

Memorandum ABP- 314602-22

To:	Karen Hamilton.
From:	Emmet Smyth.
Re:	ABP-314602-22.
Date:	15 th August 2024.

Permission is being sought by the Developer for the construction of 14 No. Wind Turbines, a meteorological mast, an on-site substation, Turbine Delivery Route and all ancillary works and the construction of an underground grid connection to Ballyvouskill 220kV substation, Co. Cork.

The Development will consist of the following main components:

• Construction of 14 No. wind turbines with an overall ground to blade tip height ranging from 179m to 185m inclusive. The wind turbines will have a rotor diameter ranging from 149m to 155m inclusive and a hub height ranging from 102.5m to 110.5m inclusive.

Construction of permanent turbine hardstands and turbine foundations.

• Construction of one temporary construction compound with associated temporary site offices, parking areas and security fencing.

• Installation of one (35-year life cycle) meteorological mast with a height of 110m and a 4m lightning pole on top.

• Development of two on-site borrow pits.

• Construction of new permanent internal site access roads, upgrade of existing internal site access roads and upgrading of the L-34011-20 road (which forms part of the Beara-Breifne Way) and lies within the site, to include passing bays and all associated drainage infrastructure.

• Development of an internal site drainage network and sediment control systems.

•Construction of 1 no. permanent 110 kV electrical substation including 2 no. control buildings with welfare facilities, all associated electrical plant and equipment, security fencing and gates, all associated underground cabling, wastewater holding tank, and all ancillary structures and works.

• All associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation. • Ancillary forestry felling to facilitate construction of the development.

• All works associated with the permanent connection of the wind farm to the national electricity grid comprising a 110 kV underground cable in permanent cable ducts from the proposed, permanent, on-site substation, in the townland of Gortyrahilly and onto the townlands of Derree, Derreenaculling, Lumnagh Beg, Lumnagh More, Scrahanagown, Bardinch, Milleeny, Inchamore, Derreenaling, Derryreag, Cummeenavrick, Glashacormick, Clydaghroe and Cummeennabuddoge to the existing Ballyvouskill 220 kV Substation in the townland of Caherdowney.

• All associated site development works including berms, landscaping, and soil excavation. • Improvement of an entrance to an existing private road off the L-7405-0 local road to include localised widening of the road and creation of a splayed entrance to facilitate the delivery of abnormal loads and turbine component deliveries.

• Improvement of an existing site entrance off the L-3402-36 local road to include removal of existing vegetation for visibility splays to facilitate the use of it for the delivery of construction materials to the site.

• Upgrade works on the turbine delivery route to include the following:

- Construction of a temporary bridge over the Sullane River to allow access to the L-3400-79 from the N22 in Ballyvourney for the duration of the construction works.
- Localised widening of the L-3405-0 road to a width of 4.5m, from the junction with the L3400-79 road to the junction with the L-7405-0 road.
- -Localised widening of the L-7405-0 road to a width of 4.5m, from the junction with the L- 3405-0 to the entrance to an existing private road off the L-7405-0.

- The construction of a temporary access road off the N22 in the townland of Cummeenavrick to facilitate 180 degree turning manoeuvre by the turbine delivery vehicles.

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.

A permanent planning permission is being sought for the Grid Connection and substation as these will become an asset of the national grid under the management of ESB & EirGrid and will remain in place upon decommissioning of the wind farm.

Purpose of the Report:

In this report I will briefly outline the sites Geology, Hydrology and hydrogeology and assess the potential for environmental Impact from the above-described development, with particular regard to Geology, surface waters and groundwaters during Construction, during Operation and during decommissioning of the development.

Current site use:

The site is situated on Carriglougha Hill, in the Shehy Mountains in Co. Cork. Presently the development lands are peatlands and agricultural lands to allow for animal grazing that have undergone significant drainage and improvement works over the years.

Bedrock Geology, soils and subsoils:

The Geological Survey of Ireland mapping tool shows that the sites bedrock incorporates 3 variations of Devonian sandstone and siltstone. These are described as follows.

The Northern portion of the site bedrock of the Gortanimill formation made up of sandstone and siltstone. A significant portion of the central part of the site bedrock is made up of the Caha Mountain formation, which is a purple and green sandstone and siltstone, with the remainder of the site's bedrock being made up of the Birdhill Formation which is described as a purple siltstone and find sandstone.

There is faulting within the area of the development the applicant has referenced the faults of note which are those separating the Caha Mountain formation and the other bedrock formations. It is also stated that the bedrock proximal to the fault lines is likely to be fractured and weathered as observed at some of the bedrock outcrops.

The subsoils across the site (Quaternary sediments) are largely mapped as bedrock outcrop and sub crop. These are further described as the soil groups of podzols (peaty) and lithosol peats with the soil being described as predominantly shallow soils derived from noncalcareous rock or gravels. The remainder of the site's subsoils are tills from Devonian sandstones and blanket peats further described as poorly draining peaty, surface water and groundwater gleys. Peat depths across the site have been reported as being very shallow and with rock outcrops accounting for 82% of the development site.

