16.0 TRAFFIC AND TRANSPORT

16.1 INTRODUCTION

This chapter presents the Traffic and Transport assessment of the potential for impacts arising from the proposed project (during construction, operation and decommission) on the existing and proposed road network. The assessment envisages the potential impacts and proposes the mitigation measures to be put in place to reduce these impacts. The impacts and mitigation measures have been presented and are discussed below.

16.2 STATEMENT OF AUTHORITY

This chapter of the EIAR has been prepared by Donncha Keohane and Maria Rooney of TOBIN Consulting Engineers. Donncha Keohane (Project Engineer Roads and Traffic) holds a BEng in Civil and Transportation Engineering from Edinburgh Napier University. He has over 10 years' experience in road and traffic design and construction. Maria Rooney (Senior Engineer Roads and Traffic) is a Chartered Engineer and has a Bachelor of Engineering in Civil Engineering and Master of Engineering in Roads and Transport Engineering. She has over nine year's work experience in roads and transport engineering.

16.3 RELEVANT STANDARDS

In addition to the EIAR guidance documents outlined in Chapter 1, the following standards have been used in the preparation of this chapter:

- Traffic and Transportation Guidelines (TII PE-PAV-02045 May 2014);
- Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions) (TII DN-GEO-03060 June 2017);
- Rural Road Link Design (TII DN-GEO-03031 June 2017);
- Guidance on Minor Improvements to National Roads (including Erratum No. 1, dated April 2013 and Erratum No. 2, dated June 2013 (TII DN-GEO-03030 March 2013);
- Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (TII PE-PAG-02017);
- Road Safety Audit (TII GE-STY-01024 December 2017); and
- 'Purple Book' – Guidelines for Managing Openings in Public Roads (Second Editions April 2017 DoTTS)

This chapter is also cognisant of the Donegal County Development Plan 2018 – 2024.

16.4 EIA SCOPING

Scoping is a process of determining the information and the methodology to be contained in an EIAR in order to gather and assess that information. Further information on the scoping exercise can be found in Chapter 1 of this EIAR (Introduction). A copy of the EIAR Scoping document (Appendix 1-3) was sent to the relevant consultees, including Donegal County Council, Transport Infrastructure Ireland and the Department of Transport. Responses are available in Appendix 1-4.

A separate scoping email was sent to the Donegal County Council Roads Departments on 24th August 2022, with project information and requesting feedback on the following specific areas:

- Site access junctions;

- Haul routes for typical construction traffic and abnormal load traffic (i.e. turbines);
- Grid connection cable route; and
- Scope of proposed traffic assessment.

A meeting was held with representatives of Donegal County Council Roads Department on 12th January 2023 to discuss the proposed project, particularly construction haul routes and the proposed Turbine Delivery Route. A copy of the scoping email is included within Appendix 1-3. At the time of writing (February 2023), no detailed response was received from Donegal County Council Roads Department.

16.5 METHODOLOGY

This EIAR chapter follows the guidelines set out by Transport Infrastructure Ireland (TII) in the document TII PE-PAV-02045 "Traffic and Transportation Assessment Guidelines, May 2014". The Traffic and Transportation Assessment is set out as follows:

- A review of the existing and future transport infrastructure in the vicinity of the proposed project;
- A description of the nature of the proposed project and the traffic volumes that it will generate during the different construction stages and when it is operational;
- A description of the abnormally large loads and vehicles that will require access to the site and a review of the traffic impacts on the proposed delivery routes; and
- A review of the potential effects of the proposed project.

The geometric design elements of the proposed wind farm include the following and have been assessed in accordance with the best practice guidelines and standards as outlined below:

- The junction geometric design and sightline visibility of the site access has been assessed in accordance with the TII DN-GEO-03060 "Geometry design of junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions), June 2017".
- The proposed geometry of the site access has been assessed using swept path analysis using Autodesk AutoCAD Vehicle Tracking for all associated construction vehicles.
- The existing geometry of the road network for the Turbine Delivery Route (TDR) for the longest Abnormal Indivisible Load (AIL), the turbine blade components have been assessed using swept path analysis using Autodesk AutoCAD Vehicle Tracking. The swept path analysis used an 82m blade length which is the maximum blade length to be used in the windfarm. The tower sections are considerably shorter than the blade sections and therefore, the 82m blade was used as a worst case scenario. A swept path analysis was also carried out for the blade lifter from the changeover location to the site. It was determined that there was no oversail or land required for this section of the route.

A Traffic Management Plan (TMP) has been developed as part of the mitigation measures to mitigate the potential impact of the proposed project. Refer to Appendix 2-7 of this EIAR.

16.6 EXISTING ENVIRONMENT

The main wind farm site (Figure 2-1, Chapter 2) which extends to approximately 1,945 ha, of which the majority is commercial forest, is located 2km south of Doochary in northwest County Donegal. The elevation of the wind farm site ranges from sea level along the Gweebarra Estuary to the north rising to over 365m AOD in the east of the site. The main urban centre

in the region is Letterkenny, located approximately 30km to the northeast of the proposed wind farm site. The site of the proposed wind farm comprises a single, slightly elongated land parcel. These lands lie between the R250 that runs from Glenties to Fintown and the River Gweebarra estuary.

The main wind farm site is currently accessed from the L6463. The L6483 is a local road, with a carriageway width of approximately 3.1m with grass verges on both sides. The road has a default speed limit of 80km/h. An existing forestry access is located on both sides of the L6483. A small number of domestic properties are located along the L6483.

No road markings are present along the L6483. Overhead utilities run along the local road crossing the carriageway of the L6483 in several locations.

16.7 PROPOSED PROJECT

A detailed description of the proposed project assessed in this EIAR is provided in Chapter 2 (Description of the Proposed Project) and is comprised of three main elements:

- The main wind farm site (hereinafter referred to as the 'wind farm site');
- Turbine Delivery Route (hereinafter within this chapter referred to as the 'Abnormal Indivisible Loads' or 'AIL');
- Grid connection (hereinafter referred to as the 'grid connection').

The proposed wind farm site includes the wind turbines, internal access tracks, hard standings, the permanent meteorological mast, recreational amenity trail and associated signage, onsite substation, internal cabling, temporary construction compound, drainage infrastructure and all associated works related to the construction of the wind farm.

The grid connection includes for the underground cabling between the proposed substation and the existing overhead line, all of which are within the site of the proposed wind farm site, with almost no use of public roads apart from a single location where it perpendicularly crosses the L648.

The AIL includes all aspects of the route from Killybegs Port in southwest County Donegal to the proposed wind farm site, and proposed works to accommodate this delivery are considered as part of this assessment, as shown in Figure 2-3 (Chapter 2).

Maintenance of the existing conifer plantation within the proposed wind farm site is an ongoing activity, and therefore part of the current baseline traffic flows on the existing network. Forest felling required for the construction stage is not anticipated to result in any change to these traffic volumes.

16.7.1 Construction Works

The phasing and scheduling of the main construction task items are outlined in Figure 2-6 of this EIAR, with construction envisaged to commence in January 2026 and take approximately 2 years.

Construction Programme

The wind farm construction programme can be broken down into 5 no. main phases (further described in Section 2.9 of Chapter 2 (Description of the Proposed Project)) as follows:

- Phase 1 Civil 14 months
- Phase 2 Electrical grid connection 6 months

- Phase 3 Site electrical 12 months
- Phase 4 Turbine deliveries and erection 4 months
- Phase 5 Commissioning 2 months

The Phase 1 civil works will include site clearance, tree felling, fencing, internal access tracks, hardstanding areas (i.e. parking, substation, turbines, met mast), concrete pours for foundation at the substations and turbine locations, on-site replanting of trees and other associated civil works. As the construction activities progress inward from the site access various phases will become active and will overlap with each other with different areas within the site at different phases of the construction programme.

For the concrete pours for the foundations (i.e. substation and turbine), these will be undertaken on a single day each. During these works, other works will continue onsite but delivery of materials other than the concrete trucks for the pours will be limited to essential vehicles.

In parallel with Phase 1, Phase 2 will commence with an estimated up to 5 turbines delivered per month over the 4 month period for erection in sequence with the foundation pours.

Construction Hours

The typical hours for construction activity will be restricted to between 07:00hrs and 19:00hrs weekdays and 07:00hrs to 14:00hrs on Saturdays. Outside of the typical construction hours occasional works will be required outside the normal construction hours (i.e. concrete pours, delivery of turbines to site, road works in carriageway). All out of hours working will be agreed in advance with the Local Authority.

Wind Farm External Site Works

In addition to the onsite works to facilitate the proposed project, external construction activities will be required encompassing Advanced Works for Abnormal Indivisible Loads (AILs). Temporary construction works will be required along the AIL haul route to accommodate the transport of the turbine components and transformers. These works will include temporary hardstanding areas, works to make road signage demountable, utility diversions and hedgerow and vegetation cuttings to accommodate the oversail of the turbine blade. A blade changeover hardstand will also be constructed. This is estimated to be approx. 2500m^2 in size and will take approx. 2 weeks to construct.

Construction Staff

The number of construction staff will vary dependant on the phase of the construction activities, and staff are required at a number of locations. At the peak construction on the wind farm site, a maximum of approximately 93-139 personnel are estimated.

In addition to the site staff, the proposed project will also require construction staff for the advanced works on the abnormal indivisible load (AIL) delivery route (and for the grid connection cabling construction activities.

