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Lissinagroagh Wind Farm, Co. Leitrim

Appendix 2-7

Surface Water Management Plan

BUILT ON KNOWLEDGE

Document Control Sheet	
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1. INTRODUCTION

This Surface Water Management Plan (SWMP) details control measures for avoiding, preventing or reducing impacts on the surface water environment during proposed construction, as identified in Chapter 8 (Hydrology and Hydrogeology) and associated technical appendices.

The objective of this SWMP is to manage the movement of surface water during the construction, operation and decommissioning of the proposed Lissinagroagh Wind Farm (proposed project). The measures implemented for the proposed construction phase will provide flow management for the operational and decommissioning phases.

The measures in the SWMP are consistent with those detailed within the Chapter 8 (Hydrology and Hydrogeology) of the Environmental Impact Assessment Report (EIAR). This is a working document and will be finalised by the appointed Contractor following appointment and prior to commencing works on the proposed project to include any additional conditions stipulated by An Coimisiún Pleanála.

All of the content provided in this SWMP will be delivered by the appointed Contractor and its finalisation by the appointed Contractor will not affect the robustness and adequacy of the information presented here and relied upon in the EIAR and Natura Impact Statement (NIS). Relevant guidelines were considered in the development of this surface water management plan.

1.1 OVERVIEW OF THE PROPOSED PROJECT

EIAR chapter 2 describes the proposed project in detail. The proposed project comprises:

- A wind farm containing fourteen (14) wind turbines, an on-site 110kV electrical substation and other ancillary infrastructure including access roads and drainage;
- A 110kV underground grid connection to connect the wind farm to the National Grid at the existing ESBN Srananagh substation in Co. Sligo;
- Works required along the public road network between Killybegs, Co. Donegal and the proposed site to facilitate turbine and construction material delivery.

The footprint of the proposed wind farm infrastructure will require 49 ha. These 49 ha are included within the wind farm planning application boundary. The planning application boundaries for the proposed grid connection route (GCR) is presented on drawings in EIAR Appendix 2-2.

The proposed wind farm site is located within the townlands of Lisdarush, Shasmore, Faughary, Boleyboy, Cashelaveela, Tawnafeacle, Lissinagroagh and Tawnylust in north County Leitrim between the villages of Kiltyclogher to the northeast and Manorhamilton to the southwest. The closest turbine is located approximately 3 km northeast of Manorhamilton and approximately 4 km southwest of Kiltyclogher.

The site is located in close proximity to the Northern Ireland border in County Fermanagh which is approximately 3 km to the north. The site ranges in elevation from 170 to 380 m AOD, with the eastern part of the site bordering Dough Mountain (462m). The northern turbines are situated within the Saddle Hill (375m) Coillte property at elevations between 280 and 310 m

AOD generally in undulating terrain. The southern turbines are located between 170 m and 380m AOD.

The land use/activities within the site are primarily commercial forestry with expanses of wet grassland in the centre, northwest and southeast and upland blanket bog/open peatland particularly in the north and northwest.

There are a number of watercourses within the site. These range from naturally occurring upland streams to modified drainage channels within forested areas at mid to lower elevations. The southeastern part of the site is characterised by a number of flashy watercourses in deep ravines, the majority of which have existing crossings in place as part of existing forest road network.

The site is located within the Killarga South Groundwater Body (GWB). The aquifers underlying the site are classified as Locally Important in the west to Regionally Important – Karstified further east and southeast. Groundwater vulnerability ranges from Low in the west of the site to Moderate and High moving eastward, with areas of Extreme vulnerability to the north and west around Saddle Hill and south of Dough Mountain. According to GSI mapping, there are no mapped karst features within the site.

The site can be accessed from the south via the L61844 Local Road diverging from the L6184 off the N16 National Road east of Manorhamilton and from the west via the L61801 diverging from the R282 Regional Road. The local roads are linked to a network of existing Coillte forestry roads, which provide good coverage, are well maintained and in good condition.

2. PROPOSED SITE DRAINAGE

2.1 DRAINAGE DESIGN OVERVIEW

The drainage measures described will be implemented for the construction phase of the proposed project and the majority of the measures will remain in place for the operational phase.

The surface water drainage system follows the recommendations of sustainable urban drainage systems (SuDS) and uses SuDS measures. The principal behind SuDS is to reduce the quantity of discharge from developments to predevelopment flows and to also improve the quality of run-off from proposed projects.

A drainage evaluation has been carried out for the proposed project using the HR Wallingford tool (https://www.hrwallingford.com/expertise/smart-data-solutions/data-modelling-mapping-and-geospatial-automation, - accessed November 2025) to identify appropriate SuDS measures for use on the proposed wind farm site.

For the proposed wind farm site the drainage design will decrease the quantity of run-off by using permeable road construction for the access roads and on the hardstanding areas and by providing surface water sedimentation/storage ponds. The following SuDS features are included in the drainage design for the proposed wind farm site:

- **Swales/Check Dams:** Sloped channels with check dams will slow down water flow, improving water quality, infiltration and reducing erosion:
- **Filter strips:** a gently sloped, vegetated area designed to treat stormwater runoff by filtering pollutants and allowing water to infiltrate into the soil. Filter strips are utilised at the level spreader locations:
- **Settlement Ponds:** Vegetated ponds designed to temporarily store surface water runoff, aiding in flood control; and
- **Hydrocarbon Interceptor:** a device designed to remove hydrocarbons, silt and other pollutants from surface water runoff before it enters the drainage system. The hydrocarbon interceptor will be located at the substation and construction compounds.

The layout of the proposed wind farm site has been designed to collect surface water runoff from hardstanding areas and discharge to settlement/infiltration ponds within the proposed wind farm site boundary. From here the water will discharge to the ground by means of finger drains in a fan arrangement at the appropriate greenfield run off rates. A drawing of the proposed settlement ponds is shown in Drawing 10955-2065, in Appendix A. Infiltration basins allow for the treatment of surface waters and provide valuable habitats.

Check dams will be provided in drainage channels to reduce the velocity of surface water run-off and are depicted in Figure 2-1. Swales will be constructed adjacent to the access road (see Appendix A) to provide drainage as depicted in Figure 2-2.

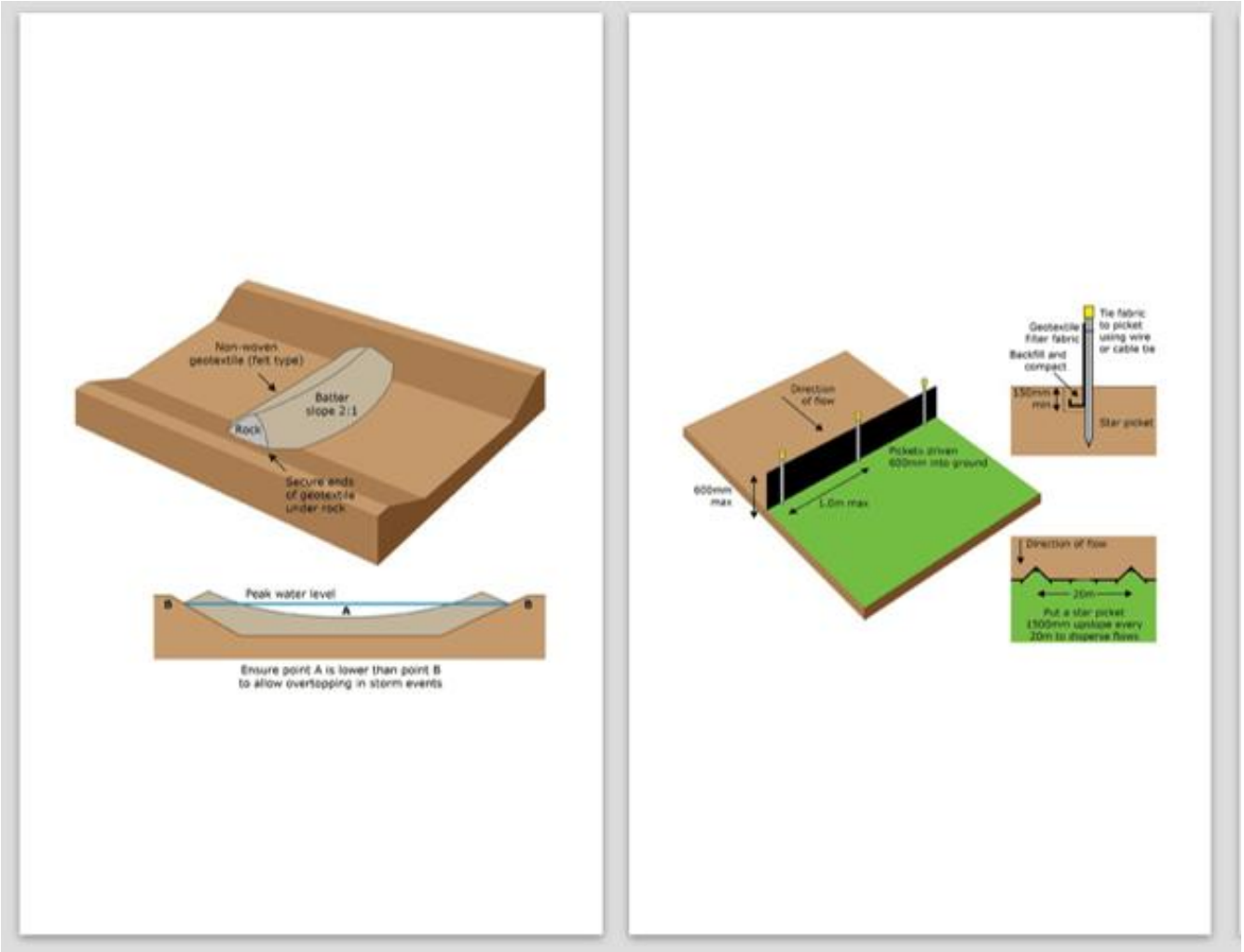


Figure 2-1 Check dam and silt fence examples (Source: Guidelines for Environmental Management, EPA Australia, 2004)

