

Table 3-4 Comparison of environmental effects of the Proposed Project layout when compared to the chosen option.

Environmental Consideration	Initial Proposed Project Layout Iterations and all associated Infrastructure	Chosen Option of the Final 7 Turbine Layout and all associated Infrastructure
Population & Human Health (incl Shadow Flicker)	Likely potential for increased shadow flicker impacts on nearby sensitive receptors due to the increased number of turbines in Proposed Project Layout Iteration no. 2 (8 turbine layout). T2 in the 8 turbine layout considered as part of Design Iteration 2 is located c.235m from a dwelling. This would cause likely potential significant effects on residential amenity, with this exceeding the minimum 500m setback in the Guidelines (DoEHLG, 2006).	Likely potential for reduced shadow flicker impacts on nearby sensitive receptors due to the reduced number of turbines in Final 7 Turbine Layout in comparison to Proposed Project Iteration no. 2 (8 turbine layout). As detailed in Chapter 5, there is no potential for significant shadow flicker effects from the proposed turbines. Shadow flicker effects can be mitigated to meet threshold criteria. There is no potential for significant noise and vibration effects from the proposed turbines. Furthermore, noise emissions can be curtailed to meet threshold criteria. As detailed in Chapter 13, the landscape type and character of the area where the proposed turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate wind energy development. Of the 19 no. viewpoints (VPs) assessed, none were deemed significant. Visual effects will decrease with distance from the proposed turbines. Based on the assessment detailed in Chapter 5, Chapter 12, Chapter 13, and the mitigation measures proposed, there will be no significant effects on population and human health from shadow flicker and noise and vibration during the construction, operation and decommissioning phases of the Proposed Project.
Biodiversity (including Birds)	Larger development footprint would result in greater potential habitat loss in Proposed Project Layout Iteration no. 2 (8 turbine layout). Greater potential impact on identified sensitive ecological receptors due to location of	Smaller development footprint would result in reduced potential habitat loss when comparing to the Proposed Project Layout Iteration no. 2 (8 turbine layout). As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on

Environmental Consideration	Initial Proposed Project Layout Iterations and all associated Infrastructure	Chosen Option of the Final 7 Turbine Layout and all associated infrastructure
	infrastructure within designated set-back buffers for marsh fritillary and Annex 1 habitat in Proposed Project Iteration no. 1, 2, and 3.	biodiversity including bats and downstream aquatic receptors. The Proposed Project includes for a BMEP, providing a local boost to biodiversity. Please see Appendix 6-4 for details. As detailed in Chapter 7, the Collision Risk Assessment (CRA) indicated that the impact of the Proposed Wind Farm on birds corresponds to a Low - Very Low effect significance. With the implementation of the mitigation measures described in Chapter 7 Birds, the residual effects for collision risk are not significant.
Land, Soils & Geology	Greater potential impact on peat, topsoil, and subsoil due to location of infrastructure for Proposed Wind Project Layout Iteration no. 2 (8 turbine layout). Potential impact on identified peat, topsoil and subsoils is neutral for Proposed Project Layout Iteration no. 1 and 3 (7 turbine layout). Larger development footprint would result in greater volume of peat and spoil to be generated, excavated and sorted. Geotechnical investigations followed by careful design would lead to no significant environmental impacts. Potential for hydrological and ecological effects due to locations of peat and spoil management areas in Proposed Project Layout Iteration No. 3.	Reduced potential impact on peat, topsoil, and subsoil due to location of final 7 turbine layout infrastructure when compared to Proposed Project Layout Iteration no. 2 (8 turbine layout). Reduced development footprint when compared to Proposed Project Layout Iteration no. 2 (8 turbine layout) would result in reduced volume of peat and spoil to be generated, excavated and sorted. As detailed in the assessment in Chapter 8, peat, topsoil and subsoil excavation volumes will be managed within the Site, and the residual effects on peat, topsoil and subsoil are not significant. Geotechnical investigations followed by careful design will lead to no significant environmental impacts. Reduced potential hydrological or ecological effect due to refined locations of peat and spoil management areas in final Proposed Project layout. The peat and spoil management proposals discussed in Chapter 4 sets out the optimal treatment for peat and spoil excavated/generated on site without

Environmental Consideration	Initial Proposed Project Layout Iterations and all associated Infrastructure	Chosen Option of the Final 7 Turbine Layout and all associated infrastructure
		creating significant impacts for biodiversity, hydrology, land use etc.
Water	Larger development footprint would result in a greater potential for silt-laden runoff to enter natural watercourses adjacent to the Site for Proposed Project Layout Iteration no. 2 (8 turbine layout). Potential for runoff is neutral for Proposed Project Layout Iteration no. 1, 2 (7 turbine layout) and 3. Project specific drainage design removes the potential for significant environmental effects.	Smaller development footprint would result in a reduced potential for silt-laden runoff to enter natural watercourses adjacent to the Site for Final Proposed Project Layout in comparison to Proposed Project Layout Iteration no. 2 (8 turbine layout). Project specific drainage design removes the potential for significant environmental effects. As detailed in the assessment in Chapter 9 Water, no significant effects on surface water or groundwater quality will occur.
Air Quality	Increased potential for impacts on air quality due to increased vehicle emissions and dust emissions due to an increased volume of material and turbine component deliveries to the Site during the construction phase for Proposed Project Layout Iteration no. 2 (8 turbine layout). Air quality emission effects are neutral for Proposed Project Layout Iteration no. 1, 2 (7 turbine layout) and 3.	Decreased potential for impacts on air quality due to reduced vehicle emissions and dust emissions due to a reduced volume of material and turbine component deliveries to the Site during the construction phase for final Proposed Project layout when compared to Proposed Project Layout Iteration no. 2 (8 turbine layout). As detailed in Chapter 10, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality by during the operational phase.
Climate	A larger number of turbines could result in a greater amount of exhaust emissions from construction vehicles and plant and the transport of materials and workers to/from the Site for Proposed Project Layout Iteration no. 2 (8 turbine layout). A larger number of turbines could result in a higher MW output in the operational phase which would result in a greater amount of carbon savings for Proposed	A smaller number of turbines could result in a reduced amount of exhaust emissions from construction vehicles and plant and the transport of materials and workers to/from the Site for the final Proposed Project layout when compared to the Proposed Project Layout Iteration no. 2 (8 turbine layout). A smaller number of turbines could result in a lower MW output in the operational phase which would result in a smaller amount of carbon savings for the final Proposed Project layout in

