine inspections of construction activities will be carried out on a daily basis by the Main Contractor staff 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 the Project CEMP and that the requirements of the Conditions of Planning, the NIS and associated documentation are being adhered to during construction.

The Main Contractor will develop their own site inspection programme, which will include an inspection procedure and relevant forms to record any issues.

Only suitably trained staff will undertake environmental site inspections. The Main Contractor will keep records of works undertaken.

5.15 Road Closures

Should road closures be required the following will apply.

The appointed Main Contractor will ensure traffic management controls are in accordance with Chapter 8 of the Traffic Signs Manual 2019 and the Temporary Traffic Management Design Guidance, Third Edition 2019.

All road works will be subject to a road opening licence. It is anticipated that the cable installation along local roads will be advanced using a combination of rolling lane closures and temporary road closures where the existing road width is insufficient to accommodate an open lane for traffic to pass the works area.

The active construction area along the underground grid connection route option will generally be minimal as the cables only need to cross the road perpendicularly at one point and/or laid parallel to the road in rolling sections. During the first stage of works the cable trenches will be constructed. The second stage of works will involve sequentially pulling electrical cables through ducts and then joining each cable together.

The cable route construction works will involve constantly moving the working area as the cable installation works progress. Grid works within the public road corridor are estimated to take approximately just over 5 months on the assumption that an average of 75m of cable is installed each day, with a 6-day working week.

These works will lead to additional traffic associated with the cable route construction.

The construction activities associated with the grid connection works will generate construction related traffic on the existing public road network while the grid connection works are ongoing. These impacts will include:

- Heavy Goods Vehicles (HGVs) transporting materials to and from the main site, including road making materials for reinstatement works, drainage/ducting materials, cabling, electrical components and excavated material.
- Light Goods Vehicles (LGVs) such as cars, 4x4s and vans used by the workers and supervisory staff involved in the grid connection works.
- There will be construction traffic throughout the Grid connection works between the main site and working area involving the transport of materials when required.

The grid connection cable works by its nature will be isolated to a relatively small works area which will move on a daily basis. Impacts associated with the works will be experienced on the road network in the immediate vicinity to the works area.

Where lane closures are implemented, the traffic will be allowed to travel in both directions. A stop/go system will be used to control the flow of traffic passing the works. This will have a temporary negative effect on road users in the form of a disruption to normal traffic flows.

During the first stage of works the cable trenches will be constructed. The second stage of works will involve sequentially pulling electrical cables through ducts and then joining each cable together.

Construction activities along the underground route option would operate between the hours 7:00 a.m. and 7:00 p.m., Monday to Friday, and between the hours 7:00 a.m. to 2:00 p.m. on

Saturday (if required). Any deviations to these times will be agreed in advance with Cork County Council. It is expected that the civil works for the underground grid connection option will require at least 10 personnel to complete the works. The electrical works will require less heavy machinery but more labour personnel.

5.16 Underground Grid Connection

The installation of the underground grid connection option along the public roads will involve the following process:

- Prior to works commencing, the area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB Networks, EirGrid, Gas Networks Ireland, Eir, Cork County Council etc. will be contacted and drawings for all existing services sought. A road opening licence will be obtained where required from Cork County Council for the relevant road sections. All plant operators and general operatives will be inducted and informed as to the location of any services.
- Prior to works commencing a dilapidation survey will be carried out photographing and noting any existing damage or defects to structures or road surfaces. A copy of this survey will be submitted to Cork County Council prior to works commencing.
- Prior to works commencing the route will be inspected and marked out on the ground. Standard good practice preparatory measures are then put in place along the extent of the route. This would include any required warning notices, temporary barriers, etc.
- Prior to works commencing a detailed traffic management plan will be prepared by the appointed Main Contractor and agreed with Cork County Council.
- During construction works, the trench will be excavated down through the existing stone in the road using an excavator machine. As stone fill is removed it is temporarily stockpiled adjacent to the trench for re-use in backfilling. In some instances, some soil or unsuitable material may be encountered in the trench, and this is removed from site and brought to an appropriate licensed facility for disposal.
- The trench is then prepared to receive concrete bedding and surround for the ducts. The ducts are surrounded by concrete with adequate cover over the duct.
- Once the concrete is suitability set, appropriate imported stone material is placed over the concrete surround and filled back up to the top of trench. Suitable warning tapes will also be installed in the trench. Once the trench is filled, the trenching and ducting process will move along the road in planned stages.
- The trench surface receives a temporary surface dressing of either spray and chip or macadam. Once the overall scheme is completed, the underground grid connection route and associated road areas will receive a new permanent macadam finish as agreed with Cork County Council.
- The as-built location of the ducting will be surveyed using a total station / GPS. Marker posts will be installed along the grid connection route to also denote the location of ducting on the ground.

