MWP

Environmental Impact Assessment Report (EIAR)

Volume 1 Non-Technical Summary

Dernacart Wind Farm

110kV Substation and Grid Connection

Statkraft Ireland

October 2024

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Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
23268	6011	A	01/10/2024	AoC/CB	CF	CF	Final

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1. Introduction

Malachy Walsh and Partners (MWP) was commissioned by Statkraft Ireland, to prepare an Environmental Impact Assessment Report (EIAR) in respect of a proposed a 110kV substation and underground grid connection between the consented Dernacart Wind Farm, Co. Laois (Planning Ref ABP-310312-21) and the consented Bracklone 110kV substation (Planning Ref. 20/638) in Portarlington, Co. Laois.

This Non-Technical Summary (NTS) is the first volume of the Environmental Impact Assessment Report (EIAR). The other two volumes which comprise the EIAR are:

- Volume 2: Main EIAR
- Volume 3: Appendices

The purpose of this Non-Technical Summary is to provide a concise overview, in non-technical terms, of the issues, impacts and mitigation measures highlighted by the Environmental Impact Assessment and presented in detail in the main EIAR, Volume 2.

1.1 Overview Proposed Development

Proposed development comprises:

- A 110kV substation on greenfield lands within the townland of Barranaghs, Co. Offaly including new entrance to substation site from the R423
- circa 2.45km of underground electric cabling systems overlain with a 5.5m wide stone access track between the consented Dernacart wind farm site and the proposed 110kV substation
- circa 10.85km of 110kV underground electrical cabling within the public road network from the proposed 110kV substation to the consented Bracklone 110kV substation.

1.2 Development Background

In February 2020 Statkraft Ireland made a planning application to Laois County Council for permission to construct a wind farm development in the townlands of Dernacart, Forest Upper and Forest Lower, Co. Laois (Laois Co. Co. Reg. Ref. 20/78). Permission for the windfarm was refused by the local authority and an appeal was lodged with An Bord Pleanála (ABP) in May 2021 (ABP Case Ref 310312-21). Permission was granted by the Board in January 2024 subject to conditions.

The permitted wind farm is comprised of up to 8 no. wind turbines with a tip height of up to 185m, turbine foundations, hardstanding areas, new access tracks and upgrading of existing access tracks, 1 no. substation including control buildings, meteorological mast, electrical and grid services equipment, underground electrical and communications cabling, drainage, sediment controls, temporary site compound, tree felling, roads, hardstands and associated works.

A grid connection did not form part of the planning application however an indicative grid connection option was included as part of the supporting planning documents and was assessed in accordance with EIA and Habitat Directives requirements. The Grid Connection considered at that time consisted of a c. 16.5km underground grid

connection route from the on-site Wind Farm substation to the future Bracklone 110kV substation all of which was within the public road network.

Due to changes in EirGrid requirements in the intervening period since the application was made, the sizing of substation compound for which permission had been sought (and now granted) is no longer adequate and therefore a revised substation with a larger footprint is required.

Dernacart Wind Farm Limited (the Applicant) is now applying to An Bord Pleanála for a grid connection which will allow the electrical energy generated from the proposed Dernacart Windfarm to be exported onto the national grid.

The grid connection now proposed involves a new relocated 110kV substation in place of the permitted Dernacart 110kV substation and a revised underground grid connection cable route to that previously anticipated. A full description of the Proposed Development is provided in Volume 2 Chapter 2 Description of the Proposed Development of this EIAR.

1.3 Applicant

Dernacart Wind Farm Limited (the 'Applicant') is a special purpose vehicle (SPV) of Statkraft Ireland.

Statkraft is a leading company in hydropower internationally and Europe's largest generator of renewable energy. The Group produces hydropower, wind power, solar power, gas-fired power and supplies district heating. Statkraft, which is also a global company in energy market operations, has 4,800 employees in 20 countries.

1.4 Site Location

The proposed development is located within southeast Co. Offaly and northeast Co. Laois.

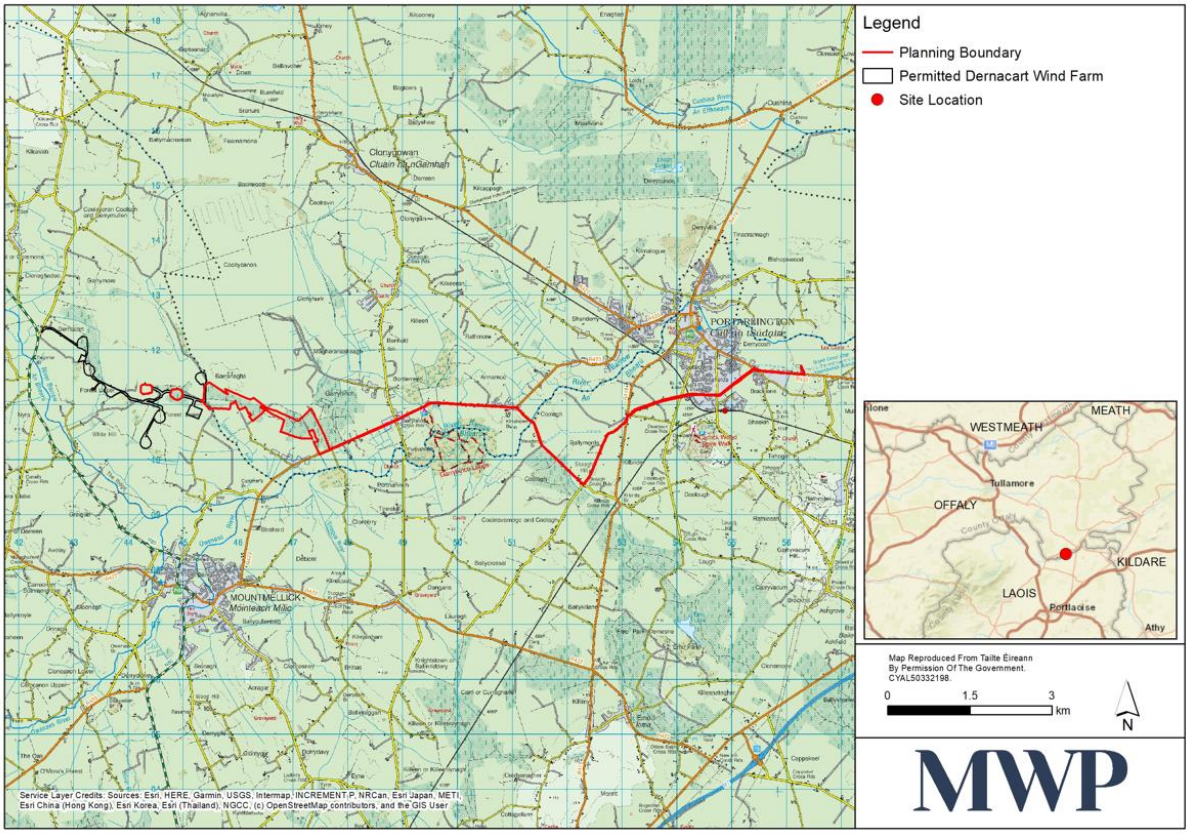
Figure 2 shows the proposed development lands and development infrastructure as per the planning application. This area includes a total area of 90.8ha, which contains the development footprint and associated works area for which development consent is being sought.

The proposed substation development site is located in County Offaly within the townland of Barranaghs. The site is situated in a rural lightly populated area approximately 1.3km southwest of Garryhinch village, approximately 3km northeast of Mountmellick town and approximately 6km southwest of Portarlington town.

The proposed access track and underground electrical cabling from the Dernacart windfarm to the relocated substation is also to be sited entirely within the townland of Barranaghs and traverses through commercial forestry plantation, scrub and peatland.

The grid connection cable is to be installed solely within the public road network, and will have a length of c. 10.85km that crosses over the administrative areas of Offaly County Council and Laois County Council passing through townlands of Barranaghs, Garryhinch, Annamore in County Offaly and Coolnavarnoga, Coolaghy, Kilbride, Ballymorris, Cooltederry and Bracklone Co. Laois.

Figure 1 Application Area



2. Description of the Proposed Development

2.1 Overview

To facilitate the connection of the consented Dernacart Wind Farm (Laois County Council Planning Reference 20/78, An Bord Pleanála Planning Reference ABP-310312-21) to the National Grid, Statkraft Ireland (the Applicant) is applying to An Bord Pleanála for permission to construct a 110kV substation in place of the permitted (but not yet constructed) Dernacart Wind Farm 110kV substation, construct and install associated access track and underground electrical cabling from the Dernacart Wind Farm to the relocated substation, and install a 110kV underground electrical cable from the proposed relocated Dernacart Wind Farm substation to the consented Bracklone 110kV Substation (Planning Ref. 20/638) in Portarlington Co. Laois.

Table 1 sets out the characteristics of the project elements for which development consent is being sought and all other associated project components.