Environmental Consideration	Initial Proposed Project Layout Iterations and all associated Infrastructure	Chosen Option of the Final 7 Turbine Layout and all associated infrastructure
	Project Layout Iteration no. 2 (8 turbines). Climate related emission effects (losses and savings) are neutral for Proposed Project Layout Iteration no. 1, 2 (7 turbine layout) and 3.	comparison to the Proposed Project Layout Iteration no. 2 (8 turbines). As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Project, 690,588 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 31.5MW clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in CAP25.
Noise & Vibration	A larger number of turbines could have a greater noise impact for Proposed Project Layout Iteration no. 2 (8 turbine layout), with T2 being within the minimum 500m setback in the Guidelines (DoEHLG, 2006). The noise impacts are neutral for Proposed Project Layout Iteration no. 1, 2 (7 turbine layout) and 3.	Potential for decreased noise levels at nearby sensitive receptors due to increased separation distance between sensitive receptors and turbine locations. Based on the assessment detailed in Chapter 12, there will be no significant effects on sensitive receptors during the construction, operational and decommissioning phases from the Proposed Project.
Landscape & Visual	A larger number of turbines could have a greater visual impact for Proposed Project Layout Iteration no. 2 (8 turbine layout). Greater potential impact on visual receptors due to location of infrastructure within designated setback buffers as set out in the Guidelines (DoEHLG, 2006) for Proposed Project Layout Iteration no. 2 (8 turbine layout)	A smaller number of turbines could have a reduced visual impact for the final Proposed Project layout in comparison to Proposed Project Layout Iteration no. 2 (8 turbine layout). The smaller number of proposed turbines layout ensures a setback in excess of the required setback set out in the Guidelines (DoEHLG, 2006). As detailed in Chapter 13, the landscape type and character of the area where the proposed turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate wind energy development. Of the 19 no. viewpoints (VPs) assessed, none were deemed significant.

Environmental Consideration	Initial Proposed Project Layout Iterations and all associated Infrastructure	Chosen Option of the Final 7 Turbine Layout and all associated infrastructure
Archaeology, Architectural and Cultural Heritage	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology for Proposed Project Layout Iteration no. 2 (8 turbine layout). Potential views of additional turbines increases the potential for indirect effects on the setting of monuments, as it is more likely that greater numbers of turbines will be seen from monuments for Proposed Project Layout Iteration 2 (8 turbine layout). The cultural heritage impacts are neutral for Proposed Project Layout Iteration no. 1, 2 (7 turbine layout) and 3.	Smaller development footprint would decrease the potential for impacts on unrecorded, subsurface archaeology for the final Proposed Project layout in comparison to Proposed Project Layout Iteration no. 2 (8 turbine layout). As detailed in the assessment in Chapter 14 (Archaeological, Architectural and Cultural Heritage), there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, and decommissioning phases. During the operational phase, there will be some not significant to moderate residual indirect effects on monuments and protected structures. However, in reality the effect will be less severe since the ZTV model does not take natural screening and buildings into consideration which will alleviate if not remove the impact on setting altogether. Archaeological monitoring under licence will be implemented during the construction phase.
Material Assets – Traffic and Transport	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials and turbine components for Proposed Project Layout Iteration no. 2 (8 turbine layout). Traffic impacts are neutral for Proposed Project Layout Iteration no. 3. Use of existing entrance at L15053 during the construction phase has the potential for greater traffic impacts for Proposed Project Layout Iteration no. 2.	Potential for reduced traffic volumes during construction phase due to smaller development footprint and requirement for less construction materials and turbine components for final Proposed Project layout in comparison to Proposed Project Layout Iteration no. 2 (8 turbine layout). As detailed in Chapter 15, there will be no significant effect on traffic volumes during the construction phase of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on site.

Environmental Consideration	Initial Proposed Project Layout Iterations and all associated Infrastructure	Chosen Option of the Final 7 Turbine Layout and all associated infrastructure
Material Assets-Utilities, Waste Management, Telecommunications and Aviation	No material difference between the Proposed Project layout Iteration no. 1, 2 and 3 for gas, water, waste management, telecommunications and aviation.	No material difference between the final Proposed Project layout Iteration no. 1, 2 and 3 for gas, water, waste management, telecommunications and aviation.
Vulnerability to Major Accidents Natural Disasters	A larger number of turbines could have a greater potential risk relating to major accidents and natural disasters for Proposed Project Layout Iteration no. 2 (8 turbine layout) due to increased land disturbance and larger excavation footprint. Impacts from major accidents and natural disasters are considered to be neutral for Proposed Project Layout Iteration no. 1 and 2 (7 turbine layout) and 3.	A smaller number of turbines could have a greater potential risk relating to major accidents and natural disasters for final Proposed Project Layout in comparison to Proposed Project Layout Iteration no. 2 (8 turbine layout) due to reduced land disturbance and smaller excavation footprint. As detailed in Chapter 16 the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low'. The highest risk scenarios to the Proposed Project (i.e., contamination and fire/explosion) are considered to be unlikely to occur at any phase of the Proposed Project. A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Section 16.4.1.6 of Chapter 16 of this EIAR.

3.2.6.3 Alternative Access Track Layout

Access tracks are required onsite in order to enable transport of infrastructure and construction materials within the Site to facilitate the Proposed Wind Farm and Proposed Grid Connection. Such tracks must be of a gradient and width sufficient to allow safe movement of equipment and vehicles. Approximately 3.7km of new access tracks are required for the Proposed Project along with approximately 772m of upgrade of existing local road (L15053) and approximately 2.75km of upgrade of existing site access tracks. Approximately 615m of temporary construction tracks are also proposed as part of the Proposed Project. These temporary construction tracks will be used for the delivery of abnormal loads and construction traffic during the construction phase and will be reseeded following the construction phase.

As the turbine layout was finalised, the most suitable routes between each component of the Proposed Project were identified, taking into account the shortest routes and existing tracks and filtering out the physical and environmental constraints of the Proposed Wind Farm and Proposed Grid Connection and the associated buffers, and utilising the most efficient route between turbines in order to minimise the footprint. Additionally, turning areas, temporary widening and temporary access tracks were

designed and sited for minimum environmental effect along internal tracks as part of the final design, i.e. Proposed Project Layout Iteration No. 4.

An alternative option to making use of the existing access track network where possible within the Site would be to construct all new tracks, having no regard to existing public roads or tracks. This approach was not favoured, as it would require unnecessary disturbance to the Site and create the potential for additional cut and fill material to be used in the construction of new tracks.

An alternative option to the temporary construction tracks within the Site would be to retain all of these tracks as part of the permanent footprint. This approach was not favoured as it would require unnecessary disturbance to the Site, increase the overall permanent footprint and create the potential for additional cut and fill material to be used in the construction of new permanent tracks.,

3.2.6.4 Alternative Borrow Pit Option

The use of an onsite borrow pit represents an efficient use of existing onsite resources and reduces the need to transport large volumes of construction stone materials along the local public road network to the Site. The use of an onsite resource, that would only be developed for the Proposed Project reduces the use of off-site existing quarry material assets.

A review of potential construction phase borrow pit locations was carried out by geotechnical experts, Hydro Environmental Services and Fehily Timoney. Site surveys were undertaken and existing GIS data and environmental constraints were also considered, namely aerial photography, soil and subsoil cover, biodiversity (habitats), on site drainage, proximity to the existing and proposed internal track network, and proximity to sensitive properties. Arising from this process, 2 no. trial pit locations and 1 rotary corehole were selected at the potential borrow pit location.