Figure 2-2 Vegetated swale

2.2 KARST AREAS

Karst is formed by the dissolution of soluble bedrock (mainly limestone/gypsum). This creates a complex subsurface of fissures, conduits, and caves. Standard drainage can result in point recharge to groundwater with limited attenuation. The primary guidance document in Ireland is HD 45/15: Design Manual for Roads and Bridges, Volume 4, Section 2, Part 2 – Design of Highway Drainage in Karst Areas. While the areas is partially karstified, the presence of extensive drainage around the site indicates that flow pathways are short with groundwater discharging to the streams over a short period of time.

The proposed drainage utilised the SuDS "treatment train," moving from source control to final discharge. The key principles of HD 45/15 Karst Drainage Design include;

- Minimise point source infiltration: Avoid concentrated flows of water into the ground, which can accelerate dissolution and cause instability.
- Attenuate and disperse runoff: Manage surface water close to its source, using shallow, dispersed systems.
- Protect groundwater quality: Prevent pollutants from entering the karst aquifer.
- Avoid concentrated discharge to ground: Infiltration, where used, must be controlled and dispersed.

The proposed drainage does not propose to directly discharge to the known shallow holes to the east of T7. Drainage is instead treated and discharged to the west of T7.

2.3 BORROW PITS

The water level in the borrow pits will be managed by a dedicated outlet and silt bag. This outlet, along with pre-installed upgradient interceptor drains, will control runoff from both the pit and

its immediate surroundings. During the construction phase, any standing water will be removed using a mobile pump to maintain dry working conditions. The pumped water will be discharged into the drainage network (silt bag, settlement ponds) that serves the outlet. To minimise sediment entering the pump, the intake will be positioned above the pit floor on a stable platform. The pump operation will be managed to maintain a stable water level, preventing turbulence that resuspends settled solids.

2.4 Forestry Drainage

Forest felling will be undertaken during the initial phase of the construction works. The Felling and Reforestation Standards describe the universal standards that apply to all felling (thinning, clear felling) and reforestation projects on all proposed wind farm sites, will be implemented under a felling licence issued by the Department of Agriculture, Food & the Marine.

All associated tree felling will be undertaken using good working practices as outlined in the Construction Environmental Management Plan (CEMP) (Appendices 2-4 of this project EIAR), the Forest Service 'Forestry Harvesting and Environment Guidelines' (2000) and the 'Forestry and Water Quality Guidelines '(2000). The latter guidelines deal with sensitive areas, erosion, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel and machine oils. Brash mats will also be used to support harvesting and forwarding machinery. The brash mats reduce erosion of the surface and will be renewed as they become used and worn over time.

Trees will be manually felled inside the 25m stream buffer. During the near stream construction work, silt traps and a double row silt fences will be placed immediately down-gradient of the construction area for the duration of the construction phase.

2.5 Flood Risk Attenuation

The creation of impermeable areas, such as hardstands, has the potential to locally increase rates of runoff and this may increase flood risk and flood severity downstream. The proposed wind farm site is relatively low permeability and will have limited potential to increase flows.

The risk of flooding associated with the proposed wind farm site is minimal based on the project specific Flood Risk Assessment carried out for the proposed project (see Appendix 8-4 of the EIAR). The layout of the proposed wind farm site will minimise the flood risk to people, property, the economy, and the environment.

It is proposed to provide temporary storage within the drainage channels by creating check dams within them at regular intervals. The spacing of the dams is every 50 metres on average but depends on the channel slope. Runoff from the impermeable areas will be directed to swales and settlement ponds. The settlement ponds limit outflows to pre-existing levels and allow any sediment to be removed through settlement. The outflow from the settlement ponds will be released in a controlled and diffuse manner onto the vegetation and existing drains.

2.6 Turbine Delivery Route and Grid Connection

There will be limited construction activities required for the grid connection and accommodation areas of the proposed Turbine Delivery Route (TDR). Further details in relation to the grid connection cable route and road/junction accommodations required for the TDR are outlined in the CEMP in Appendix 2-6 of the EIAR.

No refuelling of machinery will take place within 50 m of a watercourse. Excavated material will not be stockpiled or side-cast within 50 m of a watercourse. Appropriate steps will be taken to prevent soil/dirt generated during the temporary accommodations required for the TDR from being transported on the public road. Road sweeping vehicles will be used as required, to ensure that the public road network remains free of soil/dirt from the location of the TDR accommodations when required. This will reduce the potential for sedimentation of surface watercourses locally.

Silt fencing will be erected at the location of all stream crossings along the grid connection. Where existing drainage ditches need to be realigned (e.g., around substation), new ditches will match profile of existing ditch in relation to width, existing side slope profile (or lower) and material at base of channel will be reused. The sizing of any new culverts will be designed to maintain existing flow characteristics and depth of flow. Culverts will be assessed to ensure no barriers to fish migration occur. Where barriers occur, such culverts will be improved to increase fisheries potential.

3. WATER QUALITY MEASURES

The drainage design measures outlined in Section 2 will manage flow and quality within the proposed wind farm site and near the works areas of the proposed grid connection and TDR accommodation areas. Specific water quality measures in relation to sediment, concrete and fuel management are detailed below.

3.1 CONCRETE

During the construction phase, concrete will primarily be supplied as ready-mixed material from local batching plants, delivered in sealed concrete trucks. On-site mixing will be limited to minor tasks, such as substation blockwork. The use of ready-mixed deliveries significantly reduces environmental risks associated with large-scale on-site batching.

Upon delivery, only the truck chute will be rinsed on site using the minimum necessary volume of water. Full washout of trucks will occur at the batching plant, where appropriate facilities are already in place. Water from chute rinsing will be directed into a temporary lined, impermeable containment area. These areas will be excavated and lined with an impermeable membrane to prevent ground contamination. Residual solids and liquids will be collected and removed by a licensed waste contractor.

Concrete washout areas will be located near site entrances and at key concrete pour locations—such as turbine hardstands—to ensure accessibility.

Although surplus concrete following a pour is unlikely, any excess will be returned and disposed of off-site at the concrete production facility. Localised mixing for minor works, such as blockwork, will be conducted only as required. Any small volumes of leftover concrete from these tasks will be disposed of in the designated on-site concrete washout area.

Further details on best practices and environmental controls related to concrete delivery and pouring are provided in the Construction Environmental Management Plan (CEMP) (see Appendix 2-4). A hydrocarbon interceptor will be located at the substation and construction compound.

3.2 FUELS, OILS AND CHEMICALS – SPILL CONTROL

The following will be employed on the proposed wind farm site:

- Fuels and chemicals will be stored within bunded areas as appropriate to guard against potential accidental spills or leakages. The bund area will have a volume of at least 110% of the volume of such materials stored;
- Store all containers of oil and fuel in a secure, bunded area.
- Regularly check tanks, containers and bunds for damage and leaks.
- Supervise all fuel and oil deliveries.
- Lock containers and tanks when not in use.
- Seek advice from a line manager before disposing of waste fuel or oil, or contaminated spill granules or absorbent mats – all contaminated materials to be disposed of shall be disposed of by an appropriately licenced waste management facility.
- Liaise with a line manager to organise removal of contaminated water from bunds and trays by an appropriate contractor.
- Do not store fuel and oil, or carry out refuelling, within 50 m of a watercourse.

- All on-site refuelling will be carried out by a trained competent operative. Use a funnel when refuelling small plant. Use an automatic shut off or pistol grip delivery system when refuelling plant.
- Clear up and report all spillages immediately.
- Place a drip tray or absorbent mat under all static plant and mobile plant during fuelling.
- Mobile measures such as drip trays and fuel absorbent mats kept with all plant and bowsers and will be used as required during all refuelling operations;
- A spill kit will be stored with the bowser and the person operating the bowser will be trained in their use;
- All equipment and machinery will have regular checking for leakages and quality of performance and will carry spill kits;
- Any servicing of vehicles will be confined to designated and suitably protected areas such as construction compounds; and
- Additional drip trays and spill kits will be kept available on the proposed wind farm site, to ensure that any spills from vehicles are contained and removed off-site.