For the advanced works on the AIL delivery route requiring hardstanding, it is envisaged that a maximum of 10 construction staff (including the TTM operatives) will be required at each location. Once the final delivery of the turbine components has been completed, these hardstanding works areas will be reinstated. These reinstatement works will require similar staff levels and construction vehicles. At the identified locations, signs and posts will be made

demountable (i.e. retention sockets) in advance of AIL movements. For a brief period, the signs and posts will be removed to facilitate the AIL convoy movement and re-erected immediately after the AILs pass the relevant location. A maximum of 2-3 construction staff will remove and re-erect the signage.

The majority of the grid connection cabling works will traverse off-road internal access tracks purposely built for the wind farm, with a single crossing point of the public road network (L6483). As outlined in Chapter 2 Section 2.10.7, the crossing on the L6483 will be by standard cable trench laying traversing the road. For the cabling laying works construction staff numbers will be maximum 4-8, while the directional drilling for watercourse crossings will require a maximum of 10 staff.

Construction Vehicles

The construction vehicles will be standard rigid and articulated lorries for material deliveries / removal at the site. The rigid vehicles will include standard concrete trucks, flatbed trucks for delivery of building materials, tipper trucks, waste haulage and aggregate delivery trucks. The articulated vehicles will typically be used for the delivery of building materials (i.e. bricks, fencing, rebar, met mast, culverts etc). Other vehicles include cranes and onsite construction vehicles / machinery (i.e. rollers, tipper trucks, JCBs, rock crusher etc). These main construction vehicles will be standard HGVs in common use on Irish roads which are significantly smaller than the abnormal load vehicles required for transporting the turbine components and transformers.

The turbine component delivery is a specialist operation due to the size of the loads transported. As outlined previously these loads are referred to as Abnormal Loads[1] or Abnormal Indivisible Loads (AILs), as per the RSA guidance (otherwise referred throughout this EIAR as Turbine Delivery Routes (TDR). The abnormal load vehicles will accommodate transport of the tower, nacelle, blades and substation transformers. For the purpose of this assessment, a blade length of 82m which is the maximum blade length to be used in the windfarm. The tower sections are considerably shorter than the blade sections and therefore, the 82m blade was used as a worst-case scenario (i.e. the assessment will allow for any shorter sections or units) between Killybegs Port and the blade changeover area. From here, it will use the latest technology to lift the long turbine blades up to an angle of 60 degrees, thereby minimizing the potential issues at pinch points for the long blades. From this blade changeover area to the site of the proposed wind farm, both the tower sections and the blade lifter vehicle were assessed to ensure a robust assessment. The analysis determined that only minimal oversail of land was required for this. As indicated in Chapter 2, the turbine is estimated to have a hub height of between 112-125m with the following estimated dimensions:

- Tower:
  - Delivered in 3 to 5 sections
  - Base of the tower is approx. 5m in diameter
  - Top of the tower is approx. 2-3m in diameter
- Nacelle:
  - Dimensions can vary depending on final hub height but typically, 4m in width
- Blade
  - Between 74.5m – 82m blade length
  - 4.5m approximate width.

[1] A load which exceeds the weight, height, width or length limit(s) outlined in S.I. No. 5 of 2003 of Road Traffic Construction Equipment and Use of Vehicles Regulations 2003. (www.rsa.ie)

- The exact details of the turbine tower will be dictated by final selection of the turbine make and model, but will be within the design envelope assessed, as described above.

16.7.2 Internal Access Tracks

Internal access roads will be constructed as part of the initial phase of the construction of the wind farm. Material will be sourced from the proposed onsite borrow pits to provide the required base material of the internal roads. The final graded surface material will be sourced from local quarries. The internal roads will be permanent (construction/operational) roads.

New roadways will have a running width of approximately 5 metres (5.5m including shoulders), with slightly wider sections at corners and on the approaches to turbine locations of up to 10m. These will be detailed in final design drawings. The proposed new roadways will incorporate passing bays to allow traffic to pass easily while traveling around the site.

All new roadways will be constructed with a 2.5% camber to aid drainage and surface water runoff. A drainage design has been provided for the proposed site roads. Road Construction Details and associated drainage design are included in the drawings of Appendix 1-1.

The majority of roads onsite will be of the excavated road type, with some floating roads in areas of peat, as described in Chapter 8 (Land, Soils & Geology).

16.7.3 Site Drainage

Widening of the existing access, construction of new accesses, upgrade of existing internal site access tracks, construction of new site access tracks, construction of new hardstanding areas have the potential to impact the existing drainage flow patterns. Full details of the proposed surface water management plan are outlined in Section 2.8 of Chapter 2 (Description of the Proposed Project) of this EIAR and the hydrological and hydrogeological impacts are outlined in Chapter 9 (Hydrology and Hydrogeology). A Surface Water Management Plan is included in Appendix 9-1.

With regards to drainage works to offset the impact of the traffic and transport and associated road works it is proposed to culvert any existing minor forestry drain crossings at the internal access tracks during periods of dry weather. The proposed site drainage is discussed in detail in Chapter 2 (Description of the Proposed Project) and Chapter 9 (Hydrology & Hydrogeology).

16.7.4 Proposed Project Construction Delivery Routes

There are a number of locations, described below, between the proposed wind farm site and Killybegs Port which require temporary additional works to accommodate the construction of the proposed project.

Site Access

The proposed wind farm site will be accessed via the L6483 local road using two access points. Access point one will be used as a main entrance point during the early stages of construction until such time as the internal access roads are constructed as far as access point two. At that

stage access point two will be the main site exit and access point one will be the main site entrance. A one-way system will be in place for construction traffic on the local road network. Access point one will be located in the townland of Cloghercor on the L6483 and will be the single access/egress point for wind farm maintenance vehicles during the operational phase. Access point two will use a permitted, not yet constructed, forest entrance on the L6483, further east in the townland of Clogheracullion during the construction phase. It will not be used during the operational phase. Internal access roads will be constructed as part of the initial phase of the construction of the wind farm. Material will be sourced from the proposed onsite borrow pits to provide the required base material of the internal roads. The final graded surface material will be sourced from local quarries. The internal roads will be permanent (construction/operational) roads.

During the operational phase, there will be a separate public entrance (access point three) in the townland of Cloghercor to easily access the proposed car park and amenity facilities (located at the intersection of the proposed grid connection cable and the L6483).

Construction Material Delivery Route

Based on the nature of the proposed project, various construction materials will be delivered to the site over the construction programme. The materials will be delivered by standard heavy good vehicles (HVs) including rigid lorries and articulated lorries. Other vehicles that will attend the site include standard construction and forestry vehicles, i.e. crane, excavator, forestry machinery, logging trucks, stone crusher, concrete trucks, tipper trucks.

The construction traffic with the largest daily impact is the concrete pours for the turbine foundations. Due to the process of a continuous single pour per foundation. The second largest impact is the importation of the surface aggregate for the internal haul routes and hardstanding areas.

From desk studies, several suitable local quarries with current extraction licenses were identified including:

- Crockuna Granite Quarry
- Glenstone Quarry
- Millstone Quarry
- A S Ballantine Quarry

There is the potential that alternative local quarries may be available at the time of construction, whereby the appointed contractor will liaise with Donegal County Council to inform them of the proposed source(s).

For the purpose of this assessment, it has been assumed that the construction material delivery routes will be as follows:

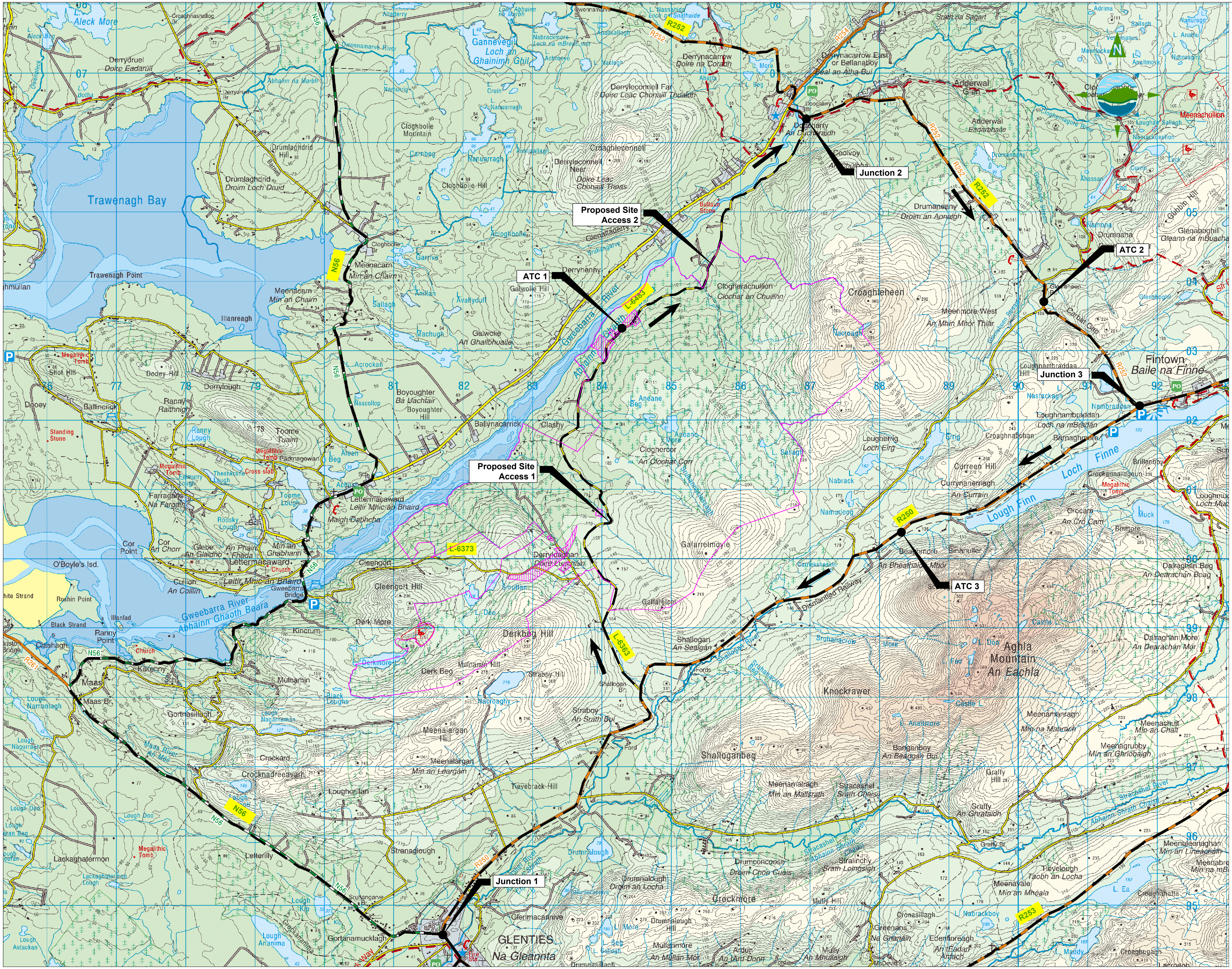
- Potential quarry location:
    - Crockuna Granite Quarry
    - Glenstone Quarry
    - Millstone Quarry
    - A S Ballantine Quarry
- Other materials including met mast, building materials, fencing, drainage, culverts, water treatment, substation materials, welfare facilities etc., are assumed to be sourced locally. There are 3 material route options which will cover all possible delivery routes back to national or regional roads.