Construction Phase potential impacts:

Impacts during this phase outlined in the EIAR; clearing <u>of the forested areas</u> which account for 35.4 hectares of land. This activity on its own right has the potential to lead to increased nutrient loads in surface waters given the fact that the run-off will dominate over infiltration across the site based on the above-described soils and subsoils. <u>Subsoils and bedrock</u> <u>removal</u> will occur as a consequence of turbine bases and the associated foundation construction, in addition to the removal of excavation material from development infrastructure such as trenching and on site borrow pits. Again, given the nature of the soil and subsoil materials overlaying the site this can lead to increased sediment and nutrients to the receiving environment. <u>Stockpile storage</u> risks to waters will be again relating to nutrient and sediment loss potential. <u>Soil contamination:</u> the potential fuel loses to soils, wastewaters and cementitious wastes, bentonite clays from the drilling all have the potential to impact soils, groundwaters and surface waters.

Operational Phase potential impacts:

During the operational Phase the applicant is referencing minor land take for the purposes of the turbine delivery route with potential for impact considered as negligible to slight. In addition, land take for the accommodation of site access roads, turbine hardstands and foundations, the grid connection route the delivery route and substation accounts for 135 hectares or 20% of the total site area. All excavation activities associated with the above activities can and may have the potential to impact on groundwaters and surface waters within the area of the proposed development.

Decommissioning Phase potential impacts:

The applicant is does not envisage any impacts of the decommissioning phase. There may be changes in baseline conditions over time.

Mitigations measures outlined:

Forest felling and clearance, subsoils and bedrock removal Stockpile storage and potential soil contamination are the major potential activities that could impact on waters both surface and ground. The mitigation by good practices will alleviate the risk of potential water contamination. The Construction Environmental Management Plan describes in detail measures to be put in place to mitigate against any potential impacts on bedrock, soils and subsoils.

Hydrological and hydrogeological regime:

The Site is characterised by relatively complex (hilly) topography with associated elevations ranging between c.230 to 423 metres as described in the application.

The site in question straddles 2 aquifer types which divide the site in a diagonal North Easterly to South Westerly Direction. The northern portion of the site is underlain by both Locally important aquifer with bedrock that is moderately productive only in local zones. The southern portion of the site is underlain by a poor aquifer where bedrock is generally unproductive except for local zones. The site is classified by GSI as having vulnerability classification of predominantly Extreme vulnerability with Rock or karst covering the more elevated portions of the site, with extreme vulnerability on the lower elevations within the subject site.

The effective rainfall across the site is 1427mm/year, effectively this is the rainfall minus the evapotranspiration, which contributes to surface waters and or groundwaters flows. The sites groundwater recharge is essentially being split in a manner reflective of the 2 types of aquifers across the site. The areas covered by peat or surface water and groundwater gleys essentially are relatively wet areas with a recharge coefficient of 22.5%. But within the areas where rock is observed at or near the surface the recharge coefficient is at 85% as shown on GSI groundwater data viewer.

There are a number of surface water features across the site that drain from the higher points of the site. In addition to this the applicant reports that there are many additional un-mapped natural and artificial drains across the site. The site is located within the Lee Cork Harbour and Youghal bay catchment (Catchment ID 19). The site is essentially then split into the following sub catchments Lee (Cork) SC 010, Lee (Cork) SC020 and the Sullane 010. The water framework status of the aforementioned within the subject area are of High status and good status, with Q values of 4 and above. However, the Sullane_010 is deemed to be at risk of not meeting its objectives under the Water framework Directive with the area.

The are no public water schemes mapped within the area of the subject site, with the applicant citing industry guidelines stipulating a buffer of 250 metres separating boreholes and turbine excavations. Elevated risk areas for Phosphorus loss typically have poor draining soils and dominant overland flow pathways. Whereas freely draining soils and substantial groundwater pathways are elevated risk for nitrogen losses. The groundwater body (Ballinhassig groundwater body IE_SW_G_005) is presently good status both quantitatively and chemically and not deemed at risk.

Construction Phase Potential Impacts:

Impacts during this phase as outlined in the EIAR; <u>Suspended solid release</u> from earthworks associated with the development, vegetation removal, borrow pit excavation and site roads. Given the drainage of the site there is the significant potential for suspended matter to reach surface waters during periods of prolonged precipitation. <u>Hydrocarbon spillage</u> from vehicles and site machinery being used and the storage of fuels onsite and the potential for spillage from refuelling of plant machinery. <u>Wastewater release</u> from welfare facilities caused by leaks of chemicals and or wastewater. <u>Construction and Cementitious wastes</u> releases at surface water crossings etc has the potential to alter pH and suspended matter. <u>Excavation dewatering and contaminated surface waters</u> heavily contaminated with suspended solids has the potential to impact on surface waters. <u>Diversion and drainage works</u> has the potential to impact on the hydrological regime by increasing or decreasing runoff volumes and or peat drainage. <u>Watercourse crossings</u> risk associate with such works could include suspended solid release, changes to hydraulic regime such as flow. <u>Drilling and associated fluids</u> can if not controlled have the potential water hydrochemistry and have ecological impacts on waters. Drilling arisings potentially increasing suspended solids loads.