4. EROSION AND SEDIMENT CONTROL MEASURES

It is proposed, that during the ground clearance of the proposed project, the contractor will implement water control measures to limit the impact on water quality using standards measures. Suspended solid (silt) removal features will be implemented in accordance with the Construction Industry Research and Information Association (CIRIA) C697 SuDS Manual, and CIRIA C648 Control of water pollution from linear construction projects.

Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. These flows will discharge diffusely overland, within the buffer zone before entering any watercourse. Regular cross flow and energy dissipation devices will be installed to divert overland flows and prevent these flows from entering the construction area.

All drainage from the proposed wind farm site shall be designed to have as a minimum three stages of treatment, as defined in the SuDS Manual. Management of runoff will include the following:

- Filtration of water through filter media (sand/stone check dam, silt fence);
- Detention/settlement in settlement ponds or behind check dam in swales; and
- Conveyance of shallow depths of water in vegetated swale.

All surface water run-off from the proposed wind farm site will pass through settlement ponds. It is proposed to locate settlement ponds downstream of borrow pits and associated stockpile areas, each hardstand and along all the proposed wind farm site access tracks.

Drainage drawings are presented in Drawing 10955-2050 to 10955-2056, in Appendix A.

4.1 CHECK DAMS/SILT FENCES

Track edge drainage/swales are required to control run-off from the running surface to lower water levels in the subgrade, to control surface water and to carry this flow to outlet points. Swales will be re-vegetated by hydro-seeding with indigenous seed mix as soon as is practicable following excavation. This will reduce the flow velocity, treat potential pollutants, increase filtration and silt retention.

Swales will be installed in advance of the main construction phase. Check dam details are presented in Drawing 10955-2065. On sections of track where there is significant longitudinal gradient, regular surface water interception channels will be employed – these will typically be at 20m intervals to collect any surface water that is discharging as sheet flow along the track and discharge the flow into the trackside swale.

Check dams will have a minimum 0.2 m freeboard (from top of check dam) to top of swale level, to prevent overtopping of flows onto the access track. All check dams, etc to be checked at least once weekly via a walkover survey during the period of construction. All excess silts will be removed. Where check dams have become fully blocked with silt, they will be replaced. The following measures will be implemented:

All stockpiled material will be battered back (Slope of 1:2 or less) to reduce the rainfall erosion potential. Silt fencing will be utilised at the base of stockpiles.

Silt fencing is to be installed in the path of sheet flow runoff to filter our heavy sediments. Silt fences are to be located at the toe of stockpiled areas to reduce sediment transport. Additional

silt fencing and emergency spill kits will be kept on the proposed wind farm site for use in emergencies. All silt fencing on the proposed wind farm site will also require regular cleaning and maintenance in accordance with manufactures guidelines.

Silt build ups, within settlement ponds, check dams, silt fences will be removed as required to ensure no carryover/breakthrough of suspended matter downstream in the drainage system. Any sediment removed will be disposed of so as to prevent any reintroduction into the drainage system.

4.2 SETTLEMENT PONDS

Settlement ponds will be located downstream of road swale sections and at turbine/hardstand locations, to manage/buffer volumes of runoff discharging from the drainage system during periods of high rainfall, thereby reducing the hydraulic loading to watercourses. Settlement ponds are designed in consideration of the greenfield runoff rates. A longitudinal cross-section and plan of a settlement pond is presented in Drawing 10955-2065, in Appendix A.

The attenuation pond is designed following the guidance in the CIRIA SuDS Manual (C697) to attenuate runoff to existing greenfield runoff rates. The attenuated runoff volume for the 1 in 100-year 6-hour event (plus 20% climate change allowance) is limited to the greenfield runoff volume. Each of the turbine and hardstand (0.9 hectare) areas drain to a constructed settlement pond with a length of 25m and 10m in width (capacity of 250 m^3), providing more than sufficient volume to cater for this runoff (with additional storage capacity for 1:100 yr extreme events plus climate change). Flows will discharge from the pond via a hydrobrake or similar hydraulic control that is designed to cap the discharge to existing greenfield runoff rates. The proposed conservative drainage design is considered appropriate for the proposed site. It should be noted that the calculations are highly conservative. The existing runoff characteristics is for 95% runoff from the agricultural and forestry lands. Due to the design of the hardstand areas, the runoff co-efficient based on empirical evidence is 85-90% due to the gravel surface (increased storage) and shallower slopes (<1 degree).

The proposed settlement pond design consists of a sediment forebay, which removes the majority of suspended solids from the inflow water. Inflow water enters the sediment forebay via an energy break, which removes energy from the incoming water resulting in a decrease in the incoming waters capacity to transport suspended solids and the deposition of material in the sediment forebay. The water then flows over a section of elevated channel bed into the flow control bay. Here the flow is controlled by a weir constructed of tightly fixed straw bales (or silt fence or equivalent). The straw acts as an effective silt trap for any remaining suspended solids while allowing the water to filter through its medium. Once the water has been filtered by the flow control device it then outfalls to an area of intact vegetation, which acts as a secondary filter. The outflow control from the settlement device is designed such that in an extreme event the device can overflow into adjacent vegetated areas.

Settlement ponds will be installed concurrently with the formation of the road. Settlement ponds are to be located as close to the source of sediment as possible with a buffer zone between the settlement pond outfall and any existing watercourse.

The settlement pond design (Drawing 10955-2065, Appendix A) is based on primary settling out of suspended solids from aqueous suspension. The theory behind the design of the settlement ponds is the application of Stoke's Law. The settlement ponds will be designed to provide sufficient retention time and a low velocity environment to allow suspended solids of small

particle size to fall out of suspension prior to allowing the water to outfall to the receiving environment. Settlement ponds will be constructed on even ground and not on steeply sloping ground and will discharge into vegetation areas to aid dispersion.

Runoff will be maintained at Greenfield (pre-development) runoff rates. The layout of the development has been designed to collect surface water runoff from hardstanding areas within the development and discharge to associated surface water attenuation lagoons adjacent to the proposed infrastructure. It will then be managed by gravity flow at Greenfield runoff rates.

4.3 Works near Watercourses

As mentioned above, where main drain crossings and stream crossings occur (i.e., access tracks), it is proposed to use a clear-span design bridge or bottomless culverts. Installation of such features will take place during dry periods to reduce the risk of sediment entering the watercourse. Smaller drains with be crossed using normal culverts.

Ten (10) new clear-span bridges are required to cross the EPA streams. Clear span bridges are required for all watercourse crossings, with the exception of the EPA watercourse segment code 35_2909, as illustrated in Table 8-20 of Chapter 8 (Hydrology and Hydrogeology). A Section 50 Consent application will be prepared and submitted to the OPW prior to construction. No instream works are proposed for any of the proposed clear span bridge crossings.

As a further precaution, near-stream construction work will only be carried out during the period permitted by Inland Fisheries Ireland in accordance with in-stream works guidance document *"Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites"*.

Culverts will be designed to be of a size adequate to carry expected peak flows in accordance with CIRIA Culvert design and operation guide (C689). Culverts will be installed to conform, wherever possible, to the natural slope and alignment of the drainage line. Where required, culverts will be buried at an appropriate depth below the channel bed and the original bed material placed at the bottom of the culvert. The sizing of any new internal drainage crossings will at a minimum maintain existing depth of flow and channel characteristics.

Culverts will be required at drain crossings along the access roads and to allow for cross drainage on the proposed windfarm. Precast concrete culverts or uPVC drainage pipes shall be provided for drain culverts, detail of which is shown in Drawing 10955-2066, in Appendix A. Earth embankments constructed for bridge approaches will be protected against erosion e.g., by re-vegetation or rock surfacing etc.

4.4 Grid Connection

Management of surface water is set out in Appendix 2-3 Substation and Grid Connection Construction Methodology Report. Cable trenches are typically developed in short sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences.

5. SURFACE WATER MONITORING

Details of the proposed surface water monitoring and maintenance activities are provided in this section of the SWMP. Operational phase monitoring is not required, as the risk of contamination during this phase is considered low. However, drainage features will be checked and maintained as required as part of regular maintenance inspections.

The Contractor will retain records of all monitoring and maintenance activities carried out during the construction phase.

5.1 RECORDING AND REPORTING

Inspections will be recorded for the proposed project. In the event that pollution indicators are observed, works will cease, and sampling will immediately be undertaken as described for the weekly monitoring, and an investigation of the potential cause will be undertaken by the appointed Contractor.

Where the construction works are identified as the source causing the exceedance, the following details will be recorded;

- Nature of the impacts and mechanism of pollution;
- Details of the activity identified as causing the incident or, in the event no clear pathway still exists, activities capable of causing the incident and an assessment undertaken as to the most likely source;
- Immediate steps taken to remove or isolate the pollution source (e.g., stopping works, containing runoff) and mitigate potential impacts (e.g., deploying silt fences); and
- Details of measures proposed and implemented to ensure that such an incident does not re-occur.