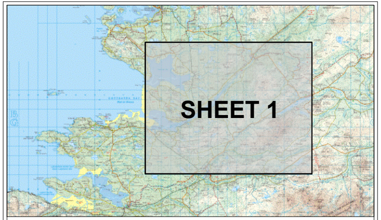
- The traffic volumes, peak and average are assessed below as arriving from one direction only as a worst-case scenario, instead of reducing the traffic volume by splitting it into different scenarios for different directions.

Figure 16-1 indicates 3 possible haul routes from the quarries and material suppliers in proximity to the site.

There is the potential for various different haul routes to the site for the construction materials to be delivered. The potential haul routes for the delivery of the construction materials are detailed below:

- **N56:** The N56 is a national secondary road that runs from Donegal Town clockwise to Letterkenny. As originally designated, it included the section of the N13 between Stranorlar and Letterkenny, forming a circular route including parts of the N15. Road marking and signage is present on the road.
- **R250:** The R250 is a regional road which runs from the Polestar Roundabout in Letterkenny to the N56 just north of Glenties via Fintown.
- **R252:** The R252 is a regional road which runs from Fintown to Ballybofey.
- **L6363:** The L6363 is a narrow local road which provides access from the R250 to the L6483.
- **L6483:** The L6483 is a narrow local road which connects the R250 to the R252. As outlined above the proposed site accesses are located along the L6483.





LEGEND:

PROPOSED WIND FARM SITE BOUNDARY	
AREA EXCLUDED FROM BOUNDARY	
CONSTRUCTION MATERIAL HAUL ROUTE	
CONSTRUCTION TRAFFIC DIRECTION	

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

OSI 1:50,000 Sheet No's: 1638, 1640, 1838 & 1840.

500m 0 500m 1Km 1.5Km

Rev	Date	Description	By	Chkd.
A	08.03.23	INFORMATION ISSUE	MN	MR

Client:

CLOGHERCOR WIND FARM LTD.

Project:

CLOGHERCOR WIND FARM

Title:

TRAFFIC COUNT LOCATIONS

Scale @ A3: 1:50,000

Prepared by: E. Beggs | Checked: O. Fitzpatrick | Date: January 23

Project Director: S. Tinnelly

Drawing Status: Draft

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Drawing No.: Figure 16.1

Revision: A

Abnormal Indivisible Load Delivery Route

An Abnormal Indivisible Load (AIL) Delivery Route is commonly referred to as a Turbine Delivery Route (TDR) and is referred throughout the rest of the chapters as a TDR. It is proposed that the turbine components will be delivered to the site via Killybegs Port in southwest County Donegal as shown in Figure 2-3 (Chapter 2). The route heads north from the port in Killybegs on the R263 to the N56 where it turns eastwards. The route then continues generally eastwards on the N56 to the junction with the R262, where it makes a northerly turn in the direction of Glenties. The route continues northwards to a proposed temporary blade changeover location (where the turbine blades are mounted on a vertical blade transporter for the rest of the route). It then runs north to re-join the N56, where it turns eastwards to Glenties. In the town of Glenties the route joins the R250 and continues traveling in a north-easterly direction until turning to the northwest onto the L6363 local road. It then turns onto the L6483 where it continues to the site entrance for the proposed project.

An assessment of the route between Killybegs Port and the site of the proposed wind farm has been carried out. A number of potential pinch points have been assessed (see the Turbine Delivery Route Assessment Drawings as Appendix 2-1 to this EIAR). An assessment was carried out using Autotrack software to determine what, if any, temporary works are required at these pinch points to allow the turbine components to be moved to the site. The outputs of this Autotrack assessment are provided in the drawings of Appendix 2-1. Works range from hedgerow trimming/clearing, temporary removal of fencing, telephone poles and road signage to facilitate oversail to the temporary placement of hardcore to allow the oversize vehicles pass, or to allow the transfer of turbine blades between different vehicles. The required works at each location are detailed in drawings of Appendix 1-1.

Although not all works along the proposed TDR will be included in the current planning application, all works along the route are assessed as part of this EIAR. Those locations where works are required, but consent is not being applied for at this time (i.e. road widening of the L6363 and L6483 between the R250 and the site entrance, and advance works in the townland of Tullycumber), will be subject to a separate consenting process.

At the end of the construction phase, any areas, road verges and field boundaries, which were given temporary hardcore surfaces will be reinstated by being covered in topsoil and reseeded. Stock proof fences will be erected along the property boundaries where reinstatement of fencing is required. It is not anticipated that there will be any requirement to use these areas in the operational phase of the proposed project, except in the unlikely event that a turbine requires a large replacement part such as a blade or tower section. This will need to be agreed with the local authority and involved landowners, and relevant consents obtained if such a situation arose.

The assessment of the TDR is discussed further below and the advanced works have been identified along the route including approximately 6 pinch points requiring temporary hardstanding, relocation / demountable street furniture, utility diversions and cutting back of vegetation to facilitate the delivery of the abnormal turbine component loads. This is discussed further under Potential Effects in Section 16.3.

The TDR includes the following routes which overlap with the material haul routes all of which are previously described.

Turbine Delivery Route (TDR) Haul Route Roads

TDR haul routes for the proposed project are the N56, R250, L6363, L6483, R263 and R262. In addition to the haul route roads described above are the R263 and R262 which will also be utilised for the TDR:

- **R263:** The R263 is a regional road which runs from the Killybegs Port to the N56. The R263 is a two way single carriageway with a grass verge in both directions.
- **R262:** The R262 is a regional road which provides an alternative route to Glenties avoiding Ardara. The R262 is a two way single carriageway with a grass verge in both directions.

Grid Connection Route

Connection will be sought from the grid system operators by application to EirGrid. It is proposed that the proposed onsite substation will connect via underground 110 kV cable to an existing overhead line, though no new sections of overhead lines are required for this connection. Fourteen existing wood polesets will be removed from the existing overhead line.

The proposed route of this underground grid connection is provided in Figure 2-4 of this EIAR. The grid connection between the proposed substation and the existing overhead line is within the site of the proposed wind farm boundary. Two new overhead end masts will be required at the loop-in and loop-out points on the existing line, to allow the connection to be made. The grid connection will cross perpendicular to a section of public road in proximity to the most northern overhead end mast.

Traffic Volumes

Existing Traffic Volumes

In order to determine the magnitude of the existing traffic flows, the following traffic surveys were carried at 5 locations; including 3 existing no. junction turning counts and 3 no. automated traffic counts. These surveys were carried out by Nationwide Data Collection (Philip Powell, Metro Count Traffic Executive (MTE) Certificate, 15 years' experience) in November 2022 at the following locations as shown in Figure 16-1;

- Junction 1 - R250/N56 T-Junction;
- Junction 2 - R252/Local Road T-Junction ;
- Junction 3 - R252/R250 T-Junction ;
- Automatic Traffic Count 1 – L6483;
- Automatic Traffic Count 2 – R252; and
- Automatic Traffic Count 3 – R25

Forecast Traffic Volumes

The baseflow traffic volumes have been forecast to the year corresponding to the end of the construction period in the year 2028 (i.e. construction commencing in 2026 and programmed for 2 year). As the operation traffic is low, assessment of the operational year, design years plus 5 years and plus 15 years have not been assessed. This is in accordance with the TII Traffic and Transportation Assessment Guidelines, as the operational traffic will be below the 10% threshold.