The findings of these geological site investigations concluded in the identification of 1 no. borrow pit within the Site with a potential of providing 16,000m³ of construction stone material for the Proposed Project. Please see Figure 4-1 for borrow pit location and Figure 4-11 for cross section details. The extraction of material from the borrow pit will be during the construction phase of the Proposed Project only and will be a temporary operation carried out over a short period of time. Rock breaking and blasting are potential methods of extracting material from the borrow pit. Processing and crushing of stone material will also be required at the borrow pit to achieve the grading requirements for use in construction. The estimated maximum volume to be extracted from the borrow pit for the Proposed Project is up to 16,000m³ with an additional 61,200m³ to come from licenced quarries. The final volumes to be removed from the borrow pit will be confirmed at the time of construction and following detailed pre-construction site investigation works. There are approx. 6 no. licenced quarries located within 20 km of the Site which have been selected for the purposes of assessment throughout this EIAR.

An alternative to using an on-site borrow pit was the option of sourcing all stone and materials from a licensed quarry or quarries in the vicinity of the Site. The movement of the volume of material required for the construction of 7 no. turbine wind farm would result in a significant increase in construction traffic and heavy loads, in combination with a potential for an increase in noise and dust emissions along the haul routes and was therefore considered a less preferable option. The cost of importing the required volume of crushed stone was also a factor in choosing to obtain stone from an on-site borrow pit.

A comparison of the potential environmental effects when comparing the sourcing of all stone from local, off-site quarries against the chosen option (is presented in Table 3-5 below.

Table 3-5 Comparison of environmental effects of sourcing all materials off site when compared against the chosen option – onsite borrow pit and offsite quarries.

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pit along with offsite quarries
Population & Human Health (incl. Shadow Flicker)	Potential for increased vehicular, noise and dust emissions from increased traffic movements, due to the volume of rock to be transported to the site along the public road network, which could be a disturbance to local residents along the haul route.	Lower dust and noise emissions, and traffic volumes due to reduced requirement for daily HGV presence on site during the construction phase. Temporary dust and noise emissions related to borrow pit extraction however, due to vegetation screening and distance from sensitive properties, the residual effects are not significant.
Biodiversity & Birds	Reduced habitat loss and ground disturbance for flora, fauna and birds.	Increase in habitat loss due to borrow pit footprint however, as assessed in the Chapter 6 Biodiversity, this habitat loss will be offset through enhancement proposals proposed onsite. Furthermore, the borrow pit will be left to naturally revegetate post construction. The Proposed Project includes for a biodiversity enhancement proposal providing a local boost to biodiversity. Please see Appendix 6-4 for details.
Land, Soils & Geology	Slight reduction in peat and spoil to be excavated, however, additional peat and spoil management areas would be required as an on-site borrow pit would not be available for the placement of excavated peat and spoil. No Material difference between the two options in relation to geotechnical and stability concerns. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.	Reduction in requirement for peat and spoil management areas. No Material difference between the two options in relation to geotechnical and stability concerns. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.
Hydrology and Hydrogeology	No Material difference between the two options.	No Material difference between the two options.
Air Quality	Potential for increased vehicular and dust emissions from increased traffic movements within the site, due to the volume of rock to be excavated.	More ground disturbance due to onsite borrow pit which can give rise to dust emissions however, lower traffic volumes arriving and departing site per day and reduced onsite traffic volumes therefore reducing dust and noxious emissions overall.

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pit along with offsite quarries
Climate	There is no material difference on climate between either option.	There is no material difference between either option.
Noise & Vibration	Increased potential for noise and vibration effects on local sensitive receptors due to arrival and departure of heavy goods vehicles during the construction phase. Reduced potential for noise and vibration effects on local sensitive properties due to no breaking or crushing of materials won from onsite borrow pit.	Increased noise and vibration effects on local sensitive properties due to breaking or crushing of materials won from onsite borrow pit.
Landscape & Visual	Reduced landscape and visual effects temporarily as no open rock face would be visible from certain viewpoints. Increased visual impact due to frequent arrival and departure of HGVs to and from the Site.	Potential for increased landscape and visual effects temporarily due to open rock face which may be visible from certain viewpoints. However, there would be a reduced HGV presence on site and on the local road network as a portion of the materials will be won onsite. Furthermore, the borrow pit will be reinstated onsite once exhausted.
Cultural Heritage & Archaeology	Slightly smaller development footprint would reduce the potential for impacts on unrecorded, subsurface archaeology.	Slightly larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.
Material Assets	Significantly higher HGV traffic volumes on the public road network during construction phase due to the volume of crushed stone required to be transported to the site and empty HGVs leaving the site. No material difference between the two options in potential for impact on waste management, telecoms, aviation, electricity, water or gas.	Reduced volume of HGVs traffic volumes on the public road network during construction as a considerable portion of materials will be won on site. Decreased potential for noise, dust and emissions due to the reduced volumes of HGV traffic on the roads. No material difference between the two options in potential for impact on waste management, telecoms, aviation, electricity, water or gas.
Vulnerability to Major Accidents Natural Disasters	No Material difference between the two options	No Material difference between the two options

3.2.6.5

Alternative Biodiversity Management and Enhancement Proposals

Similar to the Proposed Project, the proposed enhancement measures were subject to an iterative design process. The Proposed Project will result in a loss of linear habitats and scrub, see Chapter 6

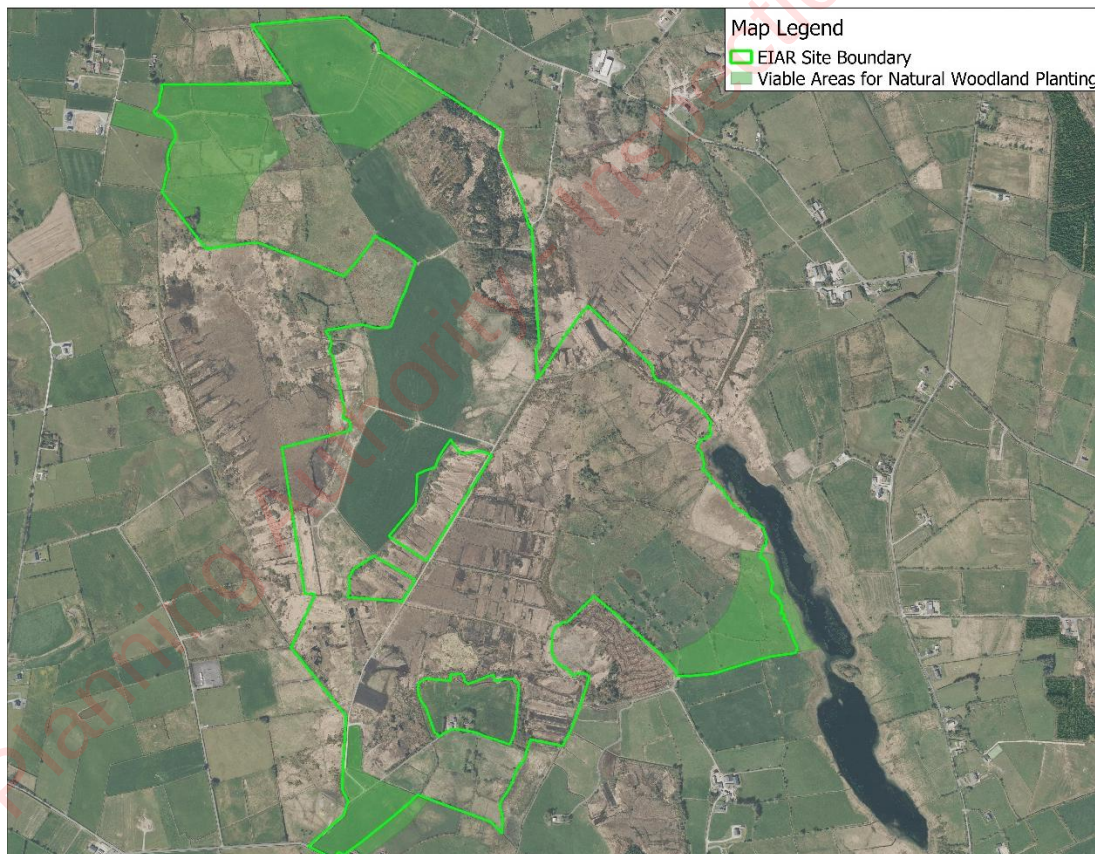
Biodiversity for further details. The loss of any key habitats will be offset through a BMEP (further detailed in Appendix 6-4).