Table 1 Characteristics of the Project Project

Project Element	Description
Proposed Development for which consent is sought	• One (1) 110kV substation with associated compound, including Two (2) single storey control and operational buildings, electrical plant, equipment, cabling, lighting, CCTV, lightning masts, diesel generator and diesel tank, security palisade fencing, • 2.45km underground electric cabling systems between the wind farm site and the proposed 110kV substation overlain with 5.5m wide stone access track • 10.85km of 110kV underground electrical cabling from the proposed 110kV substation to the consented Bracklone 110kV substation including enabling works, services diversions, joint bays, along the grid route • New entrance and access road to substation site from the R423. • New clear span and box culvert /piped water crossings • Peat/spoil deposition areas • and all associated felling, drainage and ancillary works necessary to facilitate the development
Other Associated and/or potential project Components	• 1 No. temporary construction site compound • Tree felling • Off-site replacement of permanently felled forestry • Consented Dernacart Wind Farm • Future EirGrid expansion area at the proposed substation site

2.1.1 110kV Substation

Figure 2 shows the proposed substation development footprint and illustrates the positions of the proposed plant and infrastructure, including internal access/service roads within the development boundary, future expansion area and a new site entrance from the R423. See also Planning Drawing No 23268-MWP-00-00-DR-C-5200.

The overall proposed 110kV substation compound will occupy an area of approximately 2.07ha divided into two adjoining sections: an EirGrid section along with a future expansion area and an IPP (Independent Power Producer) section each of which are enclosed within a 2.6m high palisade fence. An additional outer concrete post and rail fence (1.4m in height) will be installed around the perimeter of the EirGrid compound. Each section will contain a control building and an outdoor electrical yard. Both buildings will be a block built single storey building approximately 5.85m in height, with pitched roof and an external blockwork and plastered finish.

Parking will be provided within the compound area adjacent to each of the buildings.

A CCTV system will be operational internally and externally around the development for security. Site lighting will comprise standard, single down lights positioned around the substation compound and mounted to the substation building and will be motion activated by vehicles or personnel that enter the site. The lighting units will be hooded to minimise light impacts/ spillage.

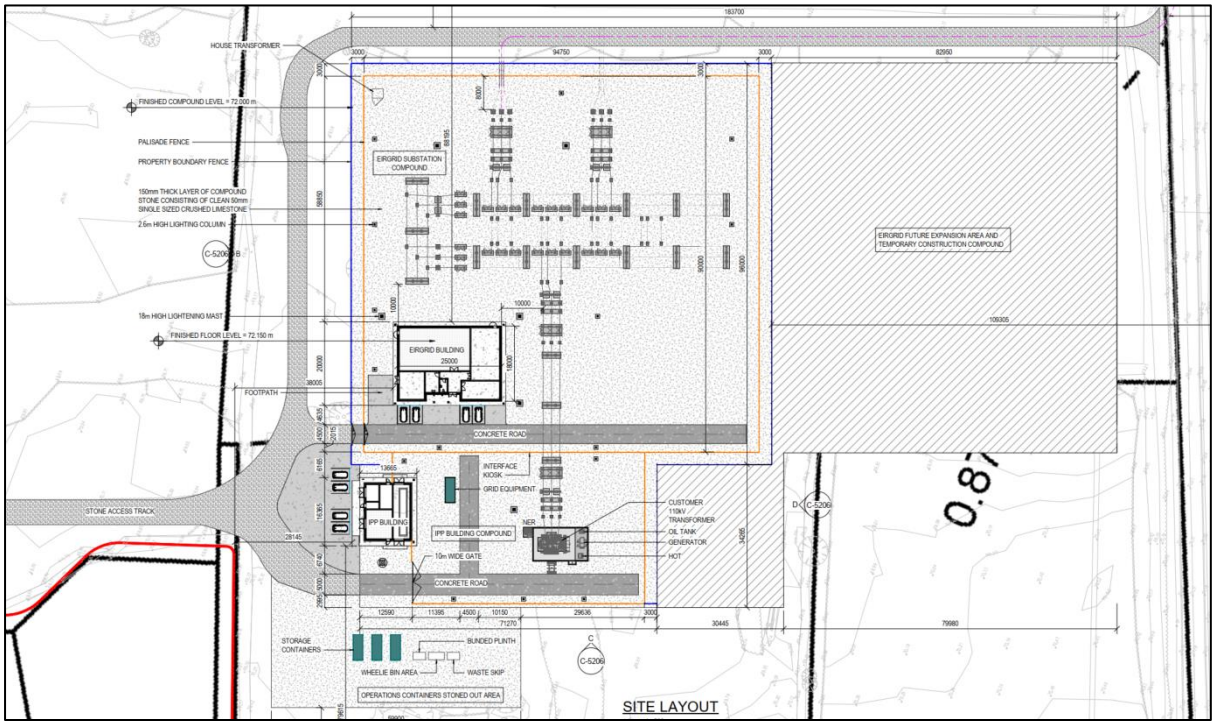
Operations welfare and storage units will comprise 3 No. steel containers which will provide essential amenities including changing, drying and storage facilities for the IPP maintenance and operative personnel when on-site and will also be used for material storage including oils, lubricants and other hazardous liquids. The units will have a built-in spill containment sump to prevent any liquid spills from escaping the container. A dedicated waste storage area will be provided adjacent to the welfare and material storage units.

There will be a very small water requirement for toilet flushing and hand washing and therefore it is proposed to harvest water from the roofs of the buildings. The discharge from the sanitary facilities within each building will go to separate wastewater holding tanks located within the substation compound where the effluent will be temporarily stored and removed at regular intervals by a permitted waste contractor and removed to a licensed/permitted waste facility for treatment and disposal.

Access to the substation site will be gained from the R423 regional roadway to the south of the site via a new entrance and access track. The construction of the new entrance and access road will require the removal of an area of approximately 45m of hedgerow and scrub vegetation.

It is proposed to construct an earthen berm along the southern boundary of the substation site using some excavated materials from the footprint of the substation and new access road. Where feasible any suitable existing hedgerows that will be removed to accommodate the development will be replanted (translocated) on the earthen berm along with new planting using native tree species.

Figure 2 Proposed Substation Layout



2.1.2 Wind Farm Collector Cable to Substation

Figure 3 shows the proposed route of the underground electrical cabling (UGC) from the Wind Farm to the proposed substation. See also Planning Drawings No. 23268-MWP-00-00-DR-C-5102 and 5103. The length of the route is approximately 2.45km with an overall development footprint of approximately 1.5ha. A 5.5m wide access track of open stone finish will be laid over the underground collector cable to facilitate access between the wind farm and the substation.

There are 4 no water crossings required along this route, only one of which (Cottoners Brook) is a mapped waterbody. The other three are field drains. Tree felling (c.2.8ha) and hedgerow removal (approximately 320m) will also be required to accommodate this access road.

Figure 3 Wind Farm Collector Cable and access track

2.1.3 110kV Underground Grid Cable

The grid connection will have a length of c.10.85 km passing through the townlands of Barranaghs, Garryhinch, Annamoe in County Offaly and Coolnavarnoga, Coolaghy, Kilbride, Ballymorris, Cooltederry and Bracklone Co. Laois.

The UGC works will consist of the installation of ducts and joint bays in an excavated trench within the public road network to accommodate power cables, and a fibre communications cable to allow communications between Deranacrt Wind Farm Substation and Bracklone Substation. An overview of the roads in which the cable is to be installed is provided in Table 2.

The proposed grid works will require a Road Opening License (ROL) prior to the commencement of any grid connection works on the public road. The road surface of the public roads will be reinstated to the standards set out by the Department of Transport, Tourism and Sport Guidelines on the Opening, Backfilling and Reinstatement of Trenches on Public Roads (April 2017).

There are 12 watercourse crossings required along the grid route, only 2 of which are mapped EPA waterbodies.

Table 2 Road Networks where UGC is to be installed

Road Network	Length of UGC within Road Network	
	Co. Laois	Co. Offaly
R423		3.6km
L-50183/L-71762		360m
L-71762	1.52km	
L-3153	1.43km	
R419	130m	
L-3158	2.55km	
R420	860m	

2.1.4 Water Crossings

There are a total of sixteen (16) no. water crossings required to facilitate the proposed development.

Four (4) are located along the route of the wind farm collector cable and access road, one (1) at the new site entrance to the proposed substation, and the remaining eleven (11) are located along the route of the 110kV underground grid cable.

There will be no instream works required for any watercourse crossing.

2.1.5 Surface Water Drainage Systems

A site surface water management system will be constructed on the site so as to attenuate run-off, guard against soil erosion and safeguard downstream water quality. The drainage system will be implemented along all works areas including all internal site access roads, storage areas, substation and temporary construction compound.

At the outset it is proposed to install clean water cut-off drains around the perimeter of the development areas to intercept surface water run-off from catchments uphill of the proposed development works. The cut-off drains will collect and divert the collected runoff around site infrastructure to prevent it entering the site and potentially coming in contact with site runoff containing suspended solids.

At the substation compound, it is proposed that surface water runoff from the roofs of the substation buildings, and hard-surfaced areas within the electrical yard, including areas where a risk of a contaminant leak or spill may be present (such as the transformer bund), will be collected in a series of filter drains, roof guttering and downpipes and routed to an underground gravity drainage network. All runoff collected in the stormwater sewer network will pass through an oil/petrol Interceptor prior to discharging to an attenuation unit on the south-east side of the substation compound. The attenuation unit will provide attenuation of the increased volumes of surface water runoff generated from the hard surfaces of the development when compared to the current greenfield condition. The attenuated surface water runoff is then proposed to overflow at a controlled rate equal to the greenfield runoff rate to an existing vegetated land drain on the western side of the compound.