Road Safety

A Stage 1 Road Safety Audit (RSA) has been undertaken on the 2 no. accesses on the L6483, as described in Section 16.8.1 and the proposed road widening along the haul route. The audit includes for both construction and operational stages. The RSA recommendations have been incorporated into the scheme design.

The RSA was carried out between 26th January and 15th February 2023. Road Collision Data is not currently available on the Road Safety Authority Database, therefore no collision trends in the immediate vicinity of the proposed site can be analysed.

The RSA report highlighted a number of problems with the existing road layout and site accesses. A description of the particular hazard for each problem is outlined along with a recommendation for remediation. Problems highlighted in the RSA include problems relating to Road width, Road surface, Carriageway drainage, Gradient, Swept path, Road Widening, Signage and Vehicle Restraint Barriers.

These are summarised in Table 16-1 below.

Table 16-1: Problems Identified During RSA and Proposed Mitigations

Problem	Proposed Mitigation
1 - Site Access 1 and 2 – Road width: The existing roads to the wind farm site are very narrow. No widths for the proposed project roads are stated on the drawings. There is concern that passing of opposing vehicles will not be possible on the route.	Ensure a suitable system is in place such that opposing traffic have suitable opportunity to pass opposing users at regular intervals. It is intended to widen the local road between the R250 and the proposed wind farm site entrance. It is also proposed to use a one way system for construction traffic associated with the proposed project.
2 - Site Access 1 and 2 – Road surface: No construction details are provided for the proposed access roads. There is risk that the roads are intended to remain with an unbound surface.	Ensure the proposed roads are finished with a suitable bound surface. It is proposed to finish the road with a bound surface which will be agreed with Donegal County Council in advance.
3 – Site Access 1 and 2 – Carriageway drainage: No drainage details have been provided. The construction of the access roads may result in additional surface water being routed to the public road, or impact with the existing road drainage system.	Ensure adequate surface water drainage is provided. A site drainage design has been provided.
4 – Site Access 1 – Gradient:	

The lands for the future development access junction are elevated above the existing road. There are concerns the new development road will fall steeply towards the existing road.	Ensure a suitable gradient dwell area is provided. The roads for the proposed wind farm have been designed with suitable gradients for safe vehicle movements.
5 – Site Access 1 – Swept Path: The audit team have been advised that turbine delivery will be via Access Location 1 only. The junction geometry appears tight for passage of long vehicles. Multiple forward / reverse movements may be required in order for the vehicle to access the new road.	Ensure a suitable junction geometry is provide for access of delivery vehicles. Autotrack assessments of the full route for turbine delivery have been carried out to show the vehicles can pass.
6 – Road Widening - TDR Area 3: The proposed widening on the National Road is in the area of the L5465 local grade road, in the townland of Aghayeevoge. At present the grassed verge assists in forcing vehicles exiting the location road to align right angles with the National Road. See drawing 10798-0001 of Appendix 2-1.	Ensure adequate physical measures are retained / installed to ensure local road traffic both yield to the National Road users and also at a suitable angle, where approaching vehicles from both direction can be observed with ease.
7 - Road Widening TDR Area 4: The field level to the east of the proposed widening is substantially lower than the existing road level. The provision of road widening to this side of the road may result in the existing embankment being made steeper. Location shown in RSA and included in drawing 10798-0004 of Appendix 2-1	Ensure the embankment / fall is no greater than existing. It has been designed in this regard.
8 – Road Widening – Signage – TDR Area 4: Existing chevron signs are located in the area of the proposed road widening. Removal / relocation of the chevron signs may lessen the impact of the sign to the motorist. Location shown in RSA and included in drawing 10798-0004 of Appendix 2-1.	Ensure suitable warning of the bend is provided to the road user at all times, even when component deliveries are scheduled. It is proposed to have these signs demountable such that they can be removed immediately before turbine movements and replaced immediately after.
9 - Road Widening – VRS - TDR Area 2: The lands to the west of the proposed road widening fall away from the road at a steep	Ensure suitable vehicle restraints are provided wherever the gradient is within

gradient. Currently the fall is protected by a vehicle restraint barrier. The barrier will need to be removed for passage of the turbine delivery vehicles. Location shown in RSA and included in drawing 10798-0014 of Appendix 2-1.	the carriageway clear zone. Furthermore, ensure the anticipated angle of impact is suitable for the performance of the barrier. Advance warning signage will be in place during the period of turbine movements, and temporary barriers will be erected in this time. Vehicle Restraint System (VRS) will be restored afterwards.
10 – Road widening – Signage - TDR Area 2: Existing chevron signs are located in the area of the proposed road widening. Removal / relocation of the chevron signs may lessen the impact of the sign to the motorist. Location shown in RSA and included in drawing 10798-0014 of Appendix 2-1.	Ensure suitable warning of the bend is provided to the road user at all times, even when component deliveries are scheduled. It is proposed to have these signs demountable such that they can be removed immediately before turbine movements and replaced immediately after.
11 – Road Widening: There is an existing humped back bridge with stone parapet walls in the area of the proposed road widening / body swing. There is concern that the delivery vehicle may impact with the parapet wall and cause structural damage. Location shown in RSA and included in drawing 10798-0017 of Appendix 2-1.	Ensure no damage is caused to the parapet wall. The delivery vehicle will not impact on this wall.
12 - Set Down Area – TDR Area 1: The set down area is located just to the south of a crest curve on the Regional Road. Long and slow moving vehicles, in the process of crossing the Regional Road in order to access the set down area, may not be seen by southbound Regional Road traffic. The set down area is illustrated in drawing 10798-0023 of Appendix 2-1.	Ensure that advanced warning is given to approaching motorists. Garda escorts will accompany all turbine movements. Traffic Management Operatives (TMOs) will be employed to provide advanced warning for large vehicle movements.

The RSA is included in Appendix 16-1 of this EIAR. All problems included in the RSA will be addressed prior to and during the construction phase of the project.

16.8 POTENTIAL EFFECTS

16.8.1 "Do Nothing" Effect

If the proposed project does not proceed there will be no additional traffic generated or works carried out on the road network and therefore no effects with respect to traffic.

The Annual Average Daily Traffic (AADT) will remain the same as the baseflow traffic with

high annual traffic growth expected along the surrounding road network.

Forestry operations will continue and construction traffic associated with the maintenance of the existing conifer plantation within the proposed wind farm site will remain at current levels.

16.8.2 Construction Stage Potential Effects

This section outlines the potential impact of the construction stage on the existing road infrastructure and the existing traffic capacity. The construction traffic (i.e. additional HGVs, light vehicles and abnormal loads) has the potential to impact on the existing road infrastructure as a result of access to the site, drainage, existing road infrastructure and traffic flow capacities on the haul routes (typical construction vehicle and abnormal loads), road pavement condition, and during cable route works (i.e. trenching).

The impact of the typical construction traffic associated with the construction of the proposed project has been assessed as a peak and an average traffic impact. The peak traffic impact will be associated with the concrete pours for the turbine foundations which will occur at 19 locations and hence only impacting on 19 days of the construction programme.

For assessing the typical impact of the development on the road network outside of these occasional peak traffic flows, the average construction traffic has been developed based on material quantities and construction programme for the proposed project.

The maximum construction staff on site is expected to be 139 during peak activities with reduction in construction personnel numbers at various phases (i.e. that are more technical and less labour intensive).

Trip Generation

The proposed trip generations during construction are summarised in Table 16-1. On the days of the concrete pours (worst case traffic volumes) all other construction deliveries will be limited to essential deliveries at other work areas onsite. For this reason, the traffic volumes associated with these concrete pours have not been included in the average traffic in Table 16-1, as these large volumes of material deliveries will be isolated from other deliveries, as much as reasonably practicable, by the appointed contractor. The average and peak traffic generations on the existing road network are discussed further in this section.

It is assumed that the subbase material (i.e. road surface dressing) and concrete are to be sourced locally. Borrow pits have been identified on the site which are assumed to provide the capping material (i.e. below the surface dressing and forming the majority of road construction material).

Table 16-2: Typical Construction Traffic Volumes – Potential Impact

ID	Task Name	Task Description	2026			Q2			Q3			Q4			2027			Q2			Q3			Q4		
			Q1			Apr-Jun			Jul-Sep			Oct-Dec			Q1			Apr-Jun			Jul-Sep			Oct-Dec		
			Jan-Mar												Jan-Mar											
			Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
1	**Site Health and Safety**																									
2	**Site Compounds**	Site compounds, site access, fencing, gates	346	346	346				346	346	346															
3	**Site Roads**	Construct roads, install drainage measures, install culvert, install water protection measures	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194									
4	**Turbine Hardstands**	Excavate base, construct hardstanding areas					751	751	751	751	751	751	751	751	751	751	751	751	751	751	751					
5	**Turbine Foundations**	Fix steel, erect shuttering, concrete pour						450	450	450	450	450	450	450												
6	**Substation Construction & Electrical Works**	Construct substation and grid connection, underground cabling between turbines	37	37	37	37	37	37									37	37	37	37	37	37	37	37		
7	**Backfilling & Landscaping**																									
8	**Turbine Delivery and Erection**																									
9	**Substation Commissioning**																									
10	**Turbine Commissioning**																									
		∑	578	578	578	232	983	1433	1741	1741	1741	1395	1395	1395	946	946	983	788	788	788	788	37	37	37	0	0

Notes: All construction deliveries (excl. concrete pours) have been averaged over the Monday-Saturday working week.