To choose what habitats to enhance/mitigate, consideration was given to species and habitat relevant to the Site. Potential effects on Annex II species including marsh fritillary were a key consideration of the design of the Proposed Project. Cumulative effects on bat species were also a key consideration in the design and assessment of the Proposed Project, with findings from bat surveys (see Chapter 6 Biodiversity) also being incorporated into the BMEP.

Proposed Enhancement Site Iteration No. 1

Desk-based studies and site surveys identified that many habitats within the Site have potential for inclusion in the BMEP for the Proposed Project. Figure 3-8 presents the initial broad areas within which potential habitat enhancement opportunities were identified and assessed, with a large viable area for woodland planting being identified. The primary objective of these areas was to improve existing habitat conditions, as well as create new suitable woodland and treeline habitats. Following further detailed surveys, assessment and landowner constraints; the final enhancement measures were refined and is detailed further below.

Figure 3-8 Proposed Enhancement Site Iteration No. 1- Viable Areas for Natural Woodland Planting



Proposed Enhancement Site Iteration No. 2

The final iteration of the enhancement measures shown in Figure 3-7 outlines refinements to the proposed biodiversity management and enhancement areas following ecological assessment, including bat surveys. Following dedicated marsh fritillary surveys being carried out at the Site, an area of marsh fritillary enhancement was selected as part of the final enhancement proposals. The BMEP includes

areas within the Site to be managed for marsh fritillary supporting habitat, linear planting of treeline/hedgerow and natural broadleaved woodland planting which will support lots of species.

The final enhancement measures have been constraints and facilitators led in their design. Full details are included in Appendix 6-4 BMEP.

3.2.6.6 **Alternative Turbine Component Delivery Option**

With regard to the selection of a transport or haul route to the Site, alternatives were considered in relation to ports of entry, turbine components, general construction-related traffic, and site access locations.

3.2.6.6.1 **Alternative Ports of Entry**

The ports considered for the port of entry of wind turbine components into Ireland for the Site include, Dublin Port, Shannon-Foynes Port, County Limerick, Cork and the Port of Galway. Shannon Foynes Port is the principal deepwater facility on the Shannon Estuary and caters for dry bulk, break bulk, liquid, and project cargoes. The Port of Galway also offers a roll-on roll-off procedure to facilitate import of wind turbine components. All of the aforementioned ports have been used for the importing of turbine components. As stated, all ports mentioned above have a proven track record in the handling and subsequent transport of large turbine components. The final selection will be driven by commercial, availability and scheduling considerations. There are clear access routes for all four ports utilising the motorway network to the proposed haul route to the Site. For the purpose of this EIAR, the Port of Galway, Co. Galway was selected as the port of entry for the proposed turbines as it is located closer to the Site, therefore reduces the amount of temporary accommodation requirements on the transport route and has been assessed in detail in Chapter 15 of this EIAR.

3.2.6.6.2 **Alternative Component Delivery Route**

The Site is located approx. 7km west of the N17 and, as such, delivery of turbine components from this direction were considered as part of the iterative design process for the Proposed Project.

Key considerations in determining the turbine delivery route are road widening requirements, modifications to street furniture, vertical alignment of roads, and structural assessments of road infrastructure due to the abnormal loads of wind turbine components.

Alternatives routes were considered that required a varying degree of widening and accommodation works. An initial Primary Route Assessment was undertaken to assess route options between Galway Port and the Site. Four route options A to D were assessed which consisted of the following:

- i. Route Options A: N83, N17 and N60 national roads and the local road network
- ii. Route Option B: N83, N17 and N60 national roads and the local road network
- iii. Route Option C: N83, N17 and thereafter the regional and local road network
- iv. Route Option D: M6, M17, N17 and thereafter the regional and local road networks.

Please see Figure 3-9 below where each option considered is illustrated.