- A condition survey will be carried out on the roads impacted by the underground grid connection route, both pre and post construction. This will include a video survey of the road extent.

5.17 Emergency Procedures During Construction

The Main Contractor shall ensure that unobstructed access is provided to all emergency vehicles along all routes and site accesses. The Main Contractor shall provide to the local authorities and emergency services, contact details of the Main Contractor 's personnel responsible for construction traffic management. In the case of an emergency the following procedure shall be followed:

- Emergency Services will be contacted immediately by dialling 112.
- Exact details of the emergency / incident will be given by the caller to the emergency line operator to allow them to assess the situation and respond in an adequate manner.
- The emergency will then be reported to the Site Team Supervisors and the Safety Officer; All construction traffic shall be notified of the incident (where such occurs off site).
- Where required, appointed site first aiders will attend the emergency immediately; and
- The Safety Officer will ensure that the emergency services are en-route. This will be further detailed in the construction phase Health and Safety Plan.

An Emergency Rep Spoil Management Plan has been prepared and is contained in Appendix 5.1 of the CEMP.

5.18 Complaints Handling

The purpose of this CTMP is to minimise the impact that construction actives have on the local road network. Should a member of the public raise a complaint about the implementation of the CTMP, they can raise a complaint with the client's community liaison officer, the Main contractors project manager, liaison officer or supervisor.

The Main Contactor will maintain a log of site complaints detailing:

- Name and address of complainant
- Time and date complaint was made.
- Date, time and nature of complaint
- Characteristics, of complaint such as noise rumble, dirty roads, etc
- Likely cause or source of nuisance
- Weather conditions,
- Investigative and follow -up actions.

The Main Contractor will appointment a Liaison Officer as a single point of contact to engage with the local community and respond to concerns. It will be the role of the Liaison Officer to keep local residents and businesses informed of progress and timing of particular construction activities that may impact on them.

5.19 Communication

The Main Contractor shall ensure that close communication with the relevant local authorities and the emergency services shall be maintained throughout the construction phase. Such communications shall include:

- Submissions of proposed traffic management measures for comment and approval.
- On-going reporting relating to the condition of the road network and updates to construction programming; and
- Information relating to local and community events that could conflict with proposed traffic management measures and construction traffic in order to implement alternative measures to avoid such conflicts.

The Main Contractor shall also ensure that the local community is informed of proposed traffic management measures in advance of their implementation. Such information shall be disseminated by posting advertisements in local newspapers and delivering leaflets to houses in the affected areas. Such information shall contain contact information for members of the public to obtain additional information and to provide additional knowledge such as local events, sports fixtures etc. which may conflict with proposed traffic management measures.

5.20 Particular Construction Impacts

5.20.1 Concrete Pours

The proposed development will be constructed using concrete and will require concrete pours. Given the size and nature of the development this will require large pours and require a continuous stream of concrete trucks to/from the development.

The majority of concrete used on this project will be supplied by ready mix concrete lorries.

Concrete deliveries will be programmed in advance of works commencing. Given the size of the area, it is not anticipated that number of lorries arriving on site will result in a queue along Croughta (L5302). The site is large enough to allow staging of concrete lorries within the site area.