This information will be shared with the Employer and the regulators. Through monitoring and this open and transparent reporting, there is a much-reduced likelihood of a small incident becoming a serious one that may require regulator action; proactively providing this information gives the regulator and the Client comfort that these issues are taken seriously on the proposed wind farm site, GCR work areas and TDR accommodation areas and addressed in a professional manner.

5.2 DETAILS OF MONITORING LOCATIONS ON SITE

There are 6 no. surface water monitoring locations (see Figure 5-1) to monitor surface water quality. These points are focussed on potential receiving areas where turbines are located close to streams/rivers. The proposed monitoring schedule is robust and sufficient for the scale of the proposed wind farm site and in line with the relevant guidance.

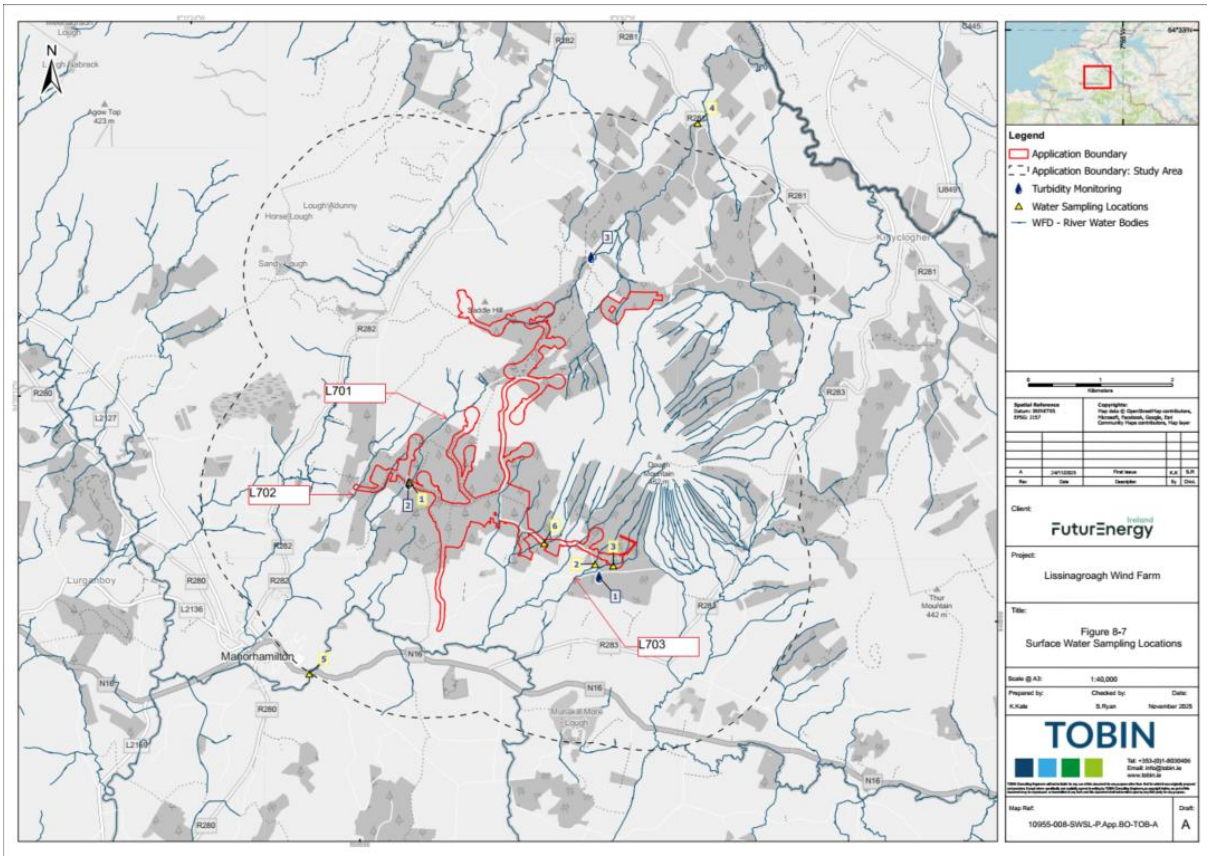


Figure 5-1 Surface water monitoring locations for the SWMP

5.2.1 Surface Water Monitoring Schedule

All surface water control measures for the proposed project will be implemented in accordance with the Construction Environmental Management Plan (CEMP) (Appendix 2-4 of the EIAR). A surface water monitoring schedule for the construction phase has been developed (see Table 5-1). Parameters and associated trigger limits are illustrated in Table 5-2. The schedule also specifies the frequency of monitoring to be undertaken before, during, and after construction. Further details of the proposed surface water monitoring locations are provided in Table 5-3.

5.2.2 Schedule of Monitoring

The critical water parameters in terms of their potential to cause damage to aquatic life, ecosystems, human health and water quality in the receiving waters are outlined in the surface water monitoring schedule (see Table 5-1).

Table 5-1: Surface Water Monitoring Schedule for Lissinagroagh Wind Farm

Phase	Preconstruction	Construction	Post construction
Monitoring Period	3 Months	24 Months	3 Months
Frequency	Continuous		
Parameters	Turbidity	Turbidity	Turbidity
Frequency	Daily		
Surface Water Parameters	N/A	Turbidity and visual checks (examination of surface drainage/sediment control measures/watercourses)	Turbidity and visual checks (examination of surface drainage/sediment control measures/watercourses)
Frequency	Weekly (Handheld Meter)		

Surface Water Parameters	pH, Electrical Conductivity, Turbidity, Temperature	pH, Electrical Conductivity, Turbidity, Temperature (Monitoring during clearance phase and construction works at Turbines)	N/A
Frequency	Monthly (Grab samples)		
Surface Water Parameters	Conductivity, Chloride, Dissolved Oxygen, Molybdate Reactive Phosphorus, Mineral Oil, pH, Turbidity, Total Ammonia, Total Phosphorus, Total Suspended Solids	Conductivity, Chloride, Dissolved Oxygen, Molybdate Reactive Phosphorus, Mineral Oil, pH, Turbidity, Total Ammonia, Total Phosphorus, Total Suspended Solids	Conductivity, Chloride, Dissolved Oxygen, Molybdate Reactive Phosphorus, Mineral Oil, pH, Turbidity, Total Ammonia, Total Phosphorus, Total Suspended Solids
Frequency	Quarterly (Grab Samples)		
Surface Water Parameters	N/A	Conductivity, Chloride, Dissolved Oxygen, Molybdate Reactive Phosphorus, Mineral Oil, pH, Turbidity, Nitrate, Total Ammonia, Total Phosphorus, Total Suspended Solids	N/A
Frequency	Pre-Construction Report	Monthly and Quarterly Monitoring Report	Final Monitoring Report
Surface Water Parameters	Upgrade limits/trigger values for construction phase water monitoring	Results screened against construction phase surface water monitoring trigger levels	Results screened against construction phase surface water monitoring trigger levels

5.2.3 Surface water Monitoring Trigger Values

Surface Water Quality Monitoring (SWQM) will be conducted by the appointed Contractor in accordance with the monitoring schedule proposed in Table 5-1. Prior to the commencement of construction, baseline preconstruction monitoring will be carried out. The results of this monitoring suite will determine the baseline and trigger values for the construction monitoring phase of the development. This will be completed in order to establish if local trigger values are required due to existing water quality exceedances.

The final details of the monitoring schedule will be agreed with the relevant authorities, prior to the commencement of construction. Construction and post construction sampling results will be screened against the agreed trigger values as proposed in Table 5-2, except where local triggers are required.

Table 5-2: Analysis and Proposed Trigger Values (Pre-Construction)

Parameter	Proposed Limits	Units
Conductivity	700 µS/cm or within preconstruction values	µS/cm
Chloride	200 mg/l or lower i.e. within trigger values established by preconstruction monitoring	mg/l
Dissolved Oxygen	80% to 120%	% Saturation
Biochemical Oxygen Demand	1.5 mg/l annual average or within preconstruction values	
Molybdate Reactive Phosphorus	0.035 mg/l annual average or within preconstruction values	mg/l
Mineral Oil	10 µg/l or within preconstruction values	µg/l
pH	6.0-9.0	pH units
Turbidity	50 NTU or within preconstruction values	Nephelometric Turbidity Unit (NTU)
Total Ammonia	0.14 mg/l (95%ile) or within preconstruction values	mg/l
Total Phosphorus	0.1 mg/l or within preconstruction values	mg/l
Total Suspended Solids	25 mg/l or within preconstruction values	mg/l

Field measurements will be taken by the contractor on a weekly basis, as per the schedule in Table 5-1, during the main earthworks stage of the construction period. In addition, daily visual inspections of the surface drainage and sediment control measurements and the watercourses will be completed. Daily turbidity monitoring will also be undertaken on the proposed wind farm site. Indicators that show evidence of water quality issues include the following and will be noted.

- Changes in water quality; and
- Changes in water transparency.

In-situ field monitoring will also be conducted during major rainfall events i.e., 15 mm in a 6-hour period. The clerk of works will undertake monitoring during the rainfall events.

5.2.4 Surface Water Quality Monitoring Locations

Monitoring will be carried out at six locations surrounding the proposed wind farm site (see Figure 5-1). Construction-phase surface water monitoring will take place at the stream locations listed in the table below (Table 5-3). The sampling point labels are consistent with those used during site investigations to allow for comparison.