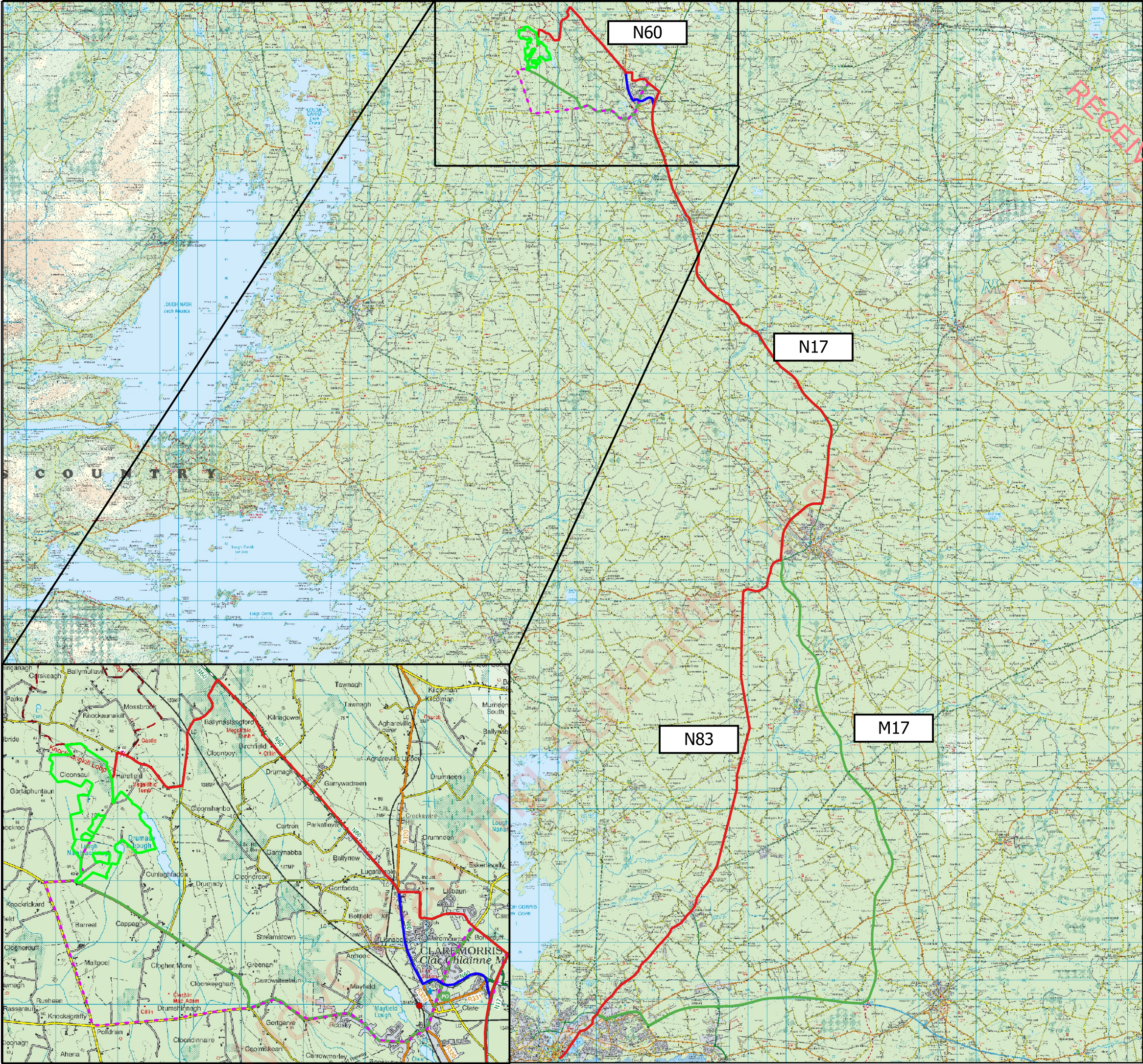
Route Option D was the preferred option brought forward for assessment. After review by the Traffic Consultant and subsequent autotrack assessment, it was concluded that Route Option D will require minimal accommodating works and minimal third party landtake to facilitate the delivery of abnormal loads to the Site. Furthermore, it has a lower potential for traffic disruption and noise emissions due to the route passing through less towns and villages due to use of the motorway network. Therefore, the optimal delivery route is one that utilises the M6, M17 and the N17 and consequently, alternative component delivery routes from the motorway to the site were not investigated further.

As per the assessment in Chapter 15, the turbine delivery route has been subject to an autotracks assessment which show that significant accommodation works are not required along the delivery route itself, and the proposed new construction entrance off the L1505 is sufficient for the delivery of abnormal loads.

All construction traffic will use designated haul routes only, as agreed with the local authority. An alternative to this would be to allow for more direct access to the Site using multiple approach routes; however, this is more likely to give rise to additional traffic and road impacts.

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. As detailed in Section 15.1 of this EIAR, turbine blades will be delivered to the Site using a Super Wing Carrier and Blade Lifter Trailer. When considering turbine transport routes, alternative modes of transport were also considered. Depending on the selected turbine delivery route and the turbine manufacturer, a blade adapter or blade transporter may also be used, if deemed appropriate, for delivery of turbines to the Site.

It should be noted that all component deliveries (abnormal loads) will be undertaken as described in the Traffic Management Plan which will be submitted and agreed with the local authorities and roads authorities upon consent of this application. All component deliveries will be subject to garda escort. All manoeuvres around junctions and into site entrances will be supervised by a qualified team of turbine delivery experts. The proposed new construction site entrance will facilitate the delivery of abnormal loads, with traffic management measures being implemented at the construction site entrance for the duration of the construction phase. Following the construction phase, this entrance will be reseeded or left to revegetate, as appropriate. However, should replacement components be required, this entrance will be temporarily reinstated to facilitate such works. Please see Section 15.1 of Chapter 15 Material Assets for further details.



Map Legend

- EIAR Site Boundary
- Haul Route Option A
- Haul Route Option B
- Haul Route Option C
- Haul Route Option D (Final Turbine Delivery Route)



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Drawing Title
Alternative Turbine Delivery Route Options

Project Title
Proposed Cunlaghfadda Green Energy Project

Drawn By JA	Checked By NS
Project No. 220825	Drawing No. Figure 3-9
Scale 1:195,000	Date 2026-03-30



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3.2.6.6.3 **Alternative Site Access Points**

Construction Site Entrances

As detailed in Section 3.2.5.2.2 above, 2 no. construction site entrances were assessed as part of the iterative design process: the existing junction on the L1505/L15053 local road in the south of the site and a new construction site entrance along the L1505 local road for abnormal loads, Heavy Goods Vehicles (HGVs) and construction phase vehicles.

Other existing site entrances to the Site were located off the L5536 and L15052 local roads. However, these were deemed unsuitable for construction traffic due to the proximity to residential properties and the potential for construction traffic to give rise to potential dust, noise and traffic impacts. Therefore, these site access points were not considered further for construction site access.

Upon review by the traffic and transport subconsultant, the existing site entrance on the L15053 local road was deemed inappropriate due to poor visibility to the west resulting in inadequate sightlines. Therefore, a new temporary site entrance was proposed along the L1505 local road which would have traffic management measures in place for the duration of the construction phase. This site entrance will be temporary and will be reseeded or left to revegetate, as appropriate, following the construction phase. Should this site entrance be required for works associated with the operational phase, such as blade replacement, or decommissioning phases, this site entrance can be reinstated.

An autotrack assessment confirmed the suitability of the proposed new site access off the L1505 for all HGVs, construction traffic vehicles, and abnormal load entry. Land take requirements were identified with minimal environmental impacts associated. As noted above, this site entrance will be temporary in nature and will only be used for the duration of the construction phase.

Operational Phase Site Access

Operational traffic will enter the site from the L1505 road, along the existing L15053 local road which is proposed to be upgraded as part of the Proposed Project, with operational traffic travelling for approximately 865m before reaching the operational site entrance.

There are a number of existing access points to the Proposed Project. These comprise private farm access points off the L15053, L15052 and the L5536 local roads. An initial review of these existing locations was carried out to identify the most suitable locations for wind farm operation site entrances.

Given the fact that the L15053 local road is proposed for upgrade, it was deemed most appropriate for operational traffic to enter the site through this access point, with a new operational site entrance being constructed c.850m north of the L15053 local road. This new operational site entrance will be used by maintenance staff of the Proposed Wind Farm and Proposed Grid Connection.

3.2.6.7 **Alternative Design of Ancillary Structures**

The ancillary structures required for the Proposed Project include the underground electrical cabling, meteorological mast and temporary construction compounds. The siting of these structures, and detail around any considered alternatives, has been summarised below.

3.2.6.7.1 **Alternative Internal Site Cabling Route**

The internal 20kV/33kV underground cabling route will follow the internal access track network throughout the Site, connecting all 7 no. turbines to the proposed onsite 110kV substation. While this means that a longer cabling route will be needed, it was considered the more environmentally prudent option. The alternative to this would be to lay the cables 'as the crow flies' between the turbines and the

proposed onsite 110kV substation, however, this would lead to a greater environmental disturbance and a greater volume of peat and spoil generated.