A separate surface water run-off drainage system will be implemented along all internal access roads, to separate and collect 'dirty water' run-off from the roadway and to intercept clean over land surface water flows from crossing internal roadways. To achieve separation, clean water drains will be positioned on the upslope and dirty water drains positioned on the downslope of road sides, with road surfaces sloped towards dirty drains. Clean water will be piped under both the access roads and downslope collection drains to avoid contamination. Piping the clean water under the service road allows the clean water to follow the course it would have taken before construction thus mimicking the existing surface water over land flow pattern of the site and thus not altering the natural existing hydrological regime on site.

2.1.6 Material Storage Areas

It is estimated that approximately 60,175m³ of excavated soils and peats will be generated during the construction of the substation and wind farm collector cable route. It is proposed that this excavated material will be retain on site.

There are 3 proposed storage areas for the excavated material. The principal storage area will be located along a section of the proposed wind farm collector cable and access road in an area of cutover bog and disturbed wet grassland. The other two areas are within the Dernacart wind farm adjacent to T4 and T5 in areas proposed to be clearfelled.

All proposed areas were selected taking account of flat topography, good containment given local ground conditions, no risk of slippage due the flat topography and the avoidance of any natural drains. These areas will

require preparation which includes the construction of natural stone berms to manage the location of stored materials. The material storage areas will be graded and vegetated with locally occurring vegetation feedstock. The deposition areas will be fenced in for a period of 12 months post construction to allow for revegetation.

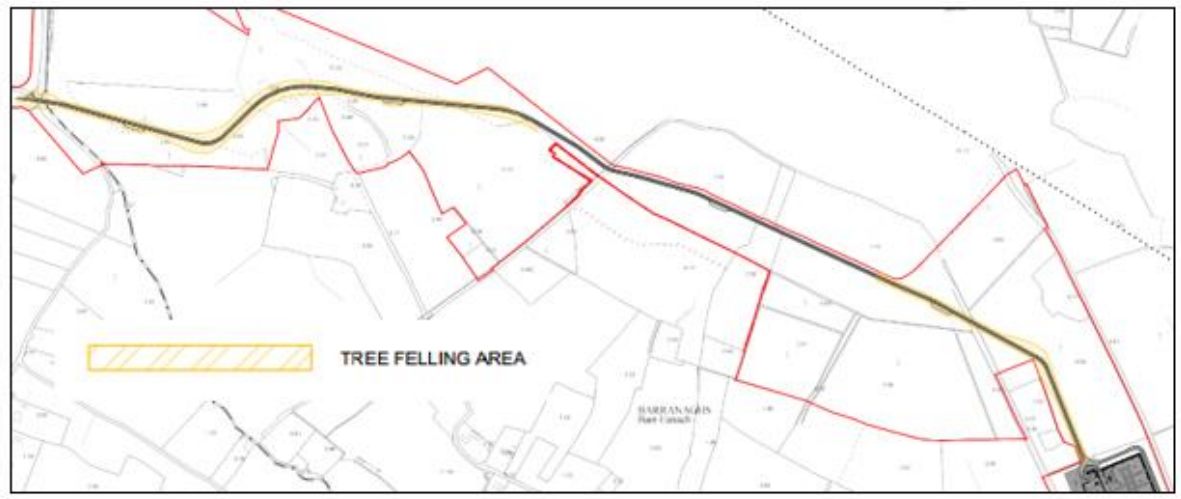
2.1.7 Conifer Felling

Felling of commercial conifer forestry is required to accommodate the construction of the underground collector cable and new access/service road from the windfarm to the 110kV substation. Overall felling of approximately 2.8ha of forestry will be required.

All tree felling will be undertaken in accordance with a tree felling licence, using good working practices as outlined by the Department of Agriculture, Food and the Marine (DAFM) Standards for Felling and Reforestation (2019). These standards deal with sensitive areas, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel and machine oils. All conditions associated with a proposed felling licence will be complied with.

To allow for the forestry removed as part of the project, replacement forestry will be planted at off-site approved lands.

Figure 4 Location of Conifer Tree Felling



2.1.8 Temporary Facilities

During the construction phase, it will be necessary to provide temporary facilities for construction operatives.

The temporary construction will have a footprint of approximately 0.5ha and be located adjacent to the proposed substation site on the lands identified for future potential expansion area of the EirGrid substation. This temporary compound will have a hard-standing surface and will be secured by an outer perimeter fence.

The compound will be used for construction phase car parking, a secure storage area for construction materials, waste materials and also contain temporary site accommodation units to provide welfare facilities for site personnel. Facilities will include offices, meeting rooms, a canteen and a drying room.

A bunded containment area will be provided within the construction compounds for the storage of lubricants, oils and site generators etc.

A designated lined concrete wash-out area will be installed within the temporary compounds to facilitate washing of concrete mixer chutes only. Washing of concrete mixer barrels will not be permitted.

A self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. This will be maintained by the Contractor on a regular basis and will be removed from the site on completion of the construction phase.

Upon completion of the project the compound will be decommissioned by backfilling the area with the material / peat arising during excavation and landscaping with topsoil.

2.2 Construction Phase

Key elements of the civil works and activities associated with the construction phase of the proposed development are outlined in the following subsections. Further details are provided in the Construction Environmental Management Plan (CEMP). See EIAR Volume 3 Appendix 2.

2.2.1 Overview of Construction Activities

2.2.1.1 Wind Farm Collector Cable and Access Track

The construction of the proposed collector cable and access track will principally comprise of the following civil works and activities:

- Pre-commencement activities including site investigation work and pre-construction surveys
- Felling of any areas of coniferous forestry plantation necessary to facilitate construction works;
- Site preparation including fencing (for ecology, water and archaeological exclusion zones if necessary),
- Construction of new watercourse crossing at Cottoners Brook;
- Earthworks and drainage infrastructure associated with construction of collector cable and new access road;
- Cable trenching and ducting;
- Cable laying;
- Reinstatement of the cable collector track.
- Aggregate placement, grading and compaction for new access track

2.2.1.2 110kV Substation

Key elements of the civil works and activities associated with the construction phase of the substation are as follows:

- Pre-commencement activities including site investigation work and pre-construction surveys
- Site preparation including fencing (for ecology, water and archaeological exclusion zones if necessary),
- Construction of site entrances and sections of internal access roads necessary to facilitate access to the temporary construction compound;
- Installation of site drainage systems;
- Construction of temporary construction compound including site offices, parking, material laydown and storage areas, etc;
- Establishment of temporary storage of stockpiled overburden and surplus excavated materials within the material storage areas.
- Bulk earthworks for formation of access road and substation compound base;
- Substation compound base and equipment foundations;
- Cable trenching and cable laying;
- Construct of control building and install equipment within compound;
- Construction of permanent drainage system
- Aggregate placement, grading and compaction for substation access road
- Complete site works: lighting, security fencing, gates, signage;
- Reinstatement of temporary drainage system;
- Demobilise offices and tidy up site.

2.2.1.3 110kV Grid Route

- Pre-commencement activities including site investigation work and pre-construction surveys
- Cable trenching and cable laying;
- Construction of Joint Bays and communication chambers;
- HDD under watercourse crossings;
- Reinstatement of the public road.

Table 3 Overview of Key Construction Activities

Element	Construction Techniques
New Site Entrance	Formation of junction with public road R423. Works includes tree/hedgerow removal and construction of new clear span drain crossing.
Substation access road and Internal roadways/access tracks	Works includes vegetation removal, topsoil stripping, excavation, grading, aggregate placement and compaction.
Substation Compound	Works includes vegetation/tree removal, topsoil stripping, excavation, grading, foundation construction, building construction, final grading and landscaping of temporary works area.
Wind farm collector cable and access road	Underground cable installation construction activities include tree felling, topsoil stripping and excavation, trenching, installing ducting and electrical cables, grading, aggregate placement and compaction.

Element	Construction Techniques
Water crossings along collector cable route	Vegetation removal and construction of new clear span crossing over Cottoners Brook. Installation of box or piped culvert at 3 drainage channels
Grid Cable (Public Road)	Works consist of the trenching, ducting, cabling and reinstatement of the road surface.
Water crossings along grid cable route	No in-stream works. All stream crossings will be achieved by HDD method.
Temporary Construction compounds	Construction includes tree / hedgerow removal, topsoil stripping, excavation, grading, aggregate placement, compaction and landscaping.

2.2.1.4 Construction Working Hours

Working hours will be.

7:00am – 7:00pm* (Monday – Friday inclusive)

7:00am – 1:00pm* (Saturday)

*The working day may extend occasionally at times when critical elements of work need to be advanced.

2.2.1.5 Construction Duration

The total construction time frame for the proposed development is a period of approximately 16 months. The 16 month construction time frame consists of the following;

- The construction time frame for the Substation and Windfarm Collector Cable and associated access road is approximately 16 months. It is anticipated that these works will be undertaken in parallel.
- The grid route is approximately 10.85km long with an expected 75m of works to be completed each day. The overall construction time frame for the UGC is approximately 30 weeks (6 months) to allow for installation of jointing bay, communication chambers, HDD and cable installation.