Operational Phase impacts:

Increases to hydraulic loading from the site given the alterations to the ground with specific regard to hardstanding areas. The applicant has outlined that the development has the potential to increase surface water run-off by a factor of 0.63% across the site area and as such increasing the hydrological response to rainfall events further downstream. This increase is deemed to be adverse but imperceptible to slight, the applicant also states that any net increase in run-off is deemed to be a significant impact.

Decommissioning phase impacts:

During this phase the potential impacts are similar to those summarised above during the construction phase with reference to the hydrological and the hydrogeological environments.

Mitigation measures outlined: The mitigation by good practices will alleviate the risk of potential water contamination. The Construction Environmental Management Plan-

Management Plan 2 (Water Quality Management Plan) & Management Plan 3 (Surface water Management Plan) describes in detail measures to be put in place to mitigate against any potential impacts on surface waters and groundwaters and these are summarised as follows.

Management Plan 2- Water Quality Management Plan

Before, during and after baseline monitoring of surface waters will be taking place and to include discharge monitoring rates.

Continuous monitoring locations with telemetry will be carried out with regard to the following parameters: Temperature, pH, turbidity and conductivity. This will provide for a data point every 15 minutes. The applicant has recommended that this is decreased to every 5 minutes given the nature of the works during the construction period. Data trends over time will then be displayed via the project website.

Hydrochemistry monitoring: Baseline monitoring of groundwaters from wells nearest to the proposed development. Water level staffs to be placed in 7 watercourses within the development footprint, with weekly water level reading to be recorded during the construction phase. There will be daily visual inspections to identify siltation, hydrocarbon and colouration of the waters. Monthly analysis for the following, but not limited to the following parameters; pH, Temperature, Total Suspended solids, Dissolved organic Carbon, Conductivity, dissolved Oxygen, Total oxidised nitrogen, ammoniacal nitrogen, ammonia, potassium, phosphate, BOD, Cod and total petroleum hydrocarbons.

Watercourse crossings the applicant is references the Inland Fisheries Irelands guidance document; Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters, in particular Section 6 – River and Stream Permanent Crossing Structures.

Management Plan 3- Surface waters

Clean water Interception.

This approach will dramatically reduce the volumes of surface waters that can become contaminated during the construction phase. In order to achieve this the applicant is proposing an upgradient interceptor drain to collect the clean waters and divert them separately downslope and discharging to local watercourses, similar to what occurs onsite presently.

SuDS Design principles:

Surface water from site tracks will be manged so as to mimic natural site drainage patterns. Drains adjoining these tracks for the collection of dirty waters will be open with gentle slopes to transport waters, allow for silt settlement and increased filtrations and slow the velocity of run-off waters that could enter watercourses, additionally all waters from these tracks will be passed through settlement ponds. Drainage vegetation that can filter and take up nutrients will also be utilised and in keeping with plant species within the area. Temporary erosion protection maybe required until such vegetation can establish itself within the channels such as silt fences with coir matting or similar are being proposed. Site road will be constructed from aggregate allowing for waters to permeate the material. Designs has allowed for a 20% rainfall increase to account for climate change.

Cut-off Ditches and collector drains, and track drains are to be provided for the collection of dirty waters which will be directed to siltation ponds for settlement. Suspended solids threshold value will be ≤ 25 mg/L at discharge point. The use of silt fences is also being proposed as a means to minimise siltation which will be subject to visual inspection daily. Filtration check dams shall be installed at intervals within the trackside drains allowing for reduced erosion and a greater level of flow control. All collected dirty waters from the site shall be passed through settlement and attenuation ponds. Traditionally the treatment of contaminated surface run-off is by way of settlement ponds, with retention times of 11 hours for medium silts (≥ 0.006 mm) and 24 hours for fine silts typically (≥ 0.004 mm).

The outfalls from these ponds are to be located 65 metres from courses allowing for a buffered volume outflow not to exceed the existing greenfield run-off rate. These settlement ponds are to be located at 67 locations across the development so as to ensure adequate treatment of contaminated surface waters during the construction period.

Conclusions:

I am of the opinion, having reviewed the controls as outlined within the Environmental Impact Assessment report and associated documentation that, subject to the implementation of said controls, where surface waters from the subject site drain to the existing watercourses, will not impede the ability to achieve Water Framework Directive objectives of maintaining high and good status waters where they exist and preventing the deterioration of status in all waters.