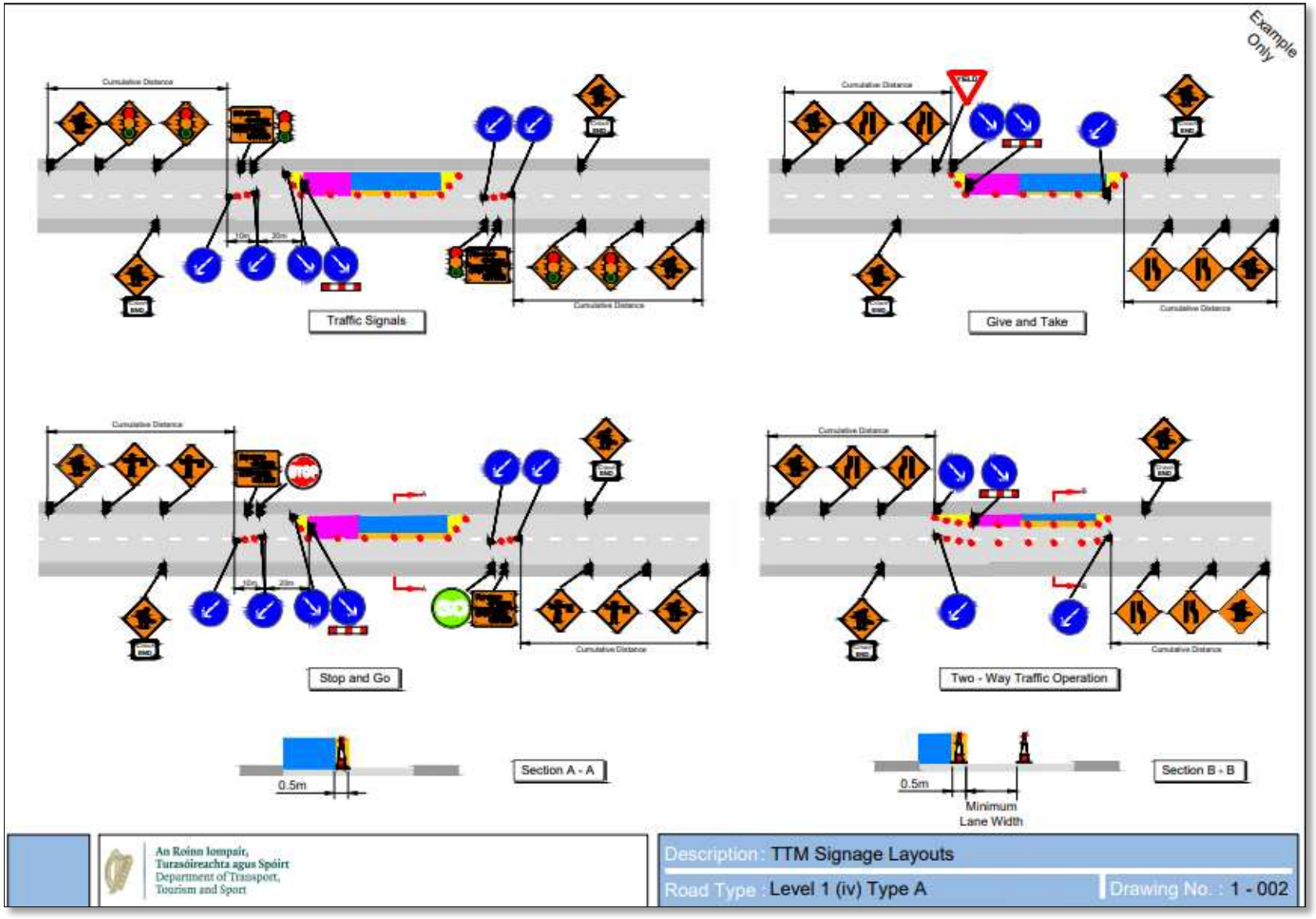
6 CONCLUSION

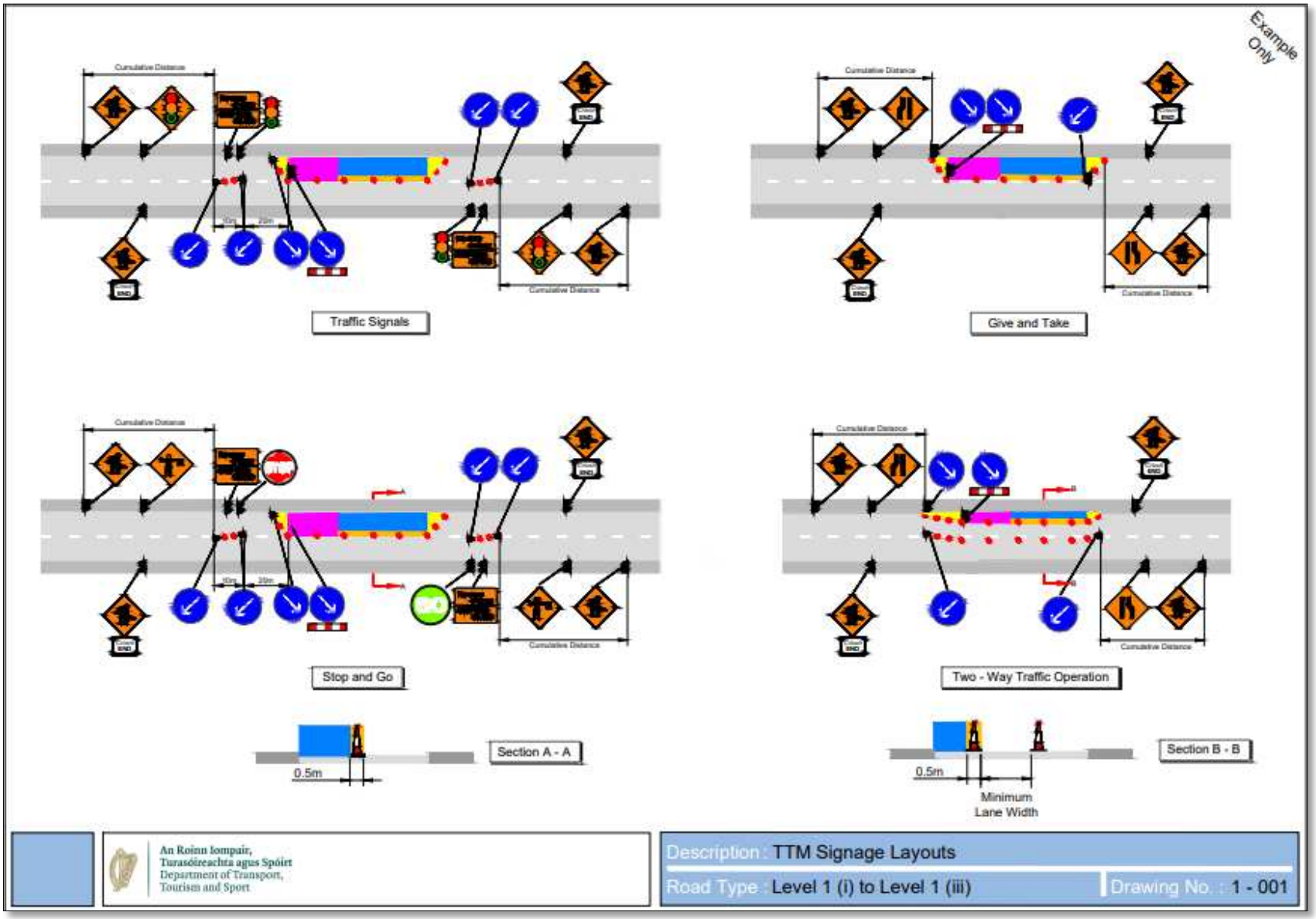
This Construction Traffic Management Plan will form part of the construction contract and is designed to reduce possible impacts which may occur during the construction of the proposed development.