Table 5-3: Surface Water Monitoring locations details

Name	Easting	Northing	River / Stream Name	Notes
SW 1	590698	841946	Skreeny	Segment Code 35_4030
SW 2	593259	840785	Null	Segment Code 35_4203
SW 3	593529	840796	Lissinagroagh_35	Segment Code 35_4210
SW 4	594698	846931	Lattone_35	Segment Code 36_6324
SW 5	589304	839304	Owenmore [Manorhamilton]	Segment Code 35_3550
SW 6	592626	841104	Mt Dough	Segment Code 35_3841

Monitoring records will include the date and time of the monitoring period and relate to the relevant consent conditions, where applicable. A written log of the environmental performance of the works will be maintained. A monthly monitoring report on the findings of the monitoring exercises will be prepared within two weeks of receipt of analytical results. The monthly monitoring reports will cover the construction works and a final monitoring report will be completed post construction.

5.2.5 Proposed Monitoring Frequency and Parameters

5.2.5.1 Pre-Construction Monitoring

It is proposed that the surface water monitoring will be scheduled together with the pre-construction stage. Continuous turbidity monitoring will be undertaken upgradient and downgradient on the Lisdarush, Skreeny and Lissinagroagh Rivers, as illustrated in Figure 5-1, both preconstruction and during construction.

5.2.5.2 Construction Stage Monitoring

Surface water monitoring will be undertaken daily during the construction stage of the proposed project. The daily monitoring will include a walk around the proposed wind farm site, visual inspection of the watercourses and field measurements for turbidity to be undertaken as required and, as a minimum, on a weekly basis. Weekly surface water monitoring will take place as per the daily surface water inspection and will include for a routine weekly measurement of turbidity at the surface water locations.

Monthly surface water samples will be collected during the construction stage of the proposed project and laboratory analysis will be undertaken for those monitoring parameters included in Table 5-2 of this SWMP.

5.2.5.3 Post-Construction

Immediately post-construction for three months, surface water samples will be collected, and laboratory analysis will be undertaken for those monitoring parameters included in Table 5-1 of this SWMP.

5.2.6 Trigger Values

The trigger values for the surface water monitoring programme are those listed in Table 5-4 of this SWMP and where relevant Surface Water Quality standards given in the Surface Water (Environmental Objectives) Regulations S.I. 272 of 2009, or as otherwise agreed with the Planning Authority in consultation with Inland Fisheries Ireland where required.

An Environmental Manager will be engaged for construction stage monitoring. Should the trigger values not be met, the Environmental Manager will have 'Stop Works Authority' to direct the contractor's construction manager to cease all works and activities on the proposed wind farm site pending further instruction, in order to address any potential water quality issues.

Table 5-4: Proposed Surface Water Parameters and Trigger Values

Parameter	Units	Proposed Trigger Values	SI No. 272 of 2009 EU Surface Water Environmental Objective Regulations (as amended)	SI No. 293 of 1988 EC Regulations (Quality of Salmonid Waters)
Electrical Conductivity (EC)	µS/cm	700		
pH	pH units	>4.5 and <9	Soft Water 4.5< pH < 9.0	>6 and <9
MRP	mg/l	0.025 (mean – high status) 0.035 (mean- good status)	0.025 (mean – high status) 0.035 (mean- good status)	
Dissolved Inorganic Nitrogen as N	mg/l	2.6	2.6	
Total Suspended Solids	mg/l	25 (annual average)		25 (annual average)
BOD	mg/l	<5	<2.6 (95%ile) good status <2.2 (95%ile) high status	<5
COD	mg/l	40		
Dissolved Iron	ug/l	200		
Sulphate	mg/l	200		
Total Alkalinity as $CaCO_3$	mg/l	No abnormal change		No abnormal change
Hydroxide Alkalinity as $CaCO_3$	mg/l	No abnormal change		No abnormal change

6. MAINTENANCE ACTIVITIES

6.1 CONSTRUCTION PHASE

Settlement ponds will be regularly cleaned/maintained to provide effective and successful operation throughout the works. Outfalls and ditches will be cleaned, when required, starting up stream with the outfalls blocked temporarily prior to cleaning. Settlement pond management will also include the following:

Sediment/silt removed via the contractor from ponds is to be disposed of at suitable locations on the proposed wind farm site, away from watercourses. Machine access is required to enable the accumulated sediment to be excavated.

Settlement pond maintenance and/or cleaning will not take place during periods of extended heavy rain. Settlement ponds will be clearly marked and fenced off for safety.

The settlement ponds will be monitored closely for key parameters listed in Section 5, over the construction timeframe to ensure effective operation and compliance with discharge limits.

6.2 OPERATION PHASE

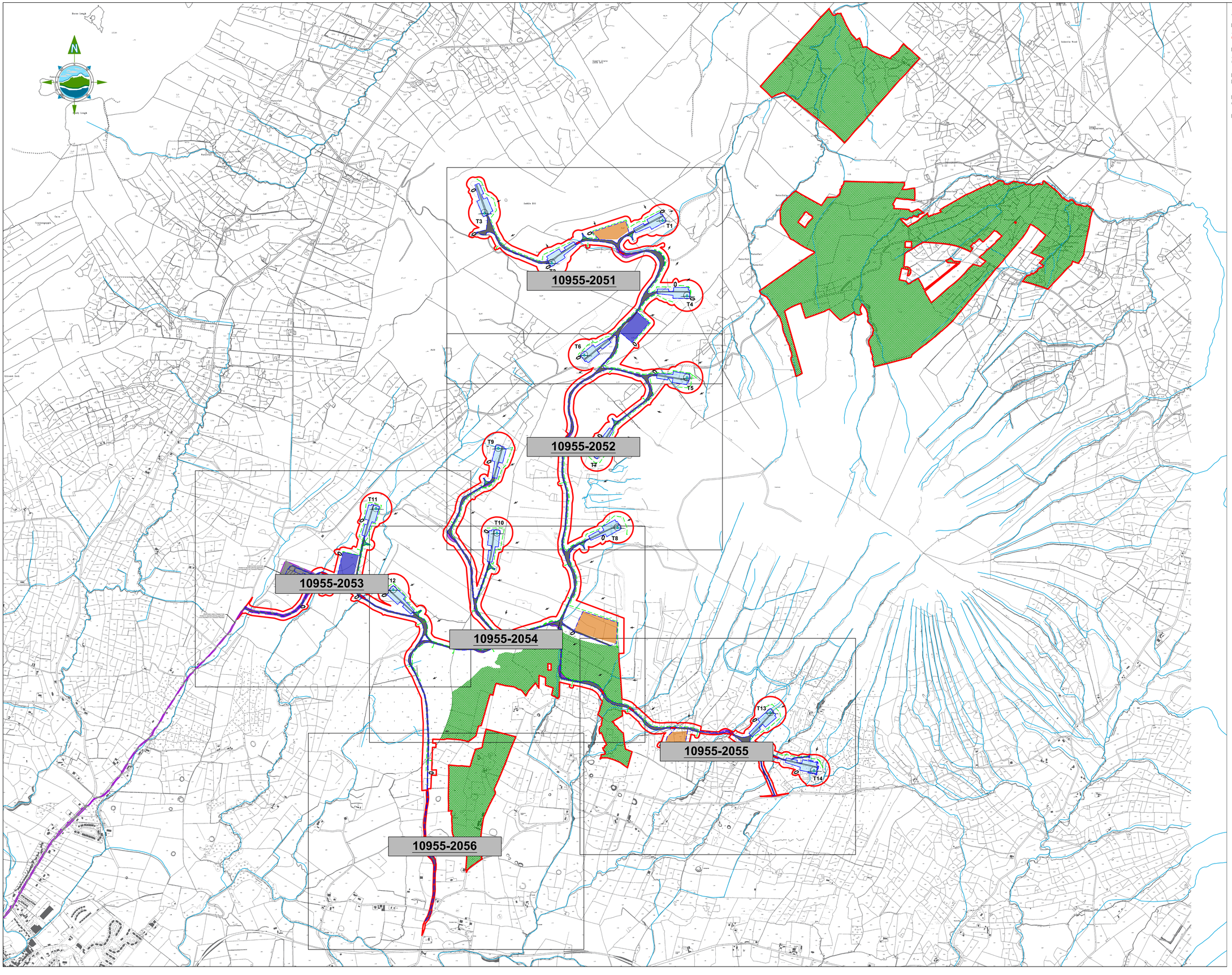
During the operational phase impediments to flows can generally occur as a result of blockages to watercourse crossings, ditches and watercourses themselves, resulting from vegetation and erosion debris. The surface water infrastructure will be regularly inspected and maintained by the operator through the lifetime of the project.

6.3 DECOMMISSIONING PHASE

A review of the relevant guidelines will be undertaken prior to the decommissioning phase. The operational phase surface water management infrastructure will be utilised for the decommissioning phase. The operational road layout will remain in place and therefore limit the potential for siltation during the decommissioning phase. Water quality measures as outlined in Section 3 will be implemented.