(1) The turbine deliveries will occur during night-time with traffic management and garda escort. As this traffic will be isolated from other daily traffic movements, it has not been added into the daily traffic volumes in this table.

(2) This construction traffic table is a simplified traffic volume table against programme and a more detailed delivery schedule will be developed by the appointed contractor.

Turbine Delivery Route (TDR)

Internal access roads will be constructed as part of the initial phase of the construction of the wind farm. Material will be sourced from the proposed onsite borrow pits to provide the required base material of the internal roads. The final graded surface material will be sourced from local quarries. The internal roads will be permanent (construction/operational) roads.

Table 16-3: TDR Delivery Route Advanced Works Potential Impacts

Pinch Point	Route	Hardstand Area (m²)	Street Furniture Works	Oversail	Drawing No.
1	Port Exit	NA	NA	NA	NA
2	Shore Road	141	Yes	Yes	10798-1001
3	N56	141	Yes	Yes	10798-0001
4	N56	0	Yes	No	10798-0002
5	N56	0	Yes	No	10798-0003
6	N56	200	Yes	No	10798-0004
7	N56	0	Yes	No	10798-0005
8	N56	0	Yes	Yes	10798-0006
9	N56	0	Yes	Yes	10798-0007
10	N56	263	No	No	10798-0008
11	N56	0	Yes	No	10798-0009
12	N56	0	No	No	10798-0010
13	N56	0	Yes	No	10798-0011
14	N56	0	Yes	Yes	10798-0012
15	R262	0	Yes	Yes	10798-0013
16	R262	898	Yes	No	10798-0014
17	R262	0	Yes	No	10798-0015

Pinch Point	Route	Hardstand Area (m²)	Street Furniture Works	Oversail	Drawing No.
18	R262	0	Yes	Yes	10798-0016
19	R262	86	Yes	Yes	10798-0017
20	R262	0	Yes	No	10798-0018
21	R262	0	Yes	Yes	10798-0019
22	R262	0	Yes	Yes	10798-0020
23	R262	0	Yes	No	10798-0021
24	R262	0	Yes	No	10798-0022
25	R262	2550	No	Yes	10798-0023
26	R262	0	No	Yes	10798-2001
27	R262	0	Yes	No	10798-2002
28	R262	0	Yes	No	10798-2003
29	R262	0	Yes	Yes	10798-2004
30	R262	0	Yes	Yes	10798-2003-1
31	R262	0	Yes	Yes	10798-2004-1
32	R250	0	Yes	No	10798-5001
33	R250	0	Yes	No	10798-5002
34	R250	0	Yes	No	10798-5003
35	R250	0	No	Yes	10798-5004
36	L6363	0	No	No	10798-5005

Pinch Point	Route	Hardstand Area (m²)	Street Furniture Works	Oversail	Drawing No.
37	L6363	0	No	No	10798-5006
38	L6363	0	No	No	10798-5007
Total		1,796			

The hardstanding areas are to be temporary in nature and the land reinstated on completion of the works. Temporary drainage works may be required adjacent to hardstanding areas at some pinch points in the form of temporary relocated interceptor ditches or a permanent filter drain. The hardstanding areas will be laid in advance of the delivery of the Abnormal Indivisible Loads (AILs) to site and reinstated immediately after delivery of the final AIL. The local road widening between the R250 and the site entrance (site access point one) will be retained as a permanent road improvement.

The construction of the temporary TDR hardstanding areas will have a likely short term effect at each pinch point requiring hardstanding. The negative effect is due to delays caused to traffic due to the works and the associated traffic management. The hardstanding works at all the pinch points is envisaged to take less than 2 weeks in total, with works at each pinch point varying from 1 day to 4 days. The temporary blade transfer area is likely to take up to 2 weeks to construct. The road widening works (between the R250 and the site entrance) are anticipated to take approximately 3-4 weeks. The removal of the hardstanding will be similar in nature and duration to the construction with a similar potential impact. On completion of the reinstatement of the hardstanding at all pinch points, it will result in a reversible impact.

During the haul of the AILs limited works will be required at the hardstanding areas (i.e. laying mats, ramps at kerbs / islands, removal of temporary bolt down kerbs etc.) immediately in advance of the AIL movement through the pinch points. These works will be undertaken under traffic management and have a brief moderate negative effect lasting less than a few hours.

Advanced works for the street furniture will be both temporary and permanent. At locations requiring removal of traffic signs, these will be made demountable with retention sockets instead of fixed posts in foundation. The permanent works will be the installation of the retention sockets (where not already done). This will facilitate the temporary removal of the sign face and post immediately in advance of the AIL movement through the pinch point location and erecting after the AIL convoy has passed the pinch point. Reducing the duration of impact at these locations and allowing for them to be readily open to background traffic without the need for significant temporary traffic management.

The making of street furniture demountable will be undertaken in conjunction with the hardstanding works and under the same traffic management. The potential impact of this work will be a moderate negative brief / temporary effect. The temporary works (i.e. removing signs and posts) will be required immediately in advance of the AIL passing the pinch points. These works will be undertaken under traffic management and have a brief moderate negative effect lasting less than a few hours. Once the AIL convoy passes the pinch point, under this same traffic management the signs and posts will be reinstated within the retention sockets and the road open to traffic. The impact will be reversible between AIL delivery and on completion of AIL delivery.

Trip Generation

The total trip generation associated with the AIL delivery route hardstanding advanced works will result in approximately 34 HGV one-way movements per day (based on a 0.5m[2] depth of hardstanding) over approx. 2 weeks. The number of light vehicle (LV) movements will vary at each pinch point location depending on the construction works (i.e. hardstanding and street furniture works) and traffic management operators required.

[2] Depth of 0.5m assumed as the majority of these AIL works are within existing roundabouts at grade and not required to raise the level of adjacent fields / grass verges.

No works zone is envisaged to have more than 10 construction personnel and a total of 5 LV movements to the works zone daily.

The oversail works are primarily hedgerow and vegetation cutting performed by a single tractor with minimal traffic management. These works will be undertaken simultaneously with Phase 1 of the site works in advance of the AIL deliveries.

The trip generations associated with the delivery of the AILs are summarised in Table 16-4. Assuming 3 components in a convoy the delivery will take 57 nights and with 5 per convoy this is reduced to 35 nights.

Table 16-4: Abnormal Indivisible Load Traffic – Potential Impacts

AIL Elements	No. of Turbines	Parts	Components per element	Total Components	Trips with: 3 per Convoy	Trips with: 5 per Convoy
Nacelle	19	1	19	171	57	35
Blade	19	3	57			
Tower	19	5	95			
Transformer				2	1	

Summary of Construction Traffic Effects (Including the Grid Connection)

Each of the aforementioned sections impacting on the traffic flow by construction phase vehicles have been amalgamated into this section to show the potential construction traffic impact. The trip generations have been developed in the previous sections for the following and are summarised further below :
Wind farm site:

- Staff using light vehicles (LVs)
- Material deliveries by heavy goods vehicles (HGVs) and
- Abnormal indivisible loads (AILs).

AIL Works:

- Staff using light vehicles (LVs) for advanced AIL works and
- Material deliveries by heavy goods vehicles (HVs) for advanced AIL works.

The potential routes are discussed in Section 16.7.4 are the basis of the traffic distributions.

Trip Generations

The trip generations for the proposed project are based on the estimated construction programme and material deliveries to the site.

Due to the nature and duration of the proposed wind farm external site works (i.e. advanced AIL works) these works will occur during the main construction activities at the wind farm site. As the external site works are short duration and the proposed project construction traffic will be occurring in advance and after these external works, the proposed project has been assessed both independently and in conjunction with the external works. The AIL deliveries will be occurring outside of the typical construction operations as night-time works. As the traffic impacts associated with these activities are not envisaged to overlap, the AIL deliveries have also been assessed independently.

Wind Farm Site

The wind farm assessment is based on the wind farm site works only, with a maximum of 139 personnel on the wind farm site during peak construction activities with 2 personnel per light vehicle (LV), resulting in a total of 70 LV movements to and 70 LV from the site each day.

Table 16-5 summarises the construction traffic for the construction activities on a single day during the construction period.

Table 16-5 indicates the daily volume of traffic arriving to the site on a day during the associated construction stage (i.e. civil works, turbine delivery, electrical, installation and commissioning). As previously mentioned, the AIL convoy movements are not accounted for as these traffic movements will be under traffic management, garda escort and be undertaken during the night-time.

Table 16-5: Typical Construction Traffic Volumes – HV One-way Daily Traffic

ID	Task Name	Task Description	2026			Q2			Q3			Q4			2027			Q2			Q3			Q4		
			Q1			Apr-Jun			Jul-Sep			Oct-Dec			Q1			Apr-Jun			Jul-Sep			Oct-Dec		
			Jan-Mar												Jan-Mar											
			Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
1	**Site Health and Safety**																									
2	**Site Compounds**	Site compounds, site access, fencing, gates	16	16	16				13	16	13															
3	**Site Roads**	Construct roads, install drainage measures, install culvert, install water protection measures	9	9	7	7	9	9	7	9	7	9	9	7	9	9	9									
4	**Turbine Hardstands**	Excavate base, construct hardstanding areas					34	34	27	34	27	34	34	27	34	34	34	27	34	34	27					
5	**Turbine Foundations**	Fix steel, erect shuttering, concrete pour						20	16	20	16	20	20	16												
6	**Substation Construction & Electrical Works**	Construct substation and grid connection, underground cabling between turbines	2	2	1	1	2	2									2	1	2	2	1	2	1	2		
7	**Backfilling & Landscaping**																									
8	**Turbine Delivery and Erection**																									
9	**Substation Commissioning**																									
10	**Turbine Commissioning**																									
		∑	26	26	24	8	45	65	63	79	63	63	63	51	43	43	45	29	36	36	29	2	1	2	0	0

Note:
(1) The peak traffic is the worst-case scenarios at each works zone.
(2) Wind Farm peak value is the maximum traffic occurring during the concrete pours for the turbine foundations. This will occur 19 times, i.e. on one day for each turbine foundation.