3.2.6.7.2 **Alternative Meteorological Mast Location**

The meteorological mast is located in the west of the Site. While other locations to situate the proposed met mast within the Site were examined, the chosen location was deemed to be most suitable due to the low ecological value of the habitat.

3.2.6.7.3 **Alternative Temporary Construction Compounds Location**

The temporary construction compounds will be used for the storage of all construction materials, turbine components, staff facilities and car-parking areas for staff and visitors. The use of two temporary construction compounds was deemed preferable to the alternative of a single large compound. Principally, it will result in shorter distances for traffic movements within the Site during construction. As the Proposed Project layout became more defined, the temporary construction compounds were sited to facilitate the most efficient flow of construction processes within the Site, with a slightly larger footprint being proposed as part of the final design iteration for both the construction compound for the Proposed Wind Farm and the Proposed Grid Connection (please see Section 3.2.6.2.1 above – Proposed Project Layout Iteration no. 4).

The temporary construction compounds are located strategically within each section of the Site to facilitate the construction of the various infrastructure components and to avoid sensitive habitats and other onsite constraints as identified in Section 3.2.6.2.1 above. As a result, vehicle emissions and the potential for dust arising will be reduced and the proposed 2 no. temporary construction compounds will have no impact on sensitive ecological habitat or other identified onsite constraints.

3.2.7 **Alternative Grid Connection Design Options**

3.2.7.1 **Proposed Grid Connection Iteration No. 1**

The Megawatt (MW) output of the Proposed Wind Farm, being over 10MW, is such that it must connect into a 38kV or 110kV substation. The optimal connection voltage (be that at 38kV or 110kV) can then subsequently be assessed given both the configuration of the substation as well as the practicalities of making the electrical connection (outages, space restrictions etc). Within a 15km radius of the Site, there is only one existing 110kV substation, Dalton 110kV substation, located to the east of Claremorris town as well as Claremorris 38kV substation.

Initial grid studies, undertaken by the Applicant, did not consider Claremorris 38kV substation further due to it being decommissioned in 2010. The existing Dalton 110kV substation was considered as a viable option, notwithstanding the requirement for ESB Networks to upgrade two existing transformers within the 110kV substation – so as to provide the requisite additional grid capacity for the Proposed Project. As these works pertain to existing electrical infrastructure, within an operational ESB Networks substation, they would likely be deemed exempted development. However, their replacement works would lead to short term electrical outages and general disruption in the substation. These would not be deemed overly restrictive, but merely considerations, and thus a connection to Dalton was deemed viable. Two potential underground grid connection cabling routes from a proposed onsite 38kV substation (as per Layout Iteration 2) to the existing Dalton 110kV Substation were considered and assessed to identify the most viable option. Please refer to Figure 3-4 above for the initial 38kV underground grid connection routes considered throughout the design process.

A key consideration in determining the grid connection method for a proposed wind energy development is whether the cabling is underground or run as an overhead line. An alternative to the two proposed 38kV underground grid connection routes would be to construct an overhead line from the proposed onsite 38kV substation to the existing Dalton 110kV substation. While overhead lines are

less expensive and allow for easier repairs when required, underground cabling will have no visual impact. For this reason, it was considered that an underground grid connection would be a preferable alternative to overhead lines. The Guidelines (DoEHLG, 2006) also indicate that underground cables are the preferred option for connection of a wind energy development to the national grid. Please see sections below for a description of the two underground grid connection route options considered.

38kV Underground Grid Connection Route A

An initial route was identified from a proposed 38kV onsite substation to the existing Dalton 110kV substation. This proposed 38kV underground grid connection route would be entirely located within the public road network, as shown in Figure 3-4. This route was approximately 13.5km long and involved the crossing of 4 no. mapped EPA watercourses and the Irish Rail Westport-Dublin rail line at 1 no. location. The Irish Rail crossing is over a humpback road bridge of regional importance in the National Inventory of Architectural Heritage (NIAH) (Reg no. 31310107) and was identified as a potential cultural heritage constraint on the route. The route travels along local, regional and national roads from the Site before approaching the existing Dalton 110kV substation from the north.

38kV Underground Grid Connection Route B

An alternative 38kV underground grid connection route was also identified to the Dalton 110kV Substation. This route was entirely located within the public road network, as shown in Figure 3-4. This route was approximately 13km long and did not include any EPA watercourse crossings, however there would be requirement to cross the Irish Rail Westport-Dublin rail line at 1 no. location. The route travels along local and national roads from the Site before approaching the existing Dalton 110kV substation from the north.

Following an informal scoping exercise being carried out for the Proposed Project, a response was received from Irish Rail specifying that should the Proposed Grid Connection involve crossing of the railway network, legal and technical consent would be required from CIE and Irish Rail. This was considered to be a potential constraint.

After further review, it was determined that due to the length of both 38kV underground grid connection routes to Dalton 110kV Substation, number of watercourse crossings, requirement for consent from CIE and Irish Rail and NIAH structures present along the grid connection route, it would be more appropriate to seek out a route that was shorter in length and was not as environmentally constrained. Another consideration that was made was the close proximity of both grid connection options to Claremorris and potential impacts that the construction phase would have on local road users and sensitive receptors. As such, an alternative grid connection option was sought that would avoid traversing through Claremorris.