It is also anticipated that works could be undertaken in tandem with the Dernacart wind farm construction works.

It is envisaged that subject to permission, the proposed development will commence in 2025 with a 16 month construction period. The start date is dependent on planning being granted, receipt of a grid connection offer from EirGrid, funding and all permits being in place.

2.3 Operation

During the operation, the Developer or a service company will carry out regular maintenance of the substation. During the life of the project, it is envisaged that at least two permanent jobs will be created in the form of an operator or maintenance personnel. In addition, operation and monitoring activities may be carried out remotely with the aid of computers connected via a telephone broadband link. However, routine inspection and preventive maintenance visits will be necessary to ensure the smooth and efficient running of the substation and require a minimal presence.

It is unlikely that the underground 110Kv grid cable will require much maintenance during its operation but in the event a fault does occur, inspection of the fault can be carried out to determine what works to the ducting may be required.

2.4 Decommissioning

The grid cable and substation will remain a permanent part of the national grid infrastructure and therefore decommissioning is not foreseen.

In the event that the development is to be decommissioned, decommissioning is typically in the reverse order of construction.

The general decommissioning activities are outlined below:

2.4.1 Wind farm collector cable and access road

The underground electrical collector cable from the wind farm to the substation would be disconnected and remain in place. The access roads will be left for use by the landowners. Environmental impacts are minimised by leaving underground cables in place. The cables contain no materials that are harmful to the environment. The cable installation would include warning tape and tracer cable that would warn anyone that could be digging in the area of the cables both during and after project operation.

2.4.2 110kV Substation

All aboveground components including buildings, structures and equipment will be removed during decommissioning.

Disassembly of the substation would include the removal of the steel, transformers, switches, conductors, and other materials that could be reconditioned and reused or sold as scrap. All underground electrical collector cables coming to the substation from the wind turbines would be cut at the perimeter of the substation; with any cables less than 1m deep removed. Any hazardous material such as oils or lubricants will be removed in accordance with Waste Management standards.

In addition to steel structures, the control building will be disassembled and removed from the site.

The O&M containers would also be removed, relocated or reconditioned. All equipment, furniture, and materials within the O&M containers will be removed prior to removal.

All fencing around the substation compound will be dismantled, removed and reused or sold as scrap.

All foundations will be removed to a depth of at least 1meter below ground surface, backfilled, graded and then covered with topsoil. Based on discussions with landowners, access roads no longer needed will be removed and the disturbed land areas subsequently graded and reseeded.
110kV UGC

The underground electrical 11kV cable would be disconnected and remain in place. All other underground elements (junction boxes, joint bay, cable ducts etc) would also remain insitu.

2.5 Use of Natural Resources

The proposed development will require the use of the following natural resources:

2.5.1 Land take

The 110kV substation development and wind farm collector cable and access track will require a permanent land take of circa 4ha. The removal of some trees and hedgerows will also be required to facilitate the development.

All of the 110kV grid line connection will run within public roads. All works within the public road network will be fully reinstated.

The temporary construction compound will require a temporary land take of approximately 0.5ha. This area will be reinstated once the construction works have been completed.

2.5.2 Aggregate

Aggregate materials required will mainly consist of higher grade materials not available to be won on site, eg stone material for roads and foundations, and concrete for the construction of the hardstanding areas. All aggregate materials will be sourced from authorised facilities

2.5.3 Water

Water needs for construction activities will be limited to concrete truck chute washing, wheel wash, dust suppression and sanitary facilities and potable water

2.6 Production of Waste

2.6.1 Construction Phase

All soils and subsoils generated from excavation works will be retained on site and reused in bunding, landscaping and localised earthworks. Excess peat and spoil material will be stored on site in designated peat deposition areas.

More general construction phase waste may consist of surplus hardcore, stone, concrete, ducting, electrical wiring, spare steel reinforcement, metal off-cuts shuttering timber, plastic waste, packaging, and unused oil, diesel. This waste will be stored in the construction compound and collected at intervals and taken off site to be reused, recycled and disposed of in accordance with best practice procedures. All waste to be taken off-site will be collected an approved contractor and recycled or disposed at an approved facility.

Wastewater from welfare facilities on site will drain to integrated wastewater holding tanks associated with the toilet units. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licensed/permitted waste facility for treatment and disposal,

Domestic refuse waste generated by contractors will be collected on site, stored in an enclosed skip at the construction compounds and disposed of at a licensed landfill facility.

The types of wastes to be generated will be similar to established construction waste streams and will not require unusual or new treatment options.

2.6.2 Operational Phase

The operational aspect of the proposed development would produce a minimal amount of waste. Wastes arising from the general operation and maintenance would principally include residual lubricating oils, cooling oils, packaging from spare parts and any interceptor silts and oils. The containment and disposal of residual waste oils and interceptor sludges will be carried out by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998. The remaining wastes will all be removed from site and reused, recycled or disposed of in an authorised facility in accordance with best practice. The wastewater generated during the operational phase will be managed by a holding tank which is of twin-hull design and fitted with an alarm to indicate levels and when it is due for empty. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licensed/permitted waste facility for treatment and disposal.

2.7 Emissions and Nuisances

The anticipated residues and emissions likely to be generated during the project lifetime are summarised in **Table 4** below. These environmental effects have been identified, assessed and proposals for management of the anticipated nuisances and/or emissions are presented throughout relevant chapters of this EIAR.

Table 4 Likely Emissions and Nuisances

Project Phase	Aspect	Potential Emission/Nuisance	Assessment Provided
Construction	Air	The main emissions to atmosphere during the construction stage of the project is from fugitive dust associated with the following activities: • Groundworks associated with excavation and construction of the project infrastructure. • Transportation and unloading of crushed stone around the site; • Vehicular movement over potentially hard dusty surfaces such as freshly excavated roads The movement of machinery, construction vehicles and the use of generators during the construction phase will also generate exhaust fumes containing predominantly carbon dioxide (CO_2), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}).	EIAR Vol 2 Chapter 8 Air and Climate
	Noise	Traffic flows, excavation works, mechanical machinery and electrical equipment typically used for construction projects would generate noise emissions.	EIAR Vol 2 Chapter 10 Noise
	Water	Surface water runoff and discharges from construction working areas are likely during construction. Potential pollution sources could arise as a result of soil erosion or from oil/ fuel or chemical storage and use. During construction the site drainage will discharge to settlement ponds and diffuse outfalls which will disperse the flow across vegetation. Silt curtains will be installed along existing field drain where construction works are proposed within 10m of their banks.	EIAR Vol 2 Chapter 5 Water
	Traffic	The additional traffic, especially heavy goods vehicles associated with the construction phase, has the potential to cause nuisance to those using the local road networks	EIAR Vol 2 Chapter 12 Traffic and Transportation
Operational	Air	No significant air emissions would be produced during operation. The diesel back-up generator would only operate in an emergency situation over a short time period.	EIAR Vol 2 Chapter 8 Air and Climate

Project Phase	Aspect	Potential Emission/Nuisance	Assessment Provided
	Noise	Noise emissions from substation plant. No noise emissions associated with the grid connection or wind farm collector cable.	EIAR Vol 2 Chapter 10 Noise
	Water	No water emissions associated with site operations. Surface water run-off from the substation will be captured and managed by the drainage system. No water emissions associated with the grid connection.	EIAR Vol 2 Chapter 5 Water
	Traffic	The substation will be monitored remotely with only occasional trips generated by maintenance and monitoring personnel. No traffic associated with the grid connection.	EIAR Vol 2 Chapter 12 Traffic and Transportation

2.8 Transboundary Effects

Transboundary impacts relate to potential impacts on other Member States, i.e. outside of the Republic of Ireland. There is no risk of potential transboundary effects due to the proposed project.

2.9 Risk of Major Accidents and Disasters

It is considered that there is no risk for the project to cause major accidents and/or disasters or vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters and man-made disasters.

2.10 Alternatives Considered

The consideration of Alternatives is a mandatory part of the EIA process. The EU Commission guidance "*Guidance on the preparation of the Environmental Impact Assessment Report*"[1] (2017) defines alternatives as: "*Different ways of carrying out the Project in order to meet the agreed objective'*. That guidance states *'The number of alternatives to be assessed has to be considered together with the type of alternatives, i.e. the 'Reasonable Alternatives' referred to by the Directive. 'Reasonable Alternatives' must be relevant to the proposed Project and its specific characteristics, and resources should only be spent assessing these Alternatives. In addition, the selection of Alternatives is limited in terms of feasibility. On the one hand, an Alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an Alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible Alternative.'*

Therefore ultimately, any Alternatives have to be able to accomplish the objectives of the Project in a satisfactory manner, and should also be feasible in terms of technical, economic, political and other relevant criteria.

1. See: http://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf

The reasonable alternatives considered during the project inception and design process including a comparison of the environmental effects and the principal reasons for proceeding with an application for the current development is as follows:

2.10.1 110kV Substation

The proposed 110kV substation is to replace the 110kV windfarm substation currently consented as part of the Dernacart Wind Farm (Planning Ref ABP-310312-21).

The need for the replacement of the consented substation is due to changes in EirGrid requirements in the intervening period between the submission of the planning application and the granting of the development. Based on current EirGrid specifications, the sizing of substation compound for which permission had been sought is no longer adequate and necessitates a larger footprint to include additional lands for future expansion if required.