APPENDIX A

PLANNING DRAWINGS 10955-2050 TO 10955-2056 AND DRAWINGS 10955-2065 & 10955-2066.



GENERAL LEGEND

PLANNING APPLICATION BOUNDARY

PROPOSED PERMANENT ACCESS ROAD

EXISTING LOCAL RIVERS / STREAMS

PROPOSED TURBINE HARDSTAND

PROPOSED TURBINE LOCATION

PROPOSED TEMPORARY COMPOUND LOCATION

PROPOSED SUBSTATION & GRID ROUTE (Submitted Separately)

PROPOSED BORROW PIT

VEHICLE OVERRUN AREA

VEHICLE TURNING AREA

PROPOSED SURFACE WATER DRAINAGE

SURFACE WATER SETTLEMENT POND

INTERCEPTOR DITCH

NOTES:

1. DRAWINGS FOR PLANNING PURPOSES ONLY.
2. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
3. GRID REFERENCES TO ITM.
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Co. Leitrim

Tailte Éireann 1:5,000 Sheet No's: 0812, 0813, 0854, 0855, 0902, 0903, 0958 & 0959.

Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Ireland FuturEnergy

Project: LISSINAGROAGH WIND FARM

Title: DRAINAGE LAYOUT MASTER PLAN

Scale @ A1: 1:10,000

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

Drawing Status: Planning

TOBIN
Tel: +353 (0)91 565 211
Email: info@tobin.ie
www.tobin.ie

Drawing No.: 10955-2050

Revision: A

PROPOSED BORROW PIT 1
(Refer to Drg. No: 10955-2090 for details).

PROPOSED VEHICLE TURNING HEAD
(For turbine delivery)

PROPOSED TURBINE HARDSTAND
(Refer to Drg. No: 10955-2031 for details).

PROPOSED TURBINE LOCATION
(Refer to Drg. No: 10955-2032 for details).

PROPOSED SITE ACCESS ROAD
(Refer to Drg. No: 10955-2033 for details)

Saddle Hill

T1

T2

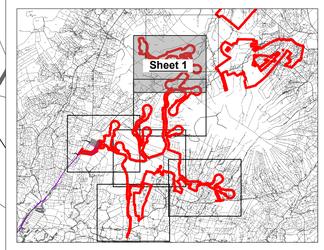
T3

T4

T6

GENERAL LEGEND

- PLANNING APPLICATION BOUNDARY
- PROPOSED PERMANENT ACCESS ROAD
- EXISTING LOCAL RIVERS / STREAMS
- PROPOSED TURBINE HARDSTAND
- PROPOSED TURBINE LOCATION
- PROPOSED TEMPORARY COMPOUND LOCATION
- PROPOSED SUBSTATION & GRID ROUTE (Submitted Separately)
- PROPOSED BORROW PIT
- VEHICLE OVERRUN AREA
- VEHICLE TURNING AREA
- PROPOSED SURFACE WATER DRAINAGE
- SURFACE WATER SETTLEMENT POND
- INTERCEPTOR DITCH



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Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Ireland FuturEnergy

Project: LISSINAGROAGH WIND FARM

Title: DRAINAGE LAYOUT PLAN
Sheet 1 of 6

Scale @ A1: 1:2,500

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

Drawing Status: Planning

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Revision: A

T6

T5

T9

T7

T10

T8

PROPOSED SITE ACCESS ROAD
(Refer to Drg. No: 10955-2033 for details)

PROPOSED VEHICLE TURNING HEAD
(For turbine delivery)

PROPOSED TURBINE HARDSTAND
(Refer to Drg. No: 10955-2031 for details).

PROPOSED TURBINE LOCATION
(Refer to Drg. No: 10955-2032 for details).

GENERAL LEGEND

PLANNING APPLICATION BOUNDARY

PROPOSED PERMANENT ACCESS ROAD

EXISTING LOCAL RIVERS / STREAMS

PROPOSED TURBINE HARDSTAND

PROPOSED TURBINE LOCATION

PROPOSED TEMPORARY COMPOUND LOCATION

PROPOSED SUBSTATION & GRID ROUTE (Submitted Separately)

PROPOSED BORROW PIT

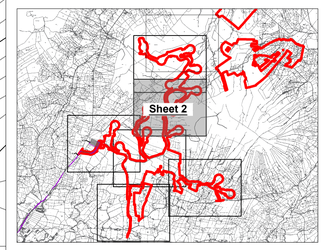
VEHICLE OVERRUN AREA

VEHICLE TURNING AREA

PROPOSED SURFACE WATER DRAINAGE

SURFACE WATER SETTLEMENT POND

INTERCEPTOR DITCH



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Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Ireland FuturEnergy

Project: LISSINAGROAGH WIND FARM

Title: DRAINAGE LAYOUT PLAN
Sheet 2 of 6

Scale @ A1: 1:2,500

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

Drawing Status: Planning

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Drawing No.: 10955-2052

Revision: A

T11

T12

PROPOSED TURBINE LOCATION
(Refer to Drg. No: 10955-2032 for details).

PROPOSED TURBINE HARDSTAND
(Refer to Drg. No: 10955-2031 for details).

PROPOSED TEMPORARY
CONSTRUCTION COMPOUND
(Refer to Drg. No: 10955-2030 for details).

PROPOSED PERMANENT MET MAST
(Refer to Drg. No: 10955-2036 for details).

PROPOSED VEHICLE TURNING HEAD
(For turbine delivery)

SUBSTATION LOCATION
(Subject to separate planning application
to be submitted to An Coimisúin Pleanála)

PERMANENT SITE ACCESS 1
(Refer to Drg. No: 10955-2071 for details).

PROPOSED GRID CONNECTION
(Subject to separate planning application
to be submitted to An Coimisúin Pleanála)

PROPOSED SITE ACCESS ROAD
(Refer to Drg. No: 10955-2033 for details)

175.00

200.00

150.00

125.00

Ringfort

GENERAL LEGEND

PLANNING APPLICATION BOUNDARY

PROPOSED PERMANENT ACCESS ROAD

EXISTING LOCAL RIVERS / STREAMS

PROPOSED TURBINE HARDSTAND

PROPOSED TURBINE LOCATION

PROPOSED TEMPORARY COMPOUND LOCATION

PROPOSED SUBSTATION & GRID ROUTE (Submitted Separately)

PROPOSED BORROW PIT

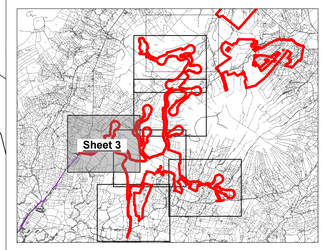
VEHICLE OVERRUN AREA

VEHICLE TURNING AREA

PROPOSED SURFACE WATER DRAINAGE

SURFACE WATER SETTLEMENT POND

INTERCEPTOR DITCH



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Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Ireland FuturEnergy

Project: LISSINAGROAGH WIND FARM

Title: DRAINAGE LAYOUT PLAN
Sheet 3 of 6

Scale @ A1: 1:2,500

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

Drawing Status: Planning

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Drawing No.: 10955-2053

Revision: A

T12

T8

PROPOSED TURBINE LOCATION
(Refer to Drg. No: 10955-2032 for details).

PROPOSED TURBINE HARDSTAND
(Refer to Drg. No: 10955-2031 for details).

PROPOSED VEHICLE TURNING HEAD
(For turbine delivery)

PROPOSED BORROW PIT 2
(Refer to Drg. No: 10955-2091 for details).

PROPOSED SITE ACCESS ROAD
(Refer to Drg. No: 10955-2033 for details)

225.00
275.00
175.00
250.00
325.00
300.00

GENERAL LEGEND

PLANNING APPLICATION BOUNDARY

PROPOSED PERMANENT ACCESS ROAD

EXISTING LOCAL RIVERS / STREAMS

PROPOSED TURBINE HARDSTAND

PROPOSED TURBINE LOCATION

PROPOSED TEMPORARY COMPOUND LOCATION

PROPOSED SUBSTATION & GRID ROUTE (Submitted Separately)

PROPOSED BORROW PIT

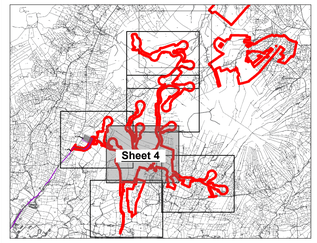
VEHICLE OVERRUN AREA

VEHICLE TURNING AREA

PROPOSED SURFACE WATER DRAINAGE

SURFACE WATER SETTLEMENT POND

INTERCEPTOR DITCH



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4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

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Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Future Energy Ireland

Project: LISSINAGROAGH WIND FARM

Title: DRAINAGE LAYOUT PLAN
Sheet 4 of 6

Scale @ A1: 1:2,500

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

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Drawing No.: 10955-2054

Revision: A

T13

T14

PROPOSED BORROW PIT 3
(Refer to Drg. No: 10955-2092 for details).