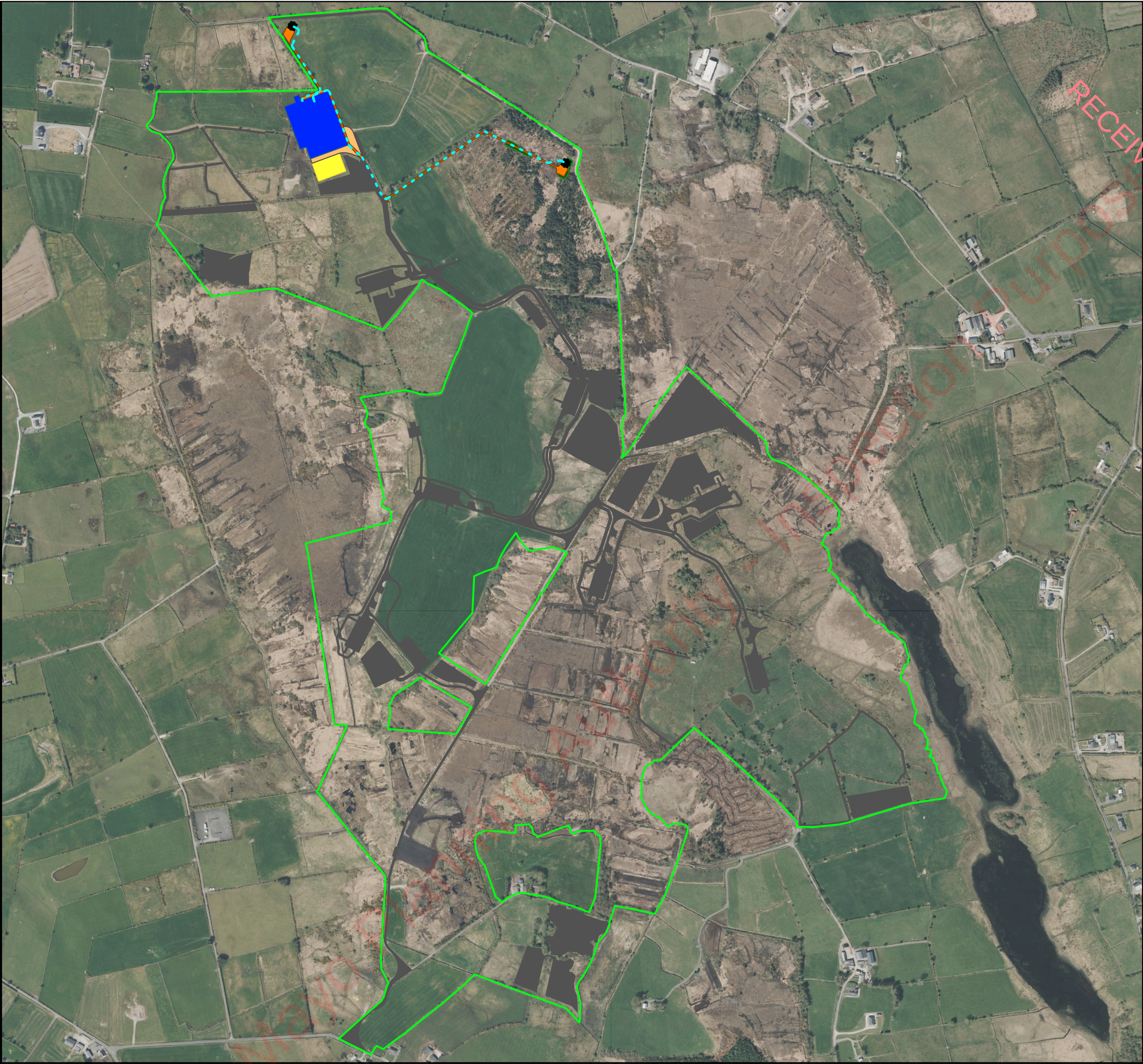
Further to advice from Grid Technical Experts, it was deemed that the most viable option to connect the Proposed Wind Farm to the national grid would be through a loop-in connection into the existing Cloon- Castlebar 110kV OHL located within the Site. This involved replacement of the initial proposed 38kV substation, with a 110kV loop-in substation being required on site to facilitate this grid connection. See Section 3.2.7.2 below for further detail.

3.2.7.2 **Proposed Grid Connection Iteration No. 2 – Final Design**

As part of Proposed Grid Connection Iteration No. 2, it is intended to connect the Proposed Wind Farm to the national grid via a new onsite 'loop-in' 110kV substation connected to the nearby Cloon to Castlebar 110kV overhead transmission line. This will be connected via approximately 982 metres (m) of underground cabling route which will run in a north-eastward direction from the proposed onsite 110kV substation through agricultural land to the existing overhead line. The existing overhead line will be broken by 2 no. end masts (lattice type towers) to facilitate the connection to the Proposed Wind Farm. Please see Figure 3-10 below.

Given the close proximity of the Cloon to Castlebar 110kV OHL and how it intersects the northern section of the Site, this grid connection option is the most optimal national grid connection point when considering the initial grid connection design involving a 38kV grid connection. The proposed 110kV underground grid cabling route is c. 982m long and located entirely within private land within the Site for which the necessary agreements are in place, thus minimising any impacts on local road users during the construction phase.

Based on the findings of the multi-disciplinary site visits, the Proposed Grid Connection was designed to minimise any effects on ecological habitats on site, with consideration being made to minimise the loss of hedgerow and treeline. A full comparison of Iteration No. 1 and 2 can be seen in Table 3-6 below.



Map Legend

- EIAR Site Boundary
- Proposed 110kV Substation
- Proposed Temporary Construction Compound
- Proposed 110kV Underground Grid Connection
- Proposed End Masts
- Proposed Felling
- Proposed Temporary Construction Tracks
- Proposed New Tracks
- S34 Infrastructure

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Drawing Title
Proposed Grid Connection Iteration 2- Final Design

Project Title
Proposed Cunlaghfadda Green Energy Project

Drawn By NS	Checked By RK
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Project No. 220825	Drawing No. Figure 3-10
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Scale 1:8,000	Date 2026-05-02
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Table 3-6 Comparison of environmental effects when compared against the chosen option (Grid Connection)

Environmental Consideration	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route A – 13.5km	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route B – 13km	Proposed Grid Connection Layout Iteration 2- Final Design – 982m
Population & Human Health	Potential for temporary visual impact for a longer construction phase considering the longer underground grid cabling route for Proposed Grid Connection Layout Iteration 1 (Route A- 13.5km), from presence of plant machinery onsite during the construction period. Potential for temporary noise and dust impacts for a longer construction phase considering the longer underground grid cabling route, from plant machinery onsite during construction phase. No potential for permanent visual impacts from 13.5km grid route as it will all be contained underground.	Potential for temporary visual impact for a longer construction phase considering the longer underground grid cabling route for Proposed Grid Connection Layout Iteration 1 (Route B-13km), from presence of plant machinery onsite during the construction period. Potential for temporary noise and dust impacts for a longer construction phase considering the longer underground grid cabling route, from plant machinery onsite during construction phase. No potential for permanent visual impacts from 13km grid route as it will all be contained underground.	Potential for temporary visual impact for a shorter construction phase considering the shorter route (982m), from presence of plant machinery onsite during the construction period when compared against Proposed Grid Connection Layout Iteration 1 Routes A and B. Potential for temporary noise and dust impacts for a shorter construction phase considering the shorter underground grid cabling routes for both from plant machinery onsite during construction phase. Potential for permanent visual impacts due to 2 new proposed tower masts required.
Biodiversity (including Birds)	Low potential for impact on sensitive ecological receptors during the construction phase as Proposed Grid Connection Layout Iteration 1 Route A does not pass through any designated site or habitat of ecological importance.	Low potential for impact on sensitive ecological receptors during the construction phase as Proposed Grid Connection Layout Iteration 1 Route B does not pass through any designated site or habitat of ecological importance.	Low potential for impact on sensitive ecological receptors during the construction phase as Proposed Grid Connection Layout Iteration 2 does not pass through any designated site or habitat of ecological importance. Potential for collision risk due to presence of permanent end masts.