Initially two locations were considered for the relocation of the proposed substation.

Option 1 - increase the development footprint at the site of the original substation location.

Option 2 – new site to the northeast of the original substation location.

However, owing to the inability, at this current time, to secure landowner consent for the extent of the necessary land take required to accommodate the increased substation footprint at these two potential substation locations, a new alternative substation location was therefore required.

The proposed site which is located immediately to the north of the R423 (approximately 1.3km west of Garryhinch) was initially identified by the Applicant and finally selected based on collaborative appraisals between multi-discipline inputs and considerations including topography, ecology, archaeology, hydrology, flood risk, and access.

2.10.2 Wind Farm Collector Cable

Owing to the proposed new alterative substation location, a new collector cable connection from the wind farm to the substation is required.

Consideration was given to the installation of the collector cable along the public road network. This would involve road opening works of circa 4.8km (approx. 3.25km within a number of minor local roads (L20978, L20971 and L20972) and 1.55km within the R423).

It was however considered by the Applicant that the preferred option would be to install the cable off-road as this route option would also facilitate a private access between the substation and the wind farm.

The primary objectives when designing the new internal access road was to utilise existing tracks where possible and to locate infrastructure where ground conditions are suitable.

The alignment of the proposed road layout was selected on the basis of field investigations, using criteria such as peat depth and gradients to minimise both the impact of peat slippage and impacts on higher value peat habitats.

Areas of deep and soft peat were avoided insofar as possible. The proposed road comprises a combination of those that 'float' on the peat surface (in flatter/wetter and deeper areas) as well as the 'cut and fill' type (on sloping ground).

2.10.3 Route of the 110kV Underground Grid Connection Cable

In order to identify potential routes between the windfarm substation and the intended connection to the substation at Bracklone, a detailed study area constraints map was created. The study area map combined data from numerous sources including OSI mapping, aerial imagery, protected areas (SAC/NHA etc.), river networks, ESB network data, architectural heritage, and monuments data.

From an initial review of the study area, three potential routes were brought forward for an initial desktop assessment. At this stage, primary public road use were assessed in order to identify UGC route options. Roads going through the centre of Portarlington town were avoided in order to minimise traffic congestion and crossing/traversing parallel with existing third-party underground utilities (water distribution, gas, telecoms, etc.), and also to avoid the high number of monuments and architectural heritage structures identified in that area.
Consideration was given in terms of the route distance in types of public road, the number of watercourse crossings by bridge, the number of crossings with Irish Rail infrastructure by overbridges, intersections with national monument zones of notification and with national architectural heritage, and the number of private land folios required where HDD crossings are not possible from road-to-road.

From an engineering and environmental perspective, the proposed route option was considered to be the more favourable in terms of construction methodology and because of its shorter overall length, shorter narrow road length, and avoiding to cross Irish Rail infrastructure.

3. Environmental Impact Assessment

The main objective of the EIA process is to ensure that all direct, indirect and cumulative environmental effects of the project are anticipated. Where effects are identified as unacceptable, these will be avoided or reduced during the design process through the implementation of practical mitigation measures. The main chronological stages of the environmental assessment undertaken include:

- Carrying out baseline studies and collecting data on the existing receiving environment
- Assessing potential for significant environmental effects (impact assessment)
- Recommending or designing mitigation measures to avoid or minimize environmental effects

The EIA has been carried out in accordance with the relevant legislative requirements and guidelines including the Environmental Impact Assessment of Projects: Guidance on the preparation of the EIA Report. European Commission (2017) and Guidelines on Information to be contained in environmental impact assessment reports EPA (2022). Specialist guidance as required under each of the environmental topics discussed hereunder has also been used where appropriate.

3.1 Population and Human Health

The scope of the assessment considers the effects of the construction, operation and decommissioning of the proposed project in terms of how the proposal could affect population and settlement, economic activity, employment, land use, amenities and tourism, and health and safety.

The proposed substation and wind farm collector cable is situated in the rural townland of Barranaghs. The proposed underground 110kV grid cable spans approximately 10.85km passing through the townlands of Barranaghs, Garryhinch, Annamore in County Offaly and Coolnavarnoga, Coolaghy, Kilbride, Ballymorris, Cooltederry and Bracklone in Co. Laois.

Settlement patterns in the broader region range from large urban centres to small community settlements and relatively isolated farmsteads. The nearest urban settlements to the site include Garryhinch village approximately 1.3km to the northeast, Mountmellick town approximately 3km to the southwest, Clonygowan village, approximately 5km northeast, and Portarlington town, approximately 6km east to northeast. These towns and small villages provide a range of local community facilities, including schools, sporting clubs, churches, general shops and post offices.

The closest residential properties to the proposed 110kV substation site are a cluster of dwellings approximately 220m to the west and 310m to the east. The nearest residential dwelling to the proposed access track and 33kV underground electrical cabling is approximately 430m to the south.

Settlement patterns along the proposed UGC route exhibits sections of ribbon development and one-off dispersed detached housing. As the route approaches Portarlington, it transitions through higher density residential and commercial developments.

There are currently no tourism attractions on or near the proposed 110kV substation or 33kV underground collector cable and access track. While there are no tourist attractions pertaining specifically to the site of the proposed substation and collector cable development, there are a number of recreational and cultural amenities in the wider area.

Garryhinch includes a tourist spot such as a Garryhinch forest recreational area. The river Barrow, a popular fishing spot, is also located close by, approximately 315m south of the proposed substation site. Other tourism attractions in the wider area are Emo Court House, approximately 7.2km southeast of the grid route, which offers guided tours around the 18th century grounds. Derryounce Lake and Walkway is also located in the greater area, approximately 3.4km northwest of the proposed grid route near Portarlington. This is a popular recreational area used mainly for walking and angling. The beautiful lakes and walkways consist of a 3km, 5.5km and 14km walking loops.

It is unlikely that the proposed development would directly or indirectly lead to any reduction in existing economic activity within the area throughout any phase of the proposed development. During the construction phase, aggregates, concrete and surface dressing supplies will be obtained from local quarries and suppliers, thus supporting the local economy. There is also potential economic opportunities for local companies and businesses to provide a ranges of services including plant hire.

The proposed development will have no impact on the settlement pattern of the area. There will be no loss of residential dwellings due to the proposed project, and therefore there will be no displacement of the existing population.

During construction there may be a level of effect on existing land-uses within the proposed development site. Existing forestry activities and harvesting within the plantation would cease for the duration of the collector cable construction works. Temporary effects on land use will arise as a result of the installation of the grid connection which will be constructed within the public road corridor.

Outside of the development footprint, the proposed development does not pose a significant risk to either existing or future land-uses. All existing landuse practices can co-exist with the proposed development. There will be no severance, loss of rights of way or amenities as a result of the proposed development.

As with any development, the construction activities can cause a nuisance to the local community and are likely to pose temporary minor disturbances locally. The potential wellbeing and nuisance effects of the Proposed Development on the local human environment have been identified as follows:

- Dust emissions from construction activities
- Noise emissions during construction/operation activities
- Traffic nuisance during construction activities

Each of these issues has been fully assessed and documented in the EIAR. These assessments conclude there will be no significant effects on human health as a result of the Proposed Development.

Disturbances associated with the additional volumes of traffic will principally be confined to the construction phase and will cease on completion of works. The construction phase will be managed to minimise the impact on the human environment and the local residents. The grid construction works will be conducted in manageable sections (75-100 meters) each day, so no significant impacts on traffic are expected during the construction phase. Once operational, the road corridors containing the underground electrical cabling route will be fully reinstated,

and the substation development will for the most part be monitored remotely with only occasional trips generated by maintenance and monitoring personnel thereby eliminating any potential operational phase traffic effects.

The results of the construction noise prediction indicate that noise generated during the construction phase will not exceed the acceptable construction noise limit at any dwelling location, for the duration of the construction phase. Once operational, the main noise source from a substation is from the transformer(s). The noise is generally recognisable as a steady hum which arises from electric and magnetic forces within the transformer. No operational noise impacts will be generated from the underground grid cable. The results of the noise modelling assessment undertaken shows that the Proposed project can achieve a low noise impact during daytime and night-time periods

During the construction phase of the Proposed Development, there will be minor emissions from construction plant and machinery and potential dust emissions associated with construction activities and construction vehicles. However, with the implementation of appropriate mitigation measures, no negative effect on air quality is expected. Once the proposed development is operational there will be no significant direct emissions to the atmosphere. The substation does not produce emissions as there is no combustion process. There will be no potential impacts to air quality during the operational phase associated with the underground grid route.

3.2 Biodiversity

The biodiversity assessment describes the ecology of the proposed development site and environs in terms of designated sites, habitats, flora, fauna and biological water quality. The assessment specifies mitigation measures to ensure that significant impacts on these features do not occur. Studies and reporting were in line with best practice and recently produced guidance. The Information on the existing environment was obtained using publicly available information sources and by field surveys.

The proposed development site does not lie within the boundary of any NHA or pNHA site.

With the exception of a section of the proposed grid route which will cross the River Barrow, the development footprint of the proposed development does not occur within any area protected for nature conservation, such as Special Areas of Conservation (SAC) or Special Protection Area (SPA). This section of the grid route will however be constructed via directional drilling therefore there will be no physical interaction within this designated natura 2000 site.