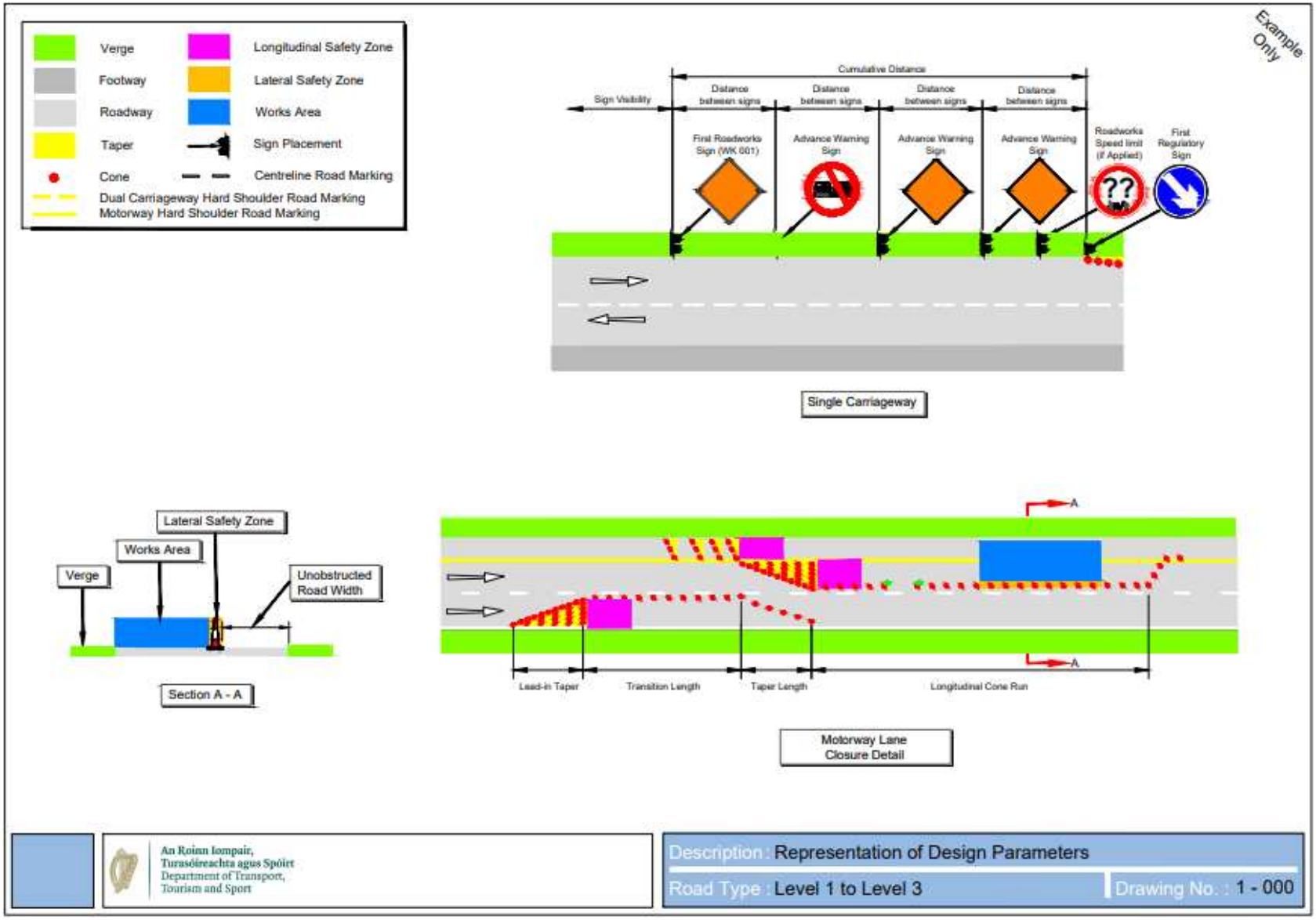
The Construction Traffic Management Plan shall be used by the appointed Main Contractor as a basis for the preparation of a final Construction Traffic Management Plan and shall detail, at a minimum, the items detailed in this Construction Traffic Management Plan and any subsequent requirements of the local authorities.

Tullacondra Green Energy Ltd shall be responsible for ensuring that the appointed Main Contractor manages the construction activities in accordance with this plan and shall ensure that any conditions of planning are incorporated into the final Construction Traffic Management Plan prepared by the appointed works Main Contractor.

Appendix A SAMPLE TEMPORARY TRAFFIC MANAGEMENT PLANS

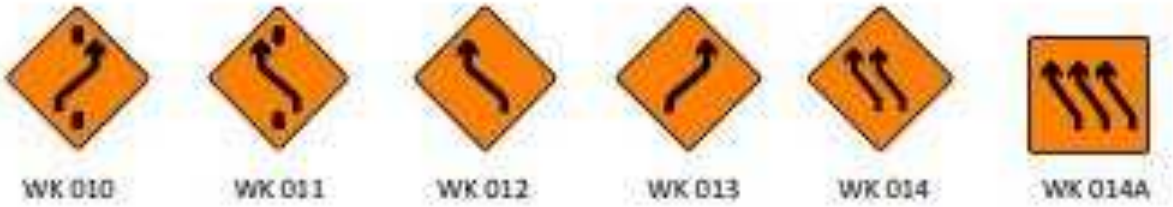

Example Only
Traffic Signals
Give and Take
Stop and Go
Two - Way Traffic Operation
0.5m
Section A - A
0.5m
Minimum Lane Width
Section B - B
An Roinn Iompair, Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport
Description : TTM Signage Layouts
Road Type : Level 1 (iv) Type A
Drawing No. : 1 - 002