Trip Distribution

The trip distribution assumes a worst-case scenario, that all LVs and HGVs will utilise the same route.

The TII Traffic and Transportation Assessment Guidelines 2014, Table 2.1 Traffic Management Guidelines Thresholds for Transport Assessments (TTA) sets out the following threshold to determine whether the preparation of a TTA is recommended:

- Traffic to and from the wind farm site exceeds 10% of the traffic flow on the adjoining road.

It should be noted the 10% flow is merely a prompt for whether or not a TTA is recommended, it does not determine the significance of effects. The significance of effects in a TTA have been based on Ratio of Flow to Capacity Value (RFC).

Traffic generated by the construction phase of the proposed project primarily consists of traffic related to either delivery of construction materials, or removal of excavated material from the site for disposal. Construction phase staff will also generate trips to and from the construction sites.

The peak and average construction phase traffic estimated to be generated for each surrounding road during the construction phase is summarised in Table 16-5. These values are the worst-case scenario projections, in order to analyse the surrounding roads. It should be noted LV traffic in relation to staff are not assigned to the delivery and haul routes. However, in order to carry out a robust assessment the HV and LV has been distributed along the delivery and haul routes.

Table 16-6: Threshold Assessment

Road	Counter	AADT [3]	Average Traffic Volume	Average % Increase	Peak Traffic Volumes	Peak % Increase
L6483	**ATC 1**	8	70*	870%	158*	1960%
R252	**ATC 2**	2077	70*	3%	158*	8%
R250	**ATC 3**	1801	70*	4%	158*	9%

*Two-way movements

As evident in this table with the exception of the L6483, the potential impact of the proposed wind farm construction traffic on the existing road is less than a 10% reduction on the national road link capacities. On these roads the construction traffic for the proposed wind farm will have a likely temporary/ short-term slight negative effect.

The largest impact is expected on the L6483, which due to its character has a lower AADT link capacity than the regional roads and lower HGV content. All the traffic to the development will travel on this road, either from the east or west. In the peak scenarios (i.e. concrete pours), the AADT volume increased significantly. This indicates that with the additional peak construction traffic the impact of this worst-case scenario on the L6483 is likely a significant adverse brief effect.

The typical construction traffic impact on the L6483 is more representative of the average construction traffic volumes. This will have a longer impact over the whole construction programme of 2 years but has a lower traffic volume impact, resulting in a likely slight negative short-term effect.

Construction Phase Junction Assessment

From a review of the percentage increase in AADT it was determined the traffic to and from the development does not exceeds 10% of the traffic flow on the adjoining roads. However, it was observed the L6483 exceeds the 10% due to the low existing traffic volumes. Therefore a junction assessment has been undertaken for Junction 2 (R252/L6483 T-Junction).

In order to undertake an analysis of the junctions, it is sometimes necessary to apply a correction factor to convert the traffic count data into seasonally adjusted traffic flows to take account of the seasonal variation that is experienced with traffic volumes. These seasonally adjusted conversion factors were calculated using data taken from the following fixed automatic traffic counters, for a 12-month period:

- N56 Between Mountcharles & Drimark, Eddrim Glebe, Co Donegal

A seasonal adjustment factor was determined by comparing the traffic flows on the actual date of the surveys to the annual average weekday traffic (Monday to Friday) over the previous year of the traffic count. A minor seasonal adjustment factor of 1.10 was applied.

[3] Annual Average Daily Traffic

Junction 2

A summary of the results for the existing roundabout between the R252/L6483 T-Junction (Junction 2) for the AM peak (08:30 - 09:30) and PM peak (17:15 - 18:15) hours during the construction phase are provided in Table 16-7. A complete set of outputs from Junction 2 are included in Appendix 16-2.

Table 16-7: Junction 2 Results: R252/L6483 T-Junction AM and PM peak

	AM				PM			
	Queue (Veh)	Delay (s)	RFC	Junction Delay (s)	Queue (Veh)	Delay (s)	RFC	Junction Delay (s)
	2022							
Stream B-C	0	0	0	0	0	0	0	0.13
Stream B-A	0	0	0		0	0	0	
Stream C-AB	0	0	0		0	5.78	0.01	
	2028 Material Route 1 No Dev							
Stream B-C	0	0	0	0	0	0	0	0.16
Stream B-A	0	0	0		0	0	0	
Stream C-AB	0	0	0		0	5.77	0.01	
	2028 Material Route 1 With Dev							
Stream B-C	0.1	5.97	0.13	1.98	0.1	6.05	0.13	2.12
Stream B-A	0	0	0		0	0	0	
Stream C-AB	0	0	0		0	5.77	0.01	
	2028 Material Route 2 With Dev							
Stream B-C	0	5.55	0	2.61	0	6.06	0	9.78
Stream B-A	0.2	7.9	0.16		0.5	19.72	0.32	
Stream C-AB	0	0	0		0	5.77	0.01	
	2028 Material Route 3 With Dev							
Stream B-C	0	6	0	9.5	0	6.06	0	9.78
Stream B-A	0.5	19.59	0.32		0.5	19.72	0.32	
Stream C-AB	0	0	0		0	5.77	0.01	

The summary of the junction performance analysis indicates that Junction 2 will operate within capacity, with max RFC[4] of 0.32 encountered at the junction which is well below the maximum desired RFC of 0.85.

It indicates that there will be negligible queues and minimal delays during the peak hours of the proposed project.

[4] Ratio of Flow to Capacity Value (RFC value – desirable value for PICADY should be no greater than 0.85 – values over 1.00 indicate the approach arm is over capacity

16.9 OPERATIONAL PHASE POTENTIAL EFFECT

The operational phase of the proposed project is envisaged to last for a duration of 35 years. During this time, the project will generate small volumes of traffic for operational and maintenance purposes. As outlined in Chapter 2 (Description of the Proposed Project), the operation of the proposed wind farm will be mostly managed remotely and monitored from an off-site location.

The site of the proposed wind farm will be used during the operational stage for recreational use as outlined in Chapter 2.

Site Entrance & Internal Access Tracks

For the operational stage, the site access will be on the L6483. Smaller site vehicles and occasional larger vehicles (i.e. maintenance HGVs) will utilise access point one. The public amenity facility will be accessed from the L6483 using access point three. The other entrance/exit will continue being used for forestry access.

The works to construct these accesses will be completed at the start of the construction stage and, with the exception of regular maintenance for hedgerows for the visibility splays, no works are envisaged to be required at the site accesses. As these works are currently ongoing as routine maintenance, the impact as part of the operational stage will have a neutral imperceptible long-term effect.

The maintenance of the visibility splays will have a positive effect on the safety aspect of the accesses.

The internal access tracks may be in use for additional purposes to the operation of the wind farm (e.g. for forest/agricultural and recreational access). Both the forestry and agricultural activities are existing operations and have a neutral effect.

Operational Traffic Impact

As previously mentioned, the construction activities for the proposed project have the potential to generate the largest traffic volumes in comparison to the operational and decommission stages of the development. The construction traffic assessment indicates that there is suitable capacity under the heavier traffic impact during construction activities indicating that the operations traffic impact will have a not significant / slight adverse long-term effect over the 35 years of operation. It has been determined due to the lower traffic volumes during the operational phase, that any potential effect would be not significant.

The operational maintenance traffic associated with the maintenance works will be undertaken by a small team of 2-3 individuals commuting to the development by four-wheel vehicle or van daily. The trips identified are a conservative assumption with occasional construction machinery to assist with maintenance of access tracks, drainage, etc. These vehicles will arrive to site from access point one on the L6483. The impact of these vehicles on the existing road network will have a likely imperceptible negative long-term effect.

The wind farm is proposed to be utilised as a recreation area for the public on completion of the construction phase. On site, a new carpark will be constructed for the recreational amenity trail. The permanent recreational facilities include marked walking trails along the

site access roads, seating areas, picnic areas and associated recreation and amenity signage. Therefore the impact of these facilities on the existing road network will have a likely imperceptible negative long-term effect.

16.10 DECOMMISSIONING STAGE POTENTIAL EFFECT

The design life of the wind farm is 35 years, after which time a decision will be made to determine whether or not the turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site may be decommissioned fully. Further details are provided in Chapter 2 of this EIAR (Description of the Proposed Project).

It is proposed that turbine foundations and hard-standing areas will be left in place and covered with peat/soil/topsoil. It is proposed to leave the access tracks in situ at the decommissioning stage (i.e. for forestry / agricultural / recreational use). It is considered that leaving the turbine foundations, access tracks and hard-standing areas in situ will cause less environmental damage than removing and recycling them. The decommissioning will be managed on a phased basis and the recreational use will be restricted during these times.