An on-line search of the NBDC database for plant species of conservation interest recorded within study area of the development footprint was carried out. Data requests from NPWS for the study area was also reviewed. A total of two Flora (Protection) Order (FPO) species have been previously recorded, namely marsh saxifrage and lesser centaury. These species are afforded legal protection in Ireland. The portion of the proposed development however within the area of these previously recorded species relates to the 110kV underground grid cable. The proposed 110kV underground grid cable route will follow the exiting road network all the way to Bracklone 110kV substation in Portarlington. The artificial nature of the habitat along 110kV underground grid cable route would not support these two species.

Overall, the proposed development site is 'low – moderate' value to bats of all species. A review of roost site data received from BCIreland determined that there are no records of roosts held for the area encompassed within the proposed development site.

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Fauna Species recorded during surveys comprise badger, pine marten, stoat, red squirrel, mountain hare, fallow deer, fox and rabbit.

The only amphibian recorded during surveys as an adult common frog

Electro-fishing surveys were conducted at 11 sites at watercourses draining the wind farm site an along the grid route to Portarlington Town. Three of these sites were on the River Barrow. Two upstream of the proposed grid route and one downstream at Kilnahown Bridge which the grid route will cross. A total of eight fish species were recorded at the three sampling points along the River Barrow.

The construction phase impacts potentially associated with the proposed development are listed in Table 5 below.

Table 5Construction phase impacts potentially associated with the proposed development

Construction Phase Effect	Source
Habitat loss/alteration	Construction of underground collector cable, access track, 110kV substation and temporary site compound, vegetation clearance, excavations and groundworks, demolition work, movement of plant and machinery, storage of construction materials and spoil, ancillary site development works, installation of services and site landscaping. Construction activity also poses a risk of spread/introduction of invasive species to site (soil disturbance and general construction activity, plant/machinery, tools/equipment, workers clothing/footwear, imported building and other materials including soil and fill can all potentially be contaminated with Invasive alien plant species (IAPS)infested soil, viable seed or other IAPS material). Treatment/management of invasive species also has potential for habitat impacts (potential use of chemical herbicides and/or risk of spread within the site).
Indirect water quality effects	Sediment/pollutant laden run-off may arise from exposed areas during groundworks/excavations from material storage areas, from construction vehicles/plant or from on-site temporary toilets and washing facilities. Leaching of fuels/oils, cementitious material etc. to groundwater in the event of accidental spillage. Potential use of chemical herbicides.
Direct species interference/disturbance/ displacement	Increased human presence/activity for duration of construction phase. Increased noise/vibration/lighting/use of chemical associated with construction works. Physical interference (injury/mortality).
Indirect species disturbance/displacement	Indirect water quality effects. Loss/fragmentation/direct or indirect alteration of foraging, commuting, breeding or resting habitat. Impacts on prey biomass.

General best practice construction mitigation measures will be followed. A Surface Water Management System forms an integral part of the project design as do a suite of avoidance measures including buffers and set back distances from watercourses, ecologically valuable habitats and designated sites. The works will be supervised by

an Ecological Clerk of Works (EcoW) who will review all method statements and monitor the construction phase to ensure that all environmental controls and mitigation is implemented in full.

No significant impacts on Biodiversity are likely to occur during the operational phase of the proposed development. Potential impacts relate to species disturbance/displacement due to lighting and noise. Both badger and bats were recorded within sections of the proposed development and are species most sensitive to lighting. It is proposed that external security lighting will be set on motion sensors and set to as short a possible a timer.

Overall, it is considered that the effects on important Ecological Features from potential construction, operation and decommissioning impacts will be avoided, reduced and mitigated sufficiently to ensure that no likely significant effects remain, with the full implementation of the ecological mitigation measures.

3.3 Lands and Soils

An impact assessment was carried out to determine whether the proposed development is likely to have a significant adverse effect on the land and soil aspects of the environment and to propose mitigation measures to reduce any potential negative effect of the proposed development.

The existing land cover on the site varies from degraded bogs, marginal grassland, forestry and scrublands. The existing land uses have much altered the natural land and soil environment over time.

No geological heritage sites are present within the development site boundary.

The geology and soils of the proposed development lands have been reviewed using the GSI database. The bedrock underlying the Proposed Development is a combination of limestone and shale. Soils comprise cutover peat at the western end of the development beneath the substation and proposed route of the collector cable, with the proposed grid route connection underlain by a mosaic of soil and subsoil.

A peat stability assessment has been completed. The PSRA report is included as Appendix 6-1 in Volume 3 of this EIAR. The report concludes that “that the risk level is Negligible and is suitable for the proposed works.

The substation and wind farm collector cable services road will require a permanent land take of circa 3ha once operational. The land take is small and the loss of this marginal land would not be considered significant. The proposed underground grid route will be installed entirely on public roadways which will be reinstated once construction works are completed. Once in place, the grid connection will not affect existing or further land uses. Overall it is considered that during the construction phase there is likely to be a slight to moderate negative impact on land use.

During the construction period, excavation of soils and subsoil will be required for the cable trenching and ducting, drainage infrastructure and for the foundation/construction works within the proposed substation. This removal of peat, soil and bedrock is a *negative impact* on the soil and geological environment, however it is not considered to be significant. The volume of material to be excavated will predominantly be manageable locally on site. Excavated material associated with the construction of the trench for the grid connection cable, will be removed to an appropriate licensed facility.

Tree felling, earthworks and stockpiling of soils will increase the likelihood of conditions which could lead to soil erosion, compaction or slippage, and construction traffic and materials will result in increased risk of spills and contamination of soils from oil, lubricants, cement and concrete. Geological resources in the form of aggregates for roads and foundations and concrete for the construction of hand standing will be required.

Potential impacts during operation are limited by virtue of the fact that the proposed development site is relatively static during the operational phase.

The potential impacts associated with decommissioning of the proposed development will be similar to those associated with construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works.
There is potential for the permitted Dernacart Wind Farm to be constructed at the same time as this proposed development which may cause a slight cumulative effect as a result from the demand for aggregate materials from local quarries.

It is considered however that the proposed project design including control measures together with mitigation measures will ensure that there will be no significant negative effect on land and soils.

3.4 Water

An impact assessment was carried out to determine whether the proposed development is likely to have a significant adverse effect on the quality and regime of surface water and groundwater in the receiving environment and to propose mitigation measures to reduce any potential negative effect of the proposed development.

The River Barrow is the main surface water feature in the area flowing in an easterly direction within close proximity to the proposed development. The latest EPA biological water quality data monitoring stations near the proposed development show that the River Barrow (although Not at Risk through the proposed development site) is at Risk of not achieving the WFD objectives.

There are no EPA mapped surface water features traversing the proposed substation site. The River Barrow flows in an easterly direction approximately 350m south of the proposed substation site on the opposite side of the R423 road. Field surveys have identified land drains along the northern, western and southern boundaries of the proposed substation field.

The wind farm collector cable starts from the permitted Dernacart wind farm and crosses Cottoner's brook which is an EPA mapped water course. The Cottoners brook stream flows in a southerly direction for approximately 1.8km before the confluence with the River Barrow.
The 110kV grid connection will be underground from the proposed substation until it connects to the permitted Bracklone substation southeast of Portarlington. The total length of the underground cable will follow existing road routes and will be installed under the following mapped water courses:

- Clonygowan (IE_SE_14C510940);
- Unnamed tributary of the River Barrow (IE_SE_14B010700);
- Rathmore 14 (IE_SE_14B010700); and
- River Barrow (IE_SE_14B010700).

There are a total of sixteen (16) no. water crossings required to facilitate the proposed development. The number of crossings related to each element of the proposed development includes:

- One (1) crossing at the new site entrance to the proposed 110kV Substation;
- Four (4) crossings located along the route of the underground collector cable and access road; and
- Eleven (11) crossings along the route of the 110kV underground grid connection cable.

The proposed development is situated within the following groundwater bodies (GWB):

- Portlaoise (IE_SE_G_107); and
- Bagenalstown Upper (IE_SE_G_153)

The underground Windfarm Collector Cable and access road and the proposed 110kV Substation are located within an aquifer that is described by Geological Survey Ireland (GSI) as a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones (LI). The majority of the 110kV grid connection cable route is situated within an aquifer which is described as a Regionally Important Aquifer - Karstified (diffuse). The start and end section of the grid connection cable are located within a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones (LI).

The GSI database lists six boreholes and eight dug wells in proximity to the proposed development site, which are labelled for domestic use and supply where the use is known. The Yield Class is described as Poor for all of these, with the exception of two dug wells and one borehole which have been assigned a medium yield class. There is one dug well and one borehole for which the yield class is unknown.

There is a public supply source protection area located approximately 2km south east of the proposed grid connection route. The scheme forms part of the Lough Public Water Supply: Portarlington Water Supply Scheme. There is an additional Mountmellick Derrygile supply source protection area located approximately 6km southwest. The Clonyquin group scheme (preliminary source protection area) is located approximately 4.3km north of the proposed development.

During the construction period, the proposed development has the potential to lead to effects on hydrology and hydrogeology unless appropriate mitigation is applied. The majority of the potential effects will be mitigated through the design of the proposed development.