PROPOSED SITE ACCESS ROAD
(Refer to Drg. No: 10955-2033 for details)

TEMPORARY SITE ACCESS 2
(Construction Stage Only)

PROPOSED VEHICLE TURNING HEAD
(For turbine delivery)

Mast

Waterfall

200.00

175.00

150.00

225.00

GENERAL LEGEND

PLANNING APPLICATION BOUNDARY

PROPOSED PERMANENT ACCESS ROAD

EXISTING LOCAL RIVERS / STREAMS

PROPOSED TURBINE HARDSTAND

PROPOSED TURBINE LOCATION

PROPOSED TEMPORARY COMPOUND LOCATION

PROPOSED SUBSTATION & GRID ROUTE (Submitted Separately)

PROPOSED BORROW PIT

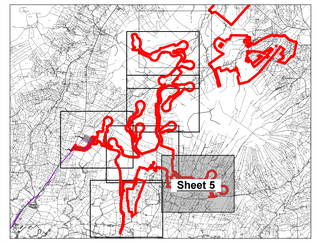
VEHICLE OVERRUN AREA

VEHICLE TURNING AREA

PROPOSED SURFACE WATER DRAINAGE

SURFACE WATER SETTLEMENT POND

INTERCEPTOR DITCH



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3. GRID REFERENCES TO ITM.
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Tailte Éireann 1:5,000 Sheet No's: 0812, 0813, 0854, 0855, 0902, 0903, 0958 & 0959.

Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Ireland FuturEnergy

Project: LISSINAGROAGH WIND FARM

Title: DRAINAGE LAYOUT PLAN
Sheet 5 of 6

Scale @ A1: 1:2,500

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

Drawing Status: Planning

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Drawing No.: 10955-2055

Revision: A

PROPOSED SITE ACCESS ROAD
(Refer to Drg. No: 10955-2033 for details)

TEMPORARY SITE ACCESS 1
(For turbine component delivery only)

Castlemoyle House

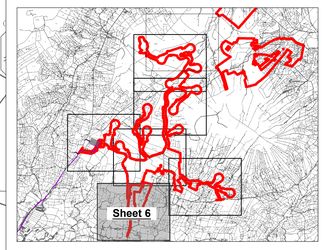
Brookfield House

Waterfall

Spring

GENERAL LEGEND

- PLANNING APPLICATION BOUNDARY
- PROPOSED PERMANENT ACCESS ROAD
- EXISTING LOCAL RIVERS / STREAMS
- PROPOSED TURBINE HARDSTAND
- PROPOSED TURBINE LOCATION
- PROPOSED TEMPORARY COMPOUND LOCATION
- PROPOSED SUBSTATION & GRID ROUTE (Submitted Separately)
- PROPOSED BORROW PIT
- VEHICLE OVERRUN AREA
- VEHICLE TURNING AREA
- PROPOSED SURFACE WATER DRAINAGE
- SURFACE WATER SETTLEMENT POND
- INTERCEPTOR DITCH



NOTES:

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3. GRID REFERENCES TO ITM.
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Co. Leitrim
Tailte Éireann 1:5,000 Sheet No's: 0812, 0813, 0854, 0855, 0902, 0903, 0958 & 0959.

Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Future Energy Ireland

Project: LISSINAGROAGH WIND FARM

Title: DRAINAGE LAYOUT PLAN
Sheet 6 of 6

Scale @ A1: 1:2,500

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

Drawing Status: Planning

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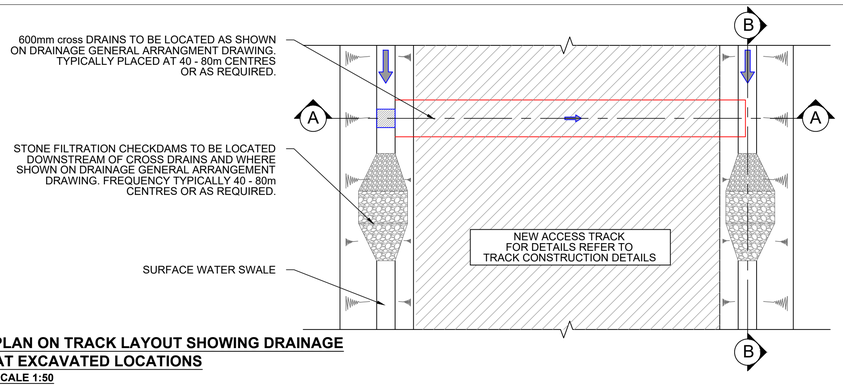
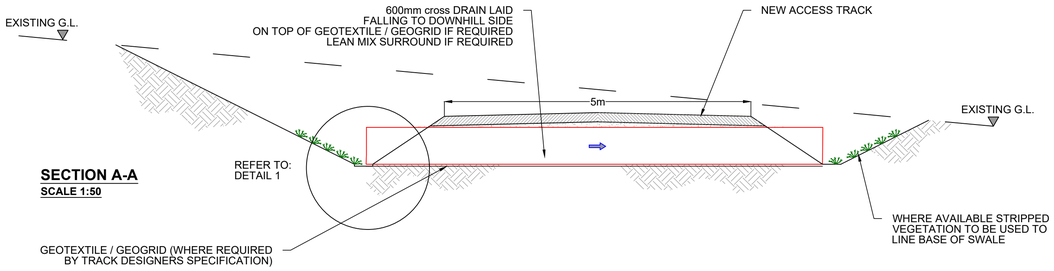
Drawing No.: 10955-2056

Revision: A



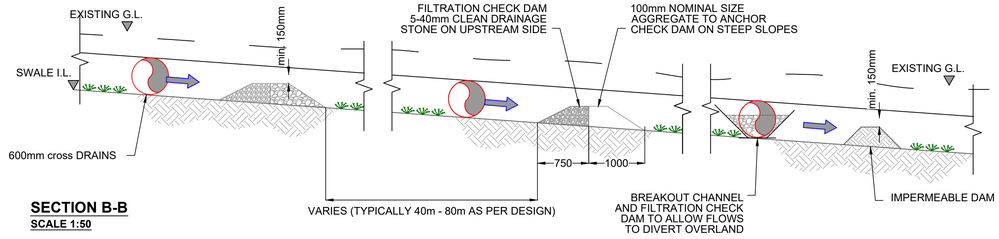
PLAN ON TRACK LAYOUT SHOWING DRAINAGE AT EXCAVATED LOCATIONS

SCALE 1:50



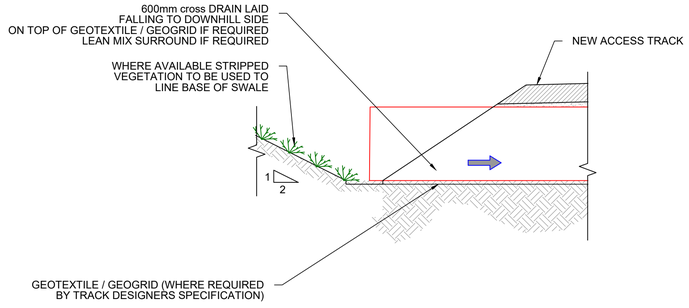
SECTION A-A

SCALE 1:50



SECTION B-B

SCALE 1:50



DETAIL 1

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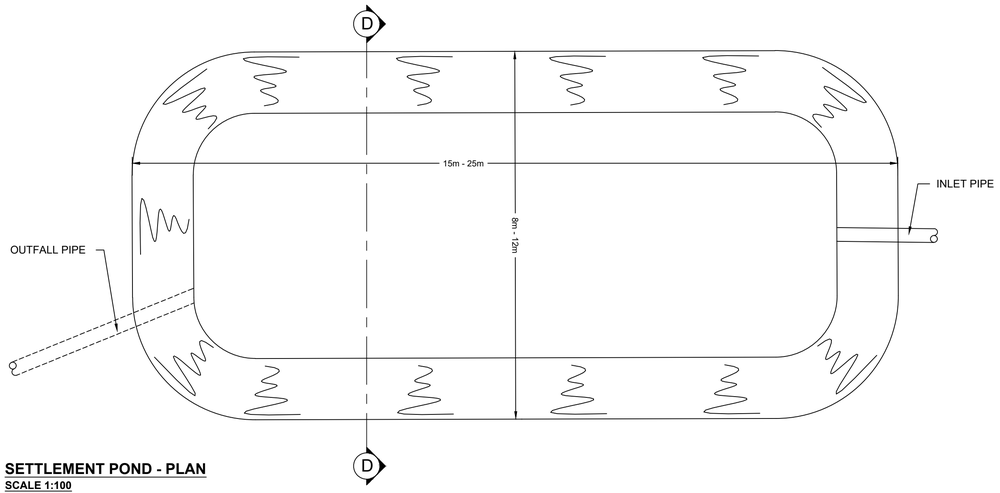
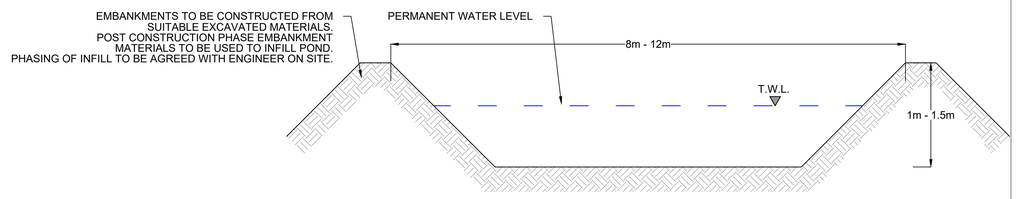