If the site is decommissioned, cranes will disassemble each turbine tower and all equipment. All infrastructure including turbine components will be separated and removed off-site for re-use, recycling and waste disposal.

Site Entrance & Internal Access Tracks

At the decommission stage use of the internal access tracks for forestry and recreation activities will be restricted. It is considered appropriate to leave the site roads in situ for future forestry, agriculture, and recreational use. Retaining the internal access tracks will have a neutral effect on the construction and have a positive effect for the recreation purposes and as a means of transport for forestry and agriculture.

Decommissioning Traffic Impact

It is estimated that the volume of traffic associated with the decommission stage will be significantly less than the construction stage as the turbine foundation, internal access roads and substation will be retained. The proposed car parking and internal access roads will be used for forestry or other recreational purposes. The large volume of stone aggregate and concrete for the concrete pours brought to site during the construction stage will not require removal. The overall traffic associated with the decommission stage is likely to have a not significant adverse temporary effect.

On completion of the decommissioning works, the site will still facilitate forestry, agricultural and recreational use. The forestry and agricultural uses will have an imperceptible impact on the road network as they are existing operations occurring in the absence of the proposed wind farm. The recreational activities will generate additional traffic, this volume of traffic is. As in the operational stage, this traffic for recreational use of the Wind Farm will have a likely not significant / slight negative long-term effect on the road network in the vicinity of the Wind Farm.

16.11 MITIGATION MEASURES

Mitigation Measures – Construction Stage

Site Access

The selection of the site access locations on the L6483 (i.e. access point one, two and three), was based on minimising the impact of the proposed project on the local residents and the local road network.

The proposed wind farm access tracks approaching the L6483 site accesses will be widened to 7.0 m over a distance of 50m to allow for passing of construction vehicles.

In addition, a long passing bay will be constructed within the proposed wind farm site to facilitate queuing of vehicles away from the public road network. This passing bay is 5.0m x 70m long which can accommodate 7 no. concrete trucks.

Each passing bay within the proposed wind farm site is approximately 50m long by 4.5m wide, accommodating up to 5 no. of 10m standard rigid trucks. The passing bays will facilitate continuous movements to the works areas with limited disruptions. For passing bays refer to Drawing No. 10798-2004 to 2006 in Appendix 1-1.

The Traffic Management Plan (Appendix 2-7) will be reviewed and updated before the construction phase as mitigation for the turbine deliveries. Deliveries of the turbine components will happen under Garda escort at night-time and will adhere to the measures set out in the TMP.

The internal road layout has been designed to accommodate the swept paths of the vehicles anticipated onsite.

Junction Visibility

Adequate visibility is available from the site accesses onto the Local Road, L6483, of 2.4m 'x- distance' by 'y-distance' of 160m in accordance with the TII DN-GEO-03060. Maintenance of the hedgerows within the visibility splays shall be undertaken to maintain the required visibility splays and mitigate the potential for overgrown vegetation which may result in inadequate visibility at the accesses during the construction activities, see Appendix 1-1 Drawing No. 10798-2042.

Adequate visibility at the site accesses will mitigate the potential increased likelihood for collisions between construction generated traffic and existing road network traffic.

Junction Swept Paths

In accordance with the TII DN-GEO-03060 swept path analysis has been undertaken at the site accesses for a worst-case typical construction vehicle (i.e. articulated truck (16.5m long)), in addition to those undertaken for the AIL as outlined in Table 16-5. The swept path of the maximum legal articulated vehicle accessing/departing the site are available in Appendix 2-1.

As previously discussed in Section 16.5 the swept path analysis of the longest AIL, the turbine blade, were undertaken following identification of potential pinch points in the route assessment report as presented in drawings in Appendix 2-1. The swept path analysis used an 82m blade length which is the maximum blade length to be used in the windfarm.

The proposed site access design has been developed to take cognisance of the swept path of all vehicles arriving to and departing from the site. The gate has been positioned to allow

for a large vehicle to wait clear of passing traffic on the L6483, to avoid potential collision between a passing vehicle and one stopped to open the gates at the site access.

At the approach to the site accesses, the internal access tracks are proposed at a widened width of 7.0m, to accommodate safe clearance width between two large construction vehicles passing and acting as passing bays.

Site Drainage

Some drainage works will be required throughout the site at the accesses and adjacent to the internal access tracks as outlined in Chapter 9 Hydrology and Hydrogeology.

Haul Routes

Mitigation measures on the haul roads and cable route includes:

- Selection of a viable route with the lowest impact on the road network.
- Avoidance where possible of sensitive receptors and urban settings
    - The site access route encourages the use of the existing infrastructure in the area while avoiding the local road and potential sensitive receptors.
    - Turbine delivery route along national and regional roads with largest capacity to accommodate the vehicles.
    - The typical construction traffic haul roads are principally along the national and regional road network, avoiding the local primary and secondary roads.
    - Restricting HGV movements during peak sensitive times on the road networks (i.e. at school times)
    - The grid connection route will be laid primarily in forestry and peatlands, avoiding works within the public road with the exception of a single local road crossing.
- To mitigate traffic on the national road network, a number of routes will be utilised as sources of material for delivery.
- To mitigate the impact of the AIL delivery on the road network, the advanced works will be undertaken (i.e. hardstanding, making signs demountable, utility diversions etc). The hardstanding works areas will be temporary in nature and removed once the final turbine is delivered to site.

To mitigate the impact of the AIL deliveries these deliveries will be undertaken under garda and traffic management escort during off-peak (i.e. night-time) hours. The arrangement of the appropriate abnormal load licenses will be obtained by the appointed contractor in a timely fashion on procurement of the AIL. The appointed contractor will liaise with the relevant road's authorities and an Garda Síochána on the delivery schedule for the AILs.

Traffic Impact

To mitigate the impact of the construction traffic, the Traffic Management Plan in Appendix 2-7 will be implemented for the wind farm traffic. It will utilise all available resources within the existing site to reduce the requirement for importation of materials to site. Excavation of stone material from 4 no. borrow pits within the wind farm site to provide capping material will reduce the HGV volumes. Local roads will be maintained during the construction phase.

The second largest traffic volume impact is associated with the haulage of the materials for the internal access track construction. In addition to the borrow pits, the internal access tracks have been designed to utilise existing forestry access tracks where feasible, reducing the volume of materials required for importation to the site.

The largest volume traffic impact is associated with the concrete pours for the turbine foundations. The works at other areas within the main site will continue during these concrete pours, but only essential deliveries will be scheduled to occur on the same days as the concrete pours. To mitigate this impact, liaison with local authorities and the community in advance of the foundation pours will occur, as well as minimising other works/deliveries as noted.

Trench Reinstatement

To mitigate the impact of the cable laid within the public road (at the single local road crossing) the reinstatement works will be backfilled and reinstated as soon as practicable. The reinstatement works will be undertaken in accordance with the "Purple Book" best guidance and practices. The proposed reinstatement and construction details and phasing will be agreed with associated Local Authorities Municipal District Office in advance of the works. The Contractor will be responsible for arranging for the required road opening licenses.

Pre and Post-Construction Pavement Surveys

The client will undertake pre-construction and post-construction visual pavement surveys on the Haul Roads. Where the surveys conclude that damage on the roadway is attributable to the Construction Phase of the proposed project, the applicant will fund the appropriate reinstatement works to bring the road back to pre-construction condition as a minimum, details for which will be agreed with the Roads Authorities.

Traffic Management Plan (TMP)

The successful completion of this project will require significant co-ordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the project in order to minimise the effects of the additional traffic generated by the proposed project. The Traffic Management Plan (TMP) proposed for the Cloghercor Wind Farm is included in Appendix 2-7.

Note, the TMP has been included as a separate document. Any changes which may arise from the planning process and in the detailed construction programme can be incorporated.

The following mitigation has been incorporated into the TMP:

- Haul route selection to avoid sensitive receptors.
- Widened approaches to the site accesses within the development to facilitate queuing of construction vehicles off the public road.
- Traffic Management Operatives (TMOs) will be provided by the principal contractor in accordance with their Traffic Management Plan at the site accesses during peak construction traffic activities, refer to the TMP.
- A wheel wash will be provided within the site.
- A one way system in and out of the site will be in place for materials deliveries to avoid conflict between delivery vehicles and ensure the efficient flow of materials and vehicles.
- Passing bays on the internal access tracks to facilitate safe passing of vehicles within the site, vehicles travelling in a forward direction (reducing higher risk reversing manoeuvres).

Project Delays

To avoid delays to the project programme all required road opening licenses, agreements with the Local Authorities and an Garda Síochána to facilitate movement of abnormal loads shall be sought by the appointed Contractor in a timely manner.

16.12 MITIGATION MEASURES – OPERATIONAL STAGE

As outlined in Section 16.9, due to the relatively low operational traffic, it is envisaged that the operational impacts of the proposed project will be not significant / slight effect when compared to the existing background traffic. As such, no mitigation measures are proposed for the operation and maintenance of the wind farm and associated generated recreational traffic. In the event that a turbine requires replacing in the future, the current TDR will have to be re-assessed as road conditions may change over time.

16.13 MITIGATION MEASURES – DECOMMISSIONING STAGE

On decommissioning of the wind farm, a decommissioning plan will be prepared and implemented to minimise the effects during this stage. The decommissioning phase will employ similar mitigation measures as the construction phase. As the decommissioning phase is envisaged to be over 35 years from now, a new TMP will be undertaken to take account of any road improvements and changes to the network in the future.