Construction phase activities will require earthworks resulting in removal of soils, and vegetation cover/ road pavement. These activities can result in the release of suspended solids along drainage and surface water discharge routes to watercourses and could result in an increase in the suspended sediment load.

Felling of commercial conifer forestry is required to accommodate the construction of the underground collector cable and new access/service road from the windfarm to the 110kV substation. Overall felling of approximately 2.8ha of forestry will be required. All tree felling will be undertaken in accordance with a tree felling licence, using good working practices as outlined by the Department of Agriculture, Food and the Marine (DAFM) Standards for Felling and Reforestation (2019).

Given the relatively small, localised scale of the works, the volume of runoff from the construction works and felling area will be minimal in relation to the overall runoff to local waterbodies.

Dewatering of water ingress into excavations has the potential to impact on local groundwater levels. This has the potential to effect local well supplies in close proximity of the site. However, due to the shallow nature of the

excavations and the connection cable route along existing roads and services, no effects on groundwater levels will occur from the construction of the underground wind farm collector cable and access road, proposed substation or the underground grid connection cable.

Spillage of cement based products and accidental spillage during refuelling of construction vehicles with petroleum hydrocarbons is a pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology.

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase.

Potential impacts on the water environment during operation are limited by virtue of the fact that the proposed development site is relatively static during the operational phase, with all construction works being complete, and drainage and runoff will be clean therefore no impacts will occur. Some minor maintenance works may be completed throughout the operational phase. These works would be of a very minor scale and would be very infrequent.

The potential impacts associated with decommissioning of the proposed development will be similar to those associated with construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works.

On implementing identified mitigation measures in addition to the avoidance by design, the significance of the residual effect on the water environment during the construction and operational phase of the development is assessed as being not significant. Mitigation by design has been implemented initially to prevent adverse impacts. Other mitigation measures will be implemented and monitored throughout the construction and operation phases. It is considered that the proposed project design including control measures together with mitigation measures will ensure that there will be no significant negative effect on surface water quality, surface water flows or groundwater resources.

3.5 Air and Climate

The potential effects of the Proposed Development on local air quality and climate have been assessed.

The construction works will involve a number of activities including soil disturbance, excavations, and use of construction traffic including trucks transporting material within the site.

Potential air quality impacts during the construction phase can occur from uncontrolled or fugitive dust emissions and Particulate Material (PM), including PM10 emissions (particulate material with diameter of less than 10 µm). This may take place during excavation works required to facilitate the temporary access road, site compound formation, foundations for the control building and equipment, and drainage systems other services and infrastructure.

Fugitive emissions of dust and PM may also be generated from truck movements and from other machinery such as excavators and dump-trucks. The handling of aggregates and other similar sized materials can also generate quantities of dust, particularly in dry weather conditions.

Using the Institute of Air Quality Management (IAQM) methodology, the dust emission magnitude is considered low to medium. Standard best practice will be adhered to during the construction phase in order to minimise fugitive dust emissions.

It is unlikely that residential receptors along the route of the UGC would experience any significant dust nuisance from the grid installation works. The active construction area for the grid connection will be small, ranging from 75-100 metres in length at any one time, and it will be transient in nature as it moves along the route.

The movement of machinery, construction vehicles and the use of generators during the construction phase will generate exhaust fumes containing predominantly carbon dioxide (CO_2), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}). Traffic levels for the construction period of the proposed development are below the TII criteria which warrant a quantitative assessment of construction traffic and are therefore unlikely to cause an adverse effect on local air quality and will not have a significant effect on local, regional or national Air Quality Standards given the scale of the high levels of dispersion and the limited duration of the works.

During the operational phase, there will be no direct emissions to atmosphere from the proposed development. The substation does not produce emissions as there is no combustion process. There will be no potential emissions during the operational phase of the underground grid route. The additional traffic generated during the operational phase will be negligible therefore the overall potential impact on air quality during the operational phase negligible.

3.6 Noise

Potential noise and vibration effects during construction and operation of the Proposed Development were assessed. The main elements of construction noise include the following:

- Substation Construction Noise
- Grid Connection Construction Noise
- Wind Farm cable and Access Track Noise
- Construction Traffic Noise

The noise from construction activities has been assessed and is predicted to not to cause any significant effects. The effects from substation construction noise are predicted to be not significant and temporary at the nearest noise sensitive locations (NSLs). It is predicted grid connection construction noise will cause a negative, slight to moderate and temporary effect at NSLs. The wind farm cable and access track noise will cause a negative, not significant and temporary effect at NSLs. It is predicted construction traffic noise will cause a negative, not significant and temporary effect at NSLs.

As there will be no significant effects there is no requirement for specific construction phase mitigation measures. Best practice for the Control of Noise and Vibration on Construction and Open Sites will be adopted during the construction phase in order to minimise the noise generated by construction activities and nuisance to neighbours The main noise emissions during the operational phase will result from substation noise. The predicted noise emissions at the nearest NSL, is 36 dB (A), which is below the operational targets of 45 dB (A). It is predicted substation operational phase noise will cause a neutral, imperceptible and long-term effect at NSLs.

As noise will not exceed the operation noise limit target at the nearest sensitive receptors, no mitigation measures are required during the operational phase.

No significant cumulative impacts are predicted as a result of other projects. The proposed development will facilitate the export of electricity from the permitted Dernacart Wind Farm. The permitted Dernacart Wind Farm is located to the west of the proposed development substation, and has not yet been constructed or is in operation. The nearest NSL to the Dernacart Wind Farm is approximately 2.1km west of the proposed development substation. Wind turbine noise from the nearest NSL to the permitted development substation will dissipate significantly over a 2.1km distance and therefore no cumulative noise effects are predicted if the proposed development and wind farm are in operation together.

Construction works of the proposed development could be undertaken in tandem with the Dernacart wind farm construction works however the wind farm works are approximately 2.5km from the proposed development substation works and therefore no cumulative effects are predicted due to the intervening distances between both projects.

The construction of the proposed wind farm collector cable and access track may overlap with construction of the Dernacart Wind Farm as the location of the proposed works approaches Dernacart Wind Farm. Given the very short timeframe that these works will overlap with the Dernacart Wind Farm works, temporary/minor nature of works, significant cumulative noise impacts are not anticipated.

3.7 Archaeology and Cultural Heritage

An assessment of impacts on archaeology and wider cultural heritage resource has been undertaken.

There are no known archaeological sites or monuments within the boundary of the proposed development or in the immediate vicinity. Several Recorded Monuments and Places (RMP) are located in the vicinity, mostly at distances of over 1km from the site boundary.

Of the buildings listed in the National Inventory of Architectural Heritage (NIAH) those closest to the underground cable route are bridges; in particular Kilanhown Bridge over the River Barrow and Blackhall Bridge, a bridge over the former course of the Grand Canal and now a significance cultural heritage feature within the landscape. Other build features stand at a removed distance from the cable route, the closest being, a post box and Clonyhurk Church, the gateway and graveyard which adjoin Garryhinch Crossroads. Other build features in the vicinity include an ice house with the former Garryhinch Demesne and Woodbrook House and gate-lodge at a considerable remove from the proposed route. Ballymossis Bridge, a railway bridge crossing Canal road is not listed in the NIAH but Ballymorris House is listed but lies over 800m to the north separated from the route by a more modern housing development.

There will be no direct physical impact by the proposed development on the known recorded archaeology, upstanding known monuments or buildings within the boundary limits of the proposed development footprint. There is a possibility for direct impacts on unknown subsurface archaeology within the boundary limits of the proposed development during the construction phase. The greatest potential impact is on previously unidentified subsurface features and the subterrain build features of the Grand Canal. Excavation though or beside the infilled course of the Grand Canal has the potential to reveal former elements of the canal structure such as canal walls,

towpaths, locks and elements of long since demolished bridges. The infilled Grand Canal is not a Recorded Monument but is cultural heritage significance is acknowledged in the Offaly and Laois Development Plans.

The risk of inadvertent impact on unknown buried archaeological material is always a possibility, however the risk of inadvertent impact on unknown buried archaeological material can be mitigated by archaeological monitoring of ground works associated with the project.

Indirect Impacts on archaeology and cultural heritage tend to be mainly visual. The only potential impacts will arise from the proposed substation site. There are no Recorded Monuments in close proximity to the substation site and other archaeological monuments are at sufficient distances to ensure that issues of visual impact do not arise. There would be no operational impacts on archaeology or cultural heritage associated with the wind farm collector cable and access road and the underground 110kV grid cable.

3.8 Landscape and Visuals

The Landscape and Visual Impact Assessment describes the landscape context of the proposed development and assesses the likely landscape and visual impacts of the proposed development on the receiving environment.

The proposed substation site is located on flat, but very wet land with poor drainage. The lands along the wind farm collector cable route is predominately low-lying flat terrain.

Landcover along the Proposed underground grid cable route consists entirely of local and Regional road corridors, which is a hard surfaced area, with grass or vegetated verges in some sections, as well as sections of wall, footpaths, tree lines, and hedgerow vegetation. For the most part the route is predominantly rural in character, before entering the suburbs of Portarlington town.

The sensitivity rating of the proposed development lands is considered to be Low Sensitivity, in that the landscape is deemed to be sufficiently robust to accommodate a wide range of development without significant adverse effects on the appearance and character of the area.