Example Only
Traffic Signals
Give and Take
Stop and Go
Two - Way Traffic Operation
Section A - A
0.5m
Section B - B
0.5m
Minimum Lane Width
An Roinn Iompair, Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport
Description : TTM Signage Layouts
Road Type : Level 1 (i) to Level 1 (iii)
Drawing No. : 1 - 001


Example Only
Verge
Footway
Roadway
Taper
Cone
Longitudinal Safety Zone
Lateral Safety Zone
Works Area
Sign Placement
Centreline Road Marking
Dual Carriageway Hard Shoulder Road Marking
Motorway Hard Shoulder Road Marking
Cumulative Distance
Sign Visibility
Distance between signs
First Roadworks Sign (WK 001)
Advance Warning Sign
Roadworks Speed limit (if Applied)
First Regulatory Sign
Single Carriageway
Lateral Safety Zone
Works Area
Verge
Unobstructed Road Width
Section A - A
A
Lead-in Taper
Transition Length
Taper Length
Longitudinal Cone Run
Motorway Lane Closure Detail
An Roinn Iompair, Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport
Description : Representation of Design Parameters
Road Type : Level 1 to Level 3
Drawing No. : 1 - 000

Appendix B SAMPLE TEMPORARY TRAFFIC MANAGEMENT SIGNAGE

WK 001



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WK 020 WK 021 WK 022 WK 023 WK 024

WK 030 WK 031 WK 032 WK 033 WK 034 WK 035

WK 040 WK 040A WK 041 WK 041A WK 042 WK 042A


WK 043
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Beolach Isteach
SITE ACCESS
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WK 061
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DETOUR
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WK 090
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Bothar Dunta
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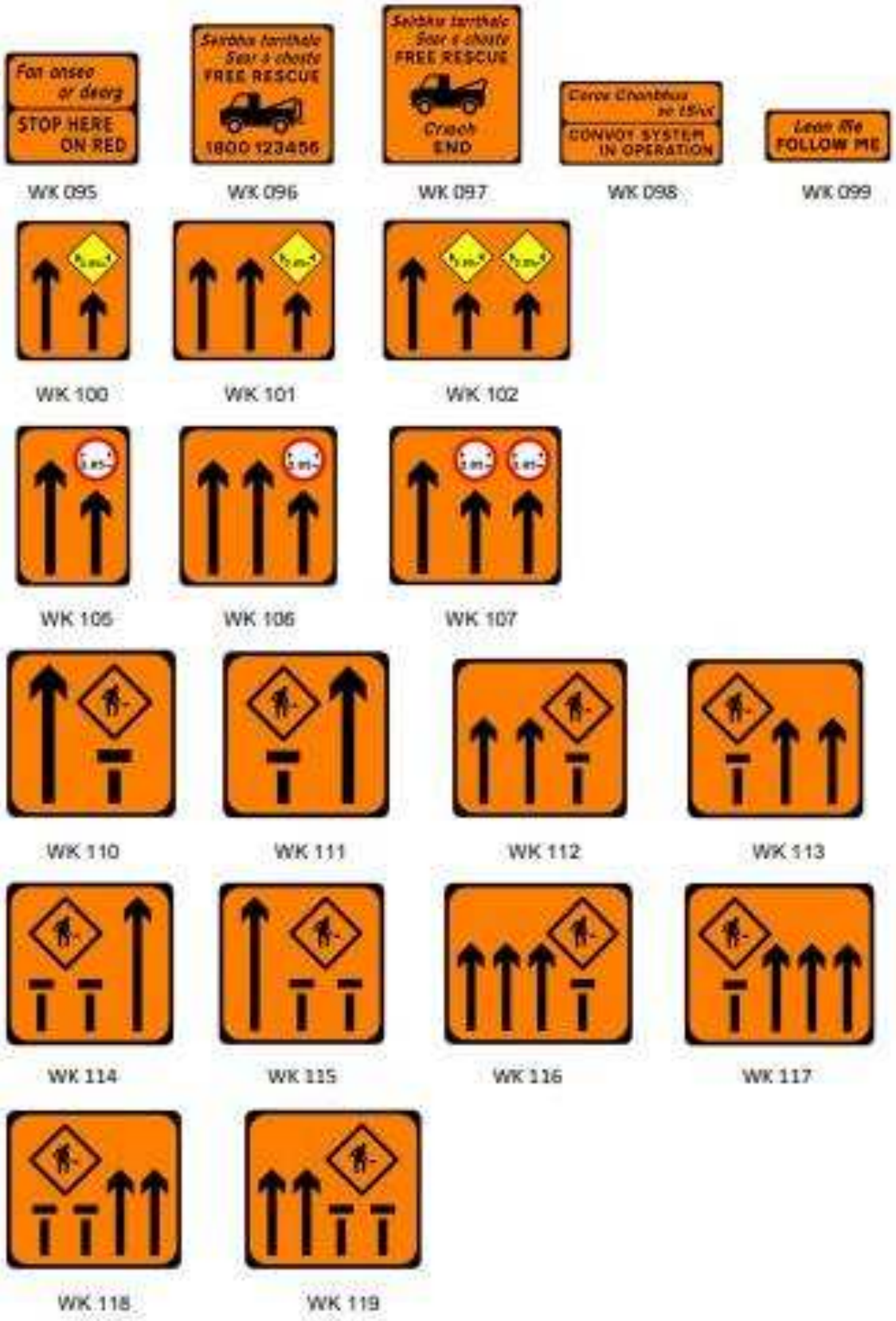
WK 094