Environmental Consideration	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route A – 13.5km	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route B – 13km	Proposed Grid Connection Layout Iteration 2- Final Design – 982m
			Additional habitat loss with footprint of end masts.
Land, Soils, & Geology	Greater volume of earthworks required due to longer route (13.5km). This underground cabling route option is entirely proposed within the public road corridor.	Greater volume of earthworks required due to longer route (13km). This underground cabling route option is entirely proposed within the public road corridor.	Lower volume of earthworks required due to the shorter route of Proposed Grid Connection Layout Iteration 2 (982m). This underground cabling route option is entirely proposed within private land. The peat and spoil management proposals discussed in Chapter 4 sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.
Water	Greater potential for impacts on hydrology due to the proposed 4 no. EPA mapped watercourse crossings.	Neutral- no EPA mapped watercourse crossings proposed.	Neutral- no EPA mapped watercourse crossings proposed.
Air Quality	As a result of the longer route (c.13.5km), this option has a greater potential for effects from dust, and vehicle emissions during construction.	As a result of the longer route (c. 13km) this option has a greater potential for effects from dust, and vehicle emissions during construction.	As a result of the shorter route, (c. 982m) this option has a lower potential for effects from dust, and vehicle emissions during the construction phase.

Environmental Consideration	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route A – 13.5km	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route B – 13km	Proposed Grid Connection Layout Iteration 2- Final Design – 982m
Climate	As a result of the longer route (c.13.5km), this option has a greater potential to result in increased vehicle emissions during the construction phase.	As a result of the longer route (c. 13km), this option has a greater potential to result in increased vehicle emissions during the construction phase.	As a result of the shorter route, (c.982m) this option will likely result in fewer vehicle emissions during the construction phase when compared to Proposed Grid Connection Layout 1 (Route A and B).
Noise & Vibration	Greater potential for noise and vibration impacts on nearby sensitive receptors during the construction phase due to the longer route (c.13.5km). This option is located on the outskirts of Claremorris (c. 1.2km from the town centre) and therefore would have an impact on local sensitive receptors.	Greater potential for noise and vibration impacts on nearby sensitive receptors during the construction phase due to the longer route (c.13km). This option is located on the outskirts of Claremorris (c. 1.2km from the town centre) and therefore would have an impact on local sensitive receptors.	Lower potential for noise and vibration impacts on nearby sensitive receptors during the construction phase due to the shorter route (c.982m). This option does not pass through any villages or settlements, with the entire grid connection route and proposed infrastructure being confined to the Site. Therefore, there would be an impact on fewer sensitive receptors in comparison to Proposed Grid Connection Iteration 1 (Route A and B).
Landscape and Visual	Decreased potential for permanent landscape and visual impact due to no end masts structures proposed, in addition to reduced footprint of 38kV onsite substation.	Decreased potential for permanent landscape and visual impact due to no end masts structures proposed, in addition to reduced footprint of 38kV onsite substation.	Increased potential for permanent landscape and visual impact due to the presence of 2 new masts structures, in addition to larger footprint of 110kV onsite substation.
Archaeology, Architectural	Increased potential effect for impacts on cultural heritage or archaeology due to underground grid cabling route crossing	Lower potential effect for impacts on cultural heritage or archaeology due to all	Greater potential for impacts on cultural heritage or archaeology due to the route proposed utilising private land, this being

Environmental Consideration	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route A – 13.5km	Proposed Grid Connection Layout Iteration 1- 38kV Underground Grid Cabling Route B – 13km	Proposed Grid Connection Layout Iteration 2- Final Design – 982m
and Cultural Heritage	over a NIAH humpback bridge (Reg no. 31310107).	infrastructure being proposed within the curtilage of the public road network.	improved grassland, therefore, greater potential to impact on undiscovered subsurface features if present.
Material Assets	Proposed Grid Connection Layout Iteration 1 underground grid cabling Route A measures c.13.5km in length and is located in the public road corridor. The route follows local, regional and national roads. This would likely result in greater traffic volumes considering the level of traffic using local, regional and national roads, and due to the longer length (c.13.5km) of the route. Likely negative impact on Irish Rail network with crossing of Westport-Dublin railway required. No material difference in potential for impact on utilities, waste management, telecoms, aviation.	Proposed Grid Connection Layout Iteration 1 underground grid cabling Route B measures c.13km in length and is located primarily in the road corridor. The route follows local roads and regional roads. This would likely result in greater traffic impacts considering the level of traffic using local roads and regional roads, and due to the longer length (c.13km) of the route. Likely negative impact on Irish Rail network with crossing of Westport-Dublin railway required. No material difference in potential for impact on utilities, waste management, telecoms, aviation.	Proposed Grid Connection Layout Iteration 2 underground grid cabling route measures approximately 982m in length and is located entirely within private land in the Site. This would likely result in lower potential for traffic impacts due to the shorter grid connection route associated. No impact on Irish Rail network as no crossing of Westport-Dublin railway required. No material difference in potential for impact on utilities, waste management, telecoms, aviation.
Vulnerability to Major Accidents Natural Disasters	No material difference between the two options.	No material difference between the two options.	No material difference between the two options.

3.2.7.3 Alternative Substation Location

A 38kV onsite substation was initially proposed at the Site as part of Proposed Grid Connection Layout Iteration No. 1, with the location of the proposed substation being in the east of the Site. The location of the 38kV onsite substation was selected based on a review of constraints on site and proximity to the existing road network. The location selected was deemed most appropriate, allowing the 38kV underground grid cabling route to be located entirely within the existing road network thus minimising environmental effects and excavated peat and spoil.

As discussed in the preceding section 3.2.6.2, a 110kV loop-in grid connection was pursued following a detailed review of the 38kV grid connection options available at the Site, and an alternative grid connection layout was chosen. Because of this, a larger footprint was required for a 110kV substation in comparison to the previous 38kV substation proposed as per Proposed Project Layout Iteration No. 2 discussed in Section 3.2.6.2, with an alternative location also being proposed to minimise length of underground grid connection to the existing Cloon to Castlebar 110kV OHL. The new location proposed is in the northwest section of the site.

This location was deemed to be suitable due to low value ecological habitats it is located on, proximity to the Cloon to Castlebar 110kV OHL to facilitate the connection of the Proposed Wind Farm to the national grid, and the existing ground conditions.

3.2.8 Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the Proposed Project's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas and geotechnically unstable areas of the Site limits the potential for environmental effects. As noted above, the layout aims to avoid any environmentally sensitive areas. Where loss of habitat occurs in the Site, this has been mitigated with the proposal of habitat enhancement and improved habitat connectivity with hedgerow replanting on the Proposed Wind Farm.

It is proposed to plant and enhance approximately 2.5km of hedgerow/ treeline within the Site in order to replace the linear habitats which are proposed to be removed in order to facilitate the Proposed Project. The planting of hedgerow/ treeline was deemed necessary in order to replace the habitat, which is being lost, however additional enhancement measures have been put in place to ensure a net gain of biodiversity on the Site, including the planting of a 3.5ha of native broadleaved woodland in addition to the 2.5km of hedgerow/ treeline planting and enhancement noted previously. Furthermore, there is an area of marsh fritillary enhancement proposed (c. 1.16 ha) as part of the enhancement proposals for the Proposed Project. These replanting and enhancement measures will have a long-term slight positive effect on biodiversity. Further detail on this biodiversity enhancement can be found in Chapter 6 of this EIAR and Appendix 6-4 BMEP.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the Site and any identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective and neither of these options is sustainable.