The are no designated 'Areas of High Amenity' in proximity to the proposed development lands. There are no specific landscape attributes at the proposed development site which afford it a high sensitivity rating. The lands are similar in nature to other lands in the area and have no striking features. The application lands are not afforded any protection under statutory or local landscape designations. There are no designated scenic views which would be affected by the proposed development. There are no tourist attractions pertaining specifically to the site of the proposed development.

While there are a few features of high sensitivity along the proposed underground grid cable route including a group of trees at Garryhinch Church which are designated as contributing significant value to the environment, built heritage features such as Garryhinch Church, a post box at Garryhinch, Kilnahown Bridge and Blackall/ Moores Bridge, and amenity features including Garryhinch forest recreational area, the river Barrow and Portarlington Golf Course, there will be no direct or long term effects. The cable will be within the carriageway of the local road network and therefore trees and adjacent walls and built heritage elements will be avoided and unaffected. The cable will be laid by Directional Drilling to cross the Kilnahown and Blackhall/Moores bridge so there will be no effects on these bridges or watercourse during the construction phase.

Some changes in the character of the host landscape will occur locally due to the presence of the Proposed Development as a new landscape element. However, the magnitude of any change would not constitute an unacceptable or detrimental effect on the local landscape character and visual receptors for the reasons outlined as follows:.

- The proposed development would not materially conflict or contravene any policy objectives set out for the landscape character area.
- There will be no loss of protected ecological habitat.
- The proposed development site would not impart a major change to the overall visual character of this
- area. The visual environment of the site and its surrounding context is generally enclosed, and due to
- the relatively low lying setting available views to the site are generally limited to its immediate context.
- The Site does not lie within any designated sensitive landscapes or in the direction of any 'key scenic views'

Overall, the landscape and visual effects arising from the introduction of the proposed development would be localised, and limited in both scale and extent, and would not result in any substantial adverse change to the landscape character of the general area. The proposed development will result in a limited visual impact on the overall landscape character and visual amenity. The proposed development will not impact on views from protected features or sensitive receptors and is considered an appropriate scale for the existing landscape.

3.9 Material Assets – Traffic and Transportation

The Traffic and Transportation Assessment quantifies and assesses the impact of construction, operational and decommissioning traffic generated by the proposed development on the existing local road network, and recommends mitigation measures, as appropriate.

Potential impacts on the surrounding road network will arise principally during the construction phase. Once operational the proposed development will generate negligible operational traffic volumes.

The proposed substation site is located on the north side of the R423 and access will be gained to the site via a new site entrance from the R423.

The Road Networks associated with the proposed underground grid cable development consists of the R423, L50183, L71762, L3153, R419, L3158 and R420 public roads.

Road traffic surveys were undertaken by MWP to establish the existing baseline traffic volumes on the existing local and regional public roads along the proposed underground grid connection route. The recorded peak traffic hour for each road occurred between the hours 4.00 p.m. to 6.00 p.m. The R423, R419 and R420 are all currently operating within their estimated capacity.

The 16 months construction would require the importation of a total of up to 11,584 loads of construction materials plus the removal of 814 loads from the grid connection works along the public road network to a

licensed waste facility. The peak daily imported loads would occur during the six weeks' substation formation and access road/track works.

During the proposed 16 months construction duration, the proposed construction works would increase Annual Average Daily Traffic (AADT) volumes on the R423 by 63 vehicles, including 33 heavy vehicles, which equates to an AADT increase of 2.3%. The proposed grid construction works along public roads would increase AADT volumes on those roads by up to 45 vehicles, including 30 heavy vehicles, which would equate to AADT increases of 6.8% on the L50183, 3.63% on the L3153, 0.9% on the R419, up to 2.2% on the L3158, and 0.6% on the R420.

During the six weeks peak construction heavy vehicle traffic generation, the peak daily increase in daily traffic volumes on the R423 generated by peak construction would be up to 396 vehicles, including up to 366 heavy vehicles, which equates to an increase of 16.6%. The peak daily increase in traffic volumes generated by the proposed grid construction works along public roads would be of the same order as the predicted AADT increase generated by the proposed grid construction works on those roads, of up to 45 vehicles, including heavy vehicles.

The assessment predicts that with forecasted traffic growth plus the proposed development construction traffic, that:

- The R423 would continue to operate well within its estimated AADT capacity.
- The R419 would operate at its estimated AADT capacity with a reduced level of service. The expected construction duration for the grid connection works along the R419 however is two to three days.
- The R420 would continue to operate well within its estimated AADT.

Overall the traffic studies carried out for the proposed development indicate that while the increased traffic volume on the local road network during the construction phase would be substantial, this increase will be well within the carrying capacity of most of the local road networks. The R419 would be at its estimated capacity. Notwithstanding, any development traffic effects on the local road networks will be temporary and will have no effect on the capacity of the road network in the long term.

A stop/go alternating direction temporary traffic management arrangement would be provided during grid connection works along the public road network, to facilitate the grid connection construction works. No public road closures and diversions are proposed for the grid connection works along public roads, and local access will be maintained.

3.10 Material Assets – Built Infrastructure

The potential effects of the Proposed Development on material assets have been assessed. The following topics have been covered as part of the EIAR, see Table 6.

Table 6 Material Assets Topics

Material Asset	Topics to be Covered
Built Services	Electricity Telecommunications Gas Water Supply Infrastructure Sewage
Waste Management	Construction Wate Operational Waste

There is known underground electrical infrastructure, water mains, and foul water mains within the route of the proposed underground grid cable. Gas distributed pipes (medium pressures) are also present along the section of the proposed underground grid route from R419 to the consented Bracklone 110kV substation. Mobile communication masts are present in the surrounding areas of the study area. These include Vodafone, Three, Eircom and Imagine Communications Ireland.

During the construction phase of the Proposed Development, it will be necessary to excavate close to existing underground services. In advance of any construction activity, the contractor will undertake detailed surveys and scans of the Proposed Development site to confirm the presence of any services. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. Some minor alignment alterations may be required if previously unknown services are encountered which will likely result in brief suspension of services. Although the exact number of interruption days for particular utility customers cannot be ascertained at this stage, any service interruptions are likely to be brief and occur rarely if required and will generally occur for a set number of hours per day.

A connection to public water or wastewater utility infrastructure is not required for the development. Water needs for construction activities will be low and limited to truck washing, wheel wash, dust suppression and sanitary facilities. Sanitary wastewater will be collected in portable toilets during construction. Disposal of sanitary wastes will be managed through a contract with a licensed waste contractor. During the operational phase, wastewater from welfare facilities on site, will drain to integrated wastewater holding tanks associated with the toilet units. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licenced waste facility for treatment and disposal. The volumes of wastewater requiring disposal are minimal and would have an imperceptible effect on the capacities of external treatment facilities.

During the course of the project, waste will be produced such as construction wastes and wastes from welfare facilities. The types of wastes to be generated will be similar to established construction waste streams and will not require unusual or new treatment options. Waste volumes will not be significant as to require new permitted treatment, storage and disposal facilities as there is sufficient capacity at existing licensed disposal or recycling

facilities in proximity to the proposed development. During the operational phase, minimal waste production is expected from the onsite operations and maintenance works

Overall no significant effects on the existing built services and waste infrastructure from the proposed development will occur during construction or operational phases.

3.11 Interaction of the Foregoing

There is potential for interactions between one aspect of the environment and another which can result in direct or indirect impacts, and which may be positive or negative.

While all environmental aspects can be inter-related to some extent, the following outlines the key potential interactions identified between each of the various environmental factors considered in this EIAR for both the construction and operational phases of the proposed Dernacart wind farm 110kV substation and grid connection. Where the potential for significant effects has been identified, the impacts have been avoided or reduced by mitigation measures, as outlined throughout the chapters of the EIAR.

A matrix has been generated to summarise the relevant interactions and interdependencies between specific environmental aspects (Refer to Table 7). It contains each of the environmental topics, which were considered as part of this environmental impact assessment, on both axes.

The most dynamic interaction and interdependencies relate to the connection between ecology, soils, and hydrology. Changes in site run-off from changes and removal of soil cover can result in effects or changes on hydrology, both in terms of water quality and hydraulic regime, which may result in secondary ecological effects on vegetation patterns and habitats and species. The relationship and effects of these aspects have been fully considered in Volume 2 Chapter 5 Biodiversity of the EIAR.

Table 7 Matrix of Impacts

	Major Interaction
	Minor Interaction
C	Construction Phase
O	Operation Phase

	Population & Human Health	Biodiversity	Water	Lands and Soils	Air Quality & Climate	Noise and Vibration	Landscape and Visual	Archaeology & Cultural Heritage	Material Assets – Traffic & Transportation	Material Assets – Built Services
Population & Human Health			C	C	C	C/O	C/O		C	O
Biodiversity			C	C		C/O			C	
Water	C	C		C					C	
Lands and Soils	C	C	C					C	C	
Air Quality and Climate	C								C	
Noise and Vibration	C/O	C/O							C	
Landscape and Visual	C/O							C		
Archaeology and Cultural Heritage				C			C			
Material Assets – Traffic & Transportation	C	C	C	C	C	C				
Material Assets – Built Services	O									