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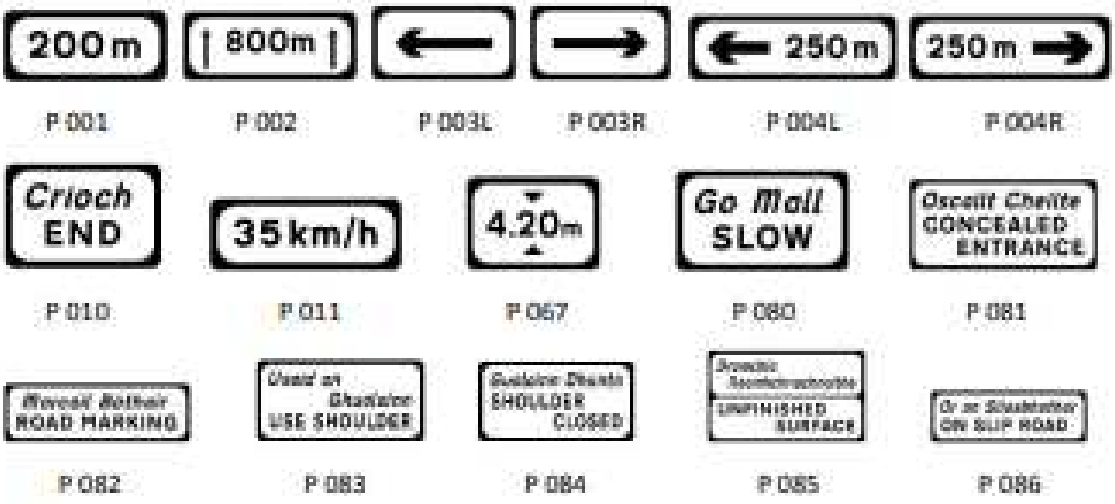
WK 105 WK 106 WK 107

WK 110 WK 111 WK 112 WK 113

WK 114 WK 115 WK 116 WK 117

WK 118 WK 119



P 001 P 002 P 003L P 003R P 004L P 004R

P 010 P 011 P 067 P 080 P 081

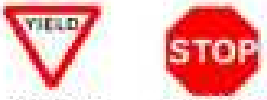
P 082 P 083 P 084 P 085 P 086

W 062L W 062R W 063L W 063R W 110 W 111

W 183 W 184 W 185

Regulatory Signs (See Chapter 5)

RUS 001 RUS 002 RUS 003 RUS 009 RUS 014



RUS 026 RUS 027

RUS 039 RUS 040 RUS 041 RUS 042 RUS 043 RUS 064 RUS 044

RUS 060 RUS 061 RUS 061

Information Signs (See Chapter 4)

F 401

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