When the turbine blades are decommissioned, they are cut to a more manageable size. The reduced blade section lengths, tower sections and nacelle are likely to remain abnormal loads, however the swept path of the long blades will be reduced. This will reduce the impact on third parties and existing road infrastructure (i.e. signs, vehicle restraint systems etc).

As previously mentioned, the large volume of material aggregate and concrete imported to site will remain onsite. The principal expected volumes of traffic will be primarily associated with the transportation off-site of turbine components and a significantly reduced volume of materials only (i.e. haul routes maintained, turbine foundations retained, substation retained, car parking hardstanding areas retained for future amenity), the residual impact is considered to be slight and temporary.

16.14 RESIDUAL EFFECTS

16.15 CONSTRUCTION STAGE

During the 24-month construction stage of the proposed project, it is forecast that the additional typical construction traffic that will appear on the delivery routes described in Table 16-7 and will have a variable effect and duration on the existing road network. The traffic volumes predicted to be generated to the wind farm site, as shown in Table 16-7, already account for the general mitigation by design (i.e. use of onsite borrow pits and use of existing forestry track infrastructure where feasible).

It is estimated that the 4 no. borrow pits will supply approximately two-thirds of the internal access road foundation material. The use of the borrow pits reduces the haulage of materials for the internal access track construction to a third of its total requirement. As stated in Chapter 2 (Description of the Proposed Project) a total of approximately 16 km of new internal access tracks are required for the proposed project. Upgrade of approximately 3 km of existing forestry access track will significantly reduce the aggregate required to be imported to site. As the second highest contributor to traffic volume (i.e. internal access track construction) for the

proposed project, the combined mitigation by design has resulted in a significant reduction in the potential impact.

The residual average construction traffic impact will remain with a short-term slight negative effect on the national road network and slight negative short- term effect on the L6483. The worst-case scenario residual construction traffic impact is the same as the peak potential impact on the L6483, with an expected short term adverse effect corresponding to the 19 no. days associated with the turbine foundation concrete pours. On the TDR there will be a non-significant residual effect following the temporary advanced works to accommodate the delivery of the turbine components (i.e. all street furniture demounted will be re-erected). At the locations requiring hard standing, the areas will be reinstated to existing conditions, resulting in a non-significant effect. During the construction works themselves, appropriate temporary traffic management will be employed at all works areas within the road. This will result in an impact on existing traffic on the road network and will have a moderate negative brief to temporary effect (depending on the location).

The cabling works will have a moderate negative brief effect on the local road network. The entire cable route is within forestry and peatlands within the wind farm site and at one location only it crosses the L6483 local road. Brief closure of the L6483 will be required but works will be undertaken off-peak and will be of very short duration (i.e. less than a day at the crossing point). On reinstatement of the road in accordance with the “Purple Book”, there will be no residual impacts caused by the cable laying.

16.16 OPERATIONAL STAGE

As the traffic effect of the proposed project will be imperceptible, long-term, negative during the operational stage, there will be no significant residual effects during this stage.

16.17 DECOMMISSIONING STAGE

As stated above, when the proposed project is decommissioned, a decommissioning plan will be prepared and implemented in order to minimise the residual effects during this stage. The decommissioning phase will employ similar mitigation measures as the construction phase. When the turbine blades are decommissioned, they are cut to a more manageable size reducing the overall impact of the AILs during removal from site. As the expected volumes of traffic will be primarily associated with the transportation off-site of turbine components and materials only, the residual effect is considered to be slight and temporary.

16.18 CUMULATIVE EFFECTS

16.19 CONSTRUCTION STAGE

Chapter 4 (Policy, Planning and Development) outlines all the relevant planning applications within the vicinity of the site to be considered as part of this cumulative assessment. The planning applications considered within this cumulative assessment effects are those consented, but not constructed. All refused, retained and continuation of current operations applications are accounted for within the baseline traffic including the existing forestry operations.

The following is a list of consented applications with potential to result in cumulative effects:

> **PL. Ref. 1750424** - A New Water Main In The L-6373-1, L6373-2 And L-6363-1 Public Roads, From The N56 Junction To A Proposed Water Storage Reservoir At Derryloughan (Ref Planning No 16/51737). Part Of The Watermain Is Inside The Boundary Of A Special Area Of Conservation (Sac) Known As West Of Ardara/Maas Road Sac. The Pipelines Are Part Of Improvements To The Regional

Water Supply Scheme. A Separate Planning Application For A Booster Pumping Station At Kincrum (Ref Planning No 16/50917) Also Refers. The Planning Application Is Accompanied By A Natura Impact Statement (Nis) at Kincrum, Lettermacaward And Cleengort And Derryloughan, Doochary, Donegal Po, Co. Donegal. This application was granted permission subject to 2 no. conditions. It is noted the permission to be issued will cease to have effect in five years from the date of issue as regards any part of the development not completed by that date.

PL. Ref. 1751928 – (1)Maintaining And Continuing The Use Of The Existing 30m Telecommunications Structure, Associated Antennae, Link Dishes For The Emergency Service Users And Associated Equipment Cabinets And (2)Additional Telecommunication/Broadband Equipment And Associated Cabinets, All Within Existing Sec urity Fence And Access Track. The Development Will Continue To Form Part Of The Existing Gsm, 3g And 4g Broadband Networks As Well As Providing Infrastrucure In Support Of Local Wireless Broadband Networks At Coilte Derkmore, Derkmore Td, Cleengort Hill, Glenties Co. Donegal. The planning application was granted approval subject to 4 no. conditions.

PL. Ref. 19/51040 – Construction of a New Forest Access Road Entrance at Clogherachullion Td, Glenleheen, Donegal Po, Co. Donegal. This Planning Application was granted permission on the 2nd of September 2019 subject to 6 no. conditions. It is expected the traffic volumes in relation to the prosed access will be low in volume.

PL. Ref. 20/50720 - Erection Of A Temporary 100m Meteorological Mast That Will Be Fixed To The Ground By Guy Wires, Together With All Ancillary Site Works For A Period Of Up To Five Years For The Purpose Of Measuring Local Climate Conditions And Collecting Meteorological Data at Clogherachullion & Cloghercor, Donegal Po, Co. Donegal. This application was refused permission by Donegal County Council and granted by An Bord Pleanála.

It is considered that the above mentioned proposed developments will have negligible impact. PL. Ref. 20/50720 will be decommissioned and removed prior to construction starting for the proposed project. PL. Ref. 1750424 has a five year permission and will likely be constructed prior to the construction of the proposed project. PL. Ref. 1751928 is the condition of the maintained existing infrastructure and it is expected the traffic volumes relating to PL. Ref. 19/51040 will be low for the construction of a new forest access.

16.20 OPERATIONAL STAGE

The cumulative effect on road and traffic will be the use of the infrastructure for existing agricultural activities, the proposed operational activities, and the recreational activities at the wind farm. As outlined in Section 16.9, the traffic volumes associated with these activities will be low and will have a likely slight negative long-term effect on the road network in the vicinity of the wind farm.

16.21 DECOMMISSIONING STAGE

No significant cumulative effects on road and traffic are envisaged, the expected volumes of traffic will be primarily associated with the transportation off-site of turbine components and materials only. The other cumulative effects of agriculture traffic is a baseflow traffic and the recreational traffic will generate low levels of traffic. The overall decommissioning stage traffic will be slight and temporary.

16.22 CONCLUSION

This chapter assesses the potential impact of the proposed project on the surrounding road network and its capacity. Regional access to the site area is typically via national roads (e.g., N56) with local access into the proposed site from the R262, R250, L6363 and L6483.

For developments of this nature, the construction phase is the critical impact period, with impacts experienced on the surrounding road network. The construction traffic impact assessment for the proposed project was developed based on the site layout, the construction materials required and the construction programme. In addition to this construction traffic also considers the traffic associated with the works required off site to accommodate a development of this nature, such as advanced AIL works.

The construction activity with the largest impact on the traffic volumes is the pouring of the turbine foundations and the second largest is the haul of material to the site for the internal access track construction. A number of haul routes were identified for the supply of these materials and at this stage no preferred construction material haul route has been selected but each has been assessed against available link capacity and change in HGV content.

A Stage 1 Road Safety Audit was undertaken and is included in Appendix 16-1. Key problems identified include, but not limited to Road width, Carriageway drainage and Gradient. In response to the RSA, all identified problems will be addressed prior to, and during, the construction phase.

To minimise the impact of the proposed project during the construction stage a TMP has been prepared. The site layout incorporates passing bays, widened approaches to the site accesses, internal access track loops and compounds to assist with the traffic management and delivery on the site by providing adequate locations clear of the public road for vehicles to queue, facilitating larger HGVs onsite to pass each other safely and also allows for reducing the high-risk reversing manoeuvres on site. The overall traffic impact will be significant impact (i.e. 19 days over 2 years). The operational stage of the project will result in low traffic volumes for operation and maintenance works at the wind farm. Existing traffic operations at the wind farm site for forestry and agriculture uses are accounted for in the baseflow traffic and will have a neutral impact as pre-existing. A benefit of the wind farm when constructed is its use as a recreational amenity (for walking). Traffic information from similar sites indicates that the recreation amenity will result in an increase of 11 movements to the proposed wind farm site per day. Due to the low volume of traffic, no mitigation measures were applied to the operational stage impacts. Overall, the operational stage traffic impact is likely to have a slight negative long-term effect on the road network in the vicinity of the wind farm.