SETTLEMENT POND - PLAN

SCALE 1:100



SECTION D-D

SCALE 1:50

NOTES:

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2. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
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Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Ireland FuturEnergy

Project: LISSINAGROAGH WIND FARM

Title: PROPOSED SURFACE WATER DETAILS

Scale @ A1: As Shown

Prepared by:	Checked by:	Date:
M. Nolan	S. Ryan	April 2026

Drawing Status: Planning

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Tel: +353 (0)91 565 211
Email: info@tobin.ie
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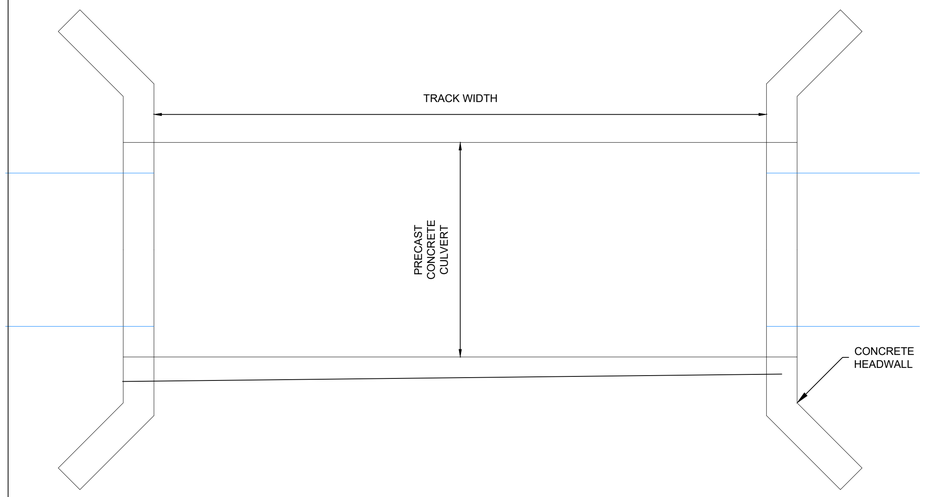
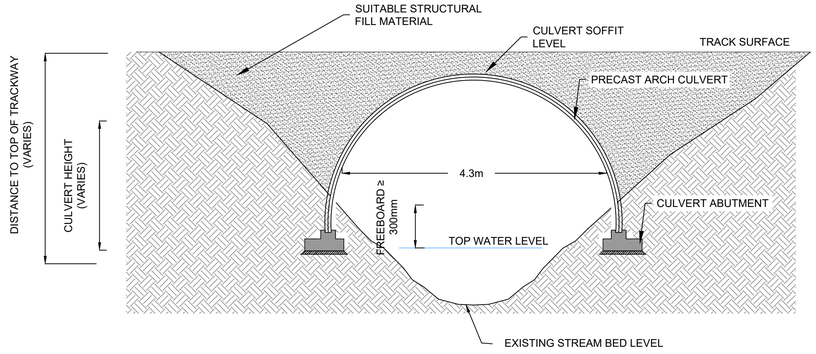
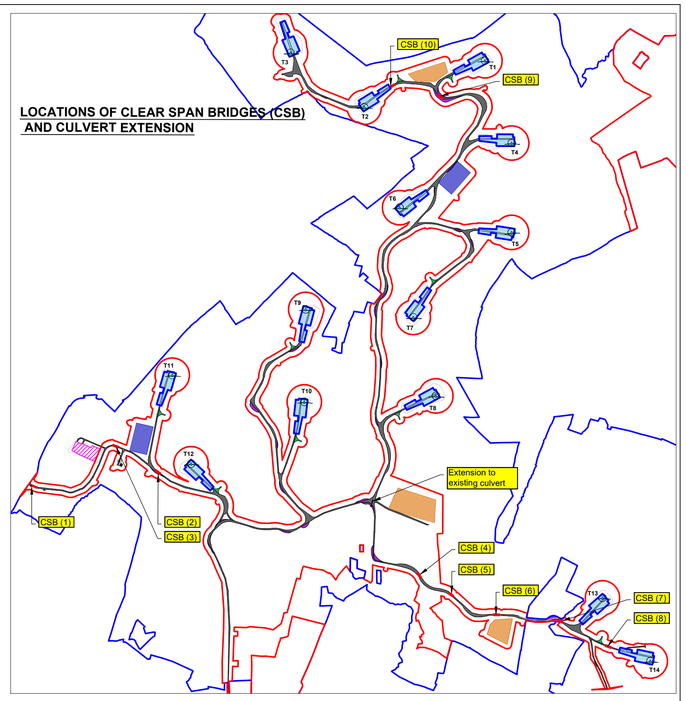
Drawing No.:	Revision:
10955-2065	A

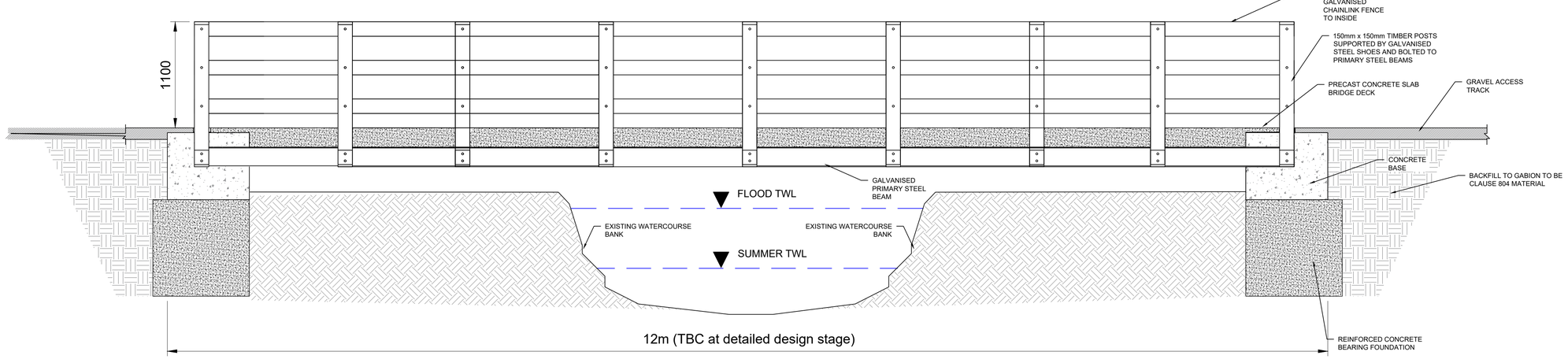


BOTTOMLESS CULVERT
PLAN 1:50

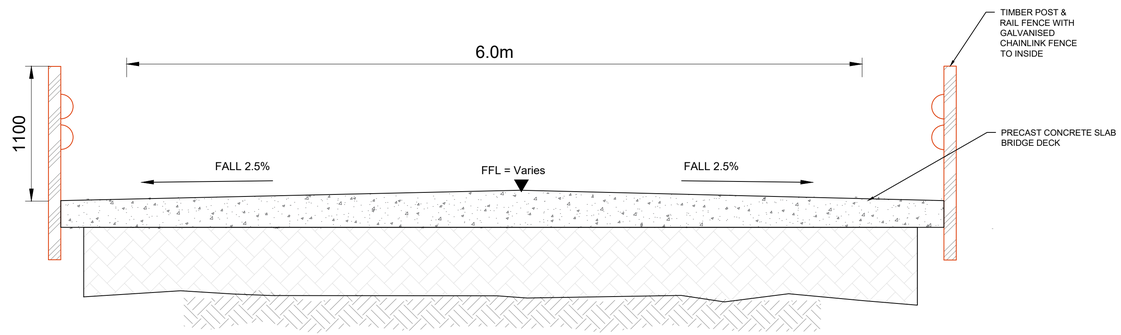


BOTTOMLESS CULVERT
ELEVATION 1:50





CLEAR SPAN BRIDGE SIDE ELEVATION
1:25



CLEAR SPAN BRIDGE FRONT ELEVATION
1:25

NOTE:
Orientation varies as multiple instances on site, north point can be seen on Drg. No: 10955-2010.

NOTES:

1. DRAWINGS FOR PLANNING PURPOSES ONLY.
2. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
3. GRID REFERENCES TO ITM.
4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	10.04.26	ISSUED FOR PLANNING	MN	SR

Client: Ireland FuturEnergy

Project: LISSINAGROAGH WIND FARM

Title: PROPOSED CLEAR SPAN BRIDGE & BOTTOMLESS CULVERT DETAILS

Scale @ A1: As Shown

Prepared by: M. Nolan | Checked by: S. Ryan | Date: April 2026

Drawing Status: Planning

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Drawing No.: 10955-2066

Revision: A

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