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CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED FAHY BEG WIND FARM, CO. CLARE

VOLUME 2 – MAIN EIAR

CHAPTER 13 – TRAFFIC AND TRANSPORTATION

Prepared for: RWE Renewables Ireland Ltd.

RWE

Date: November 2022

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13. TRAFFIC AND TRANSPORTATION

13.1 Introduction

This section of the EIAR evaluates the proposed project in the context of the traffic and transportation within the study area. The assessment examines potential impacts and identifies mitigations for construction, operation and decommissioning of the project.

The proposed project will primarily consist of a wind farm of 8 no. wind turbine generators (WTG's), 1 no. substation compound along with ancillary civil and electrical infrastructure. The associated grid connection will consist entirely of underground cable and will connect the on-site 38kV substation to an existing 110kV substation at Ardnacrusha, Co. Clare. The assessed project also includes temporary accommodation works associated with the Turbine Delivery Route (TDR).

The TDR route was identified and surveyed by Pell Frischmann Consulting Engineers. Pell Frischmann is a multi-disciplinary and international consultant engineering company working across infrastructure, buildings, and regeneration. The commission was led by Gordon Buchan BEng (Hons), MSc, FCIHT, CMCILT, Divisional Director for Pell Frischmann and Timothy Lockett BSc, MCILT. Gordon has over 15 years' experience in undertaking abnormal load assessments across the UK, Republic of Ireland and northern Europe and has worked on over 500 wind farm sites. Timothy has over 10 years' experience and has worked on over 300 wind farm sites in the UK and Ireland.

Full details of the proposed project are contained in Chapter 3.

13.1.1 Study Area

The study area for the traffic and transportation chapter includes the main wind farm site along with the surrounding road network leading to and from the main wind farm site. Site access points are also assessed.

The roads associated with the grid connection are assessed as is the turbine delivery route.

The site location and surrounding road network comprising the study area is identified in Figure 13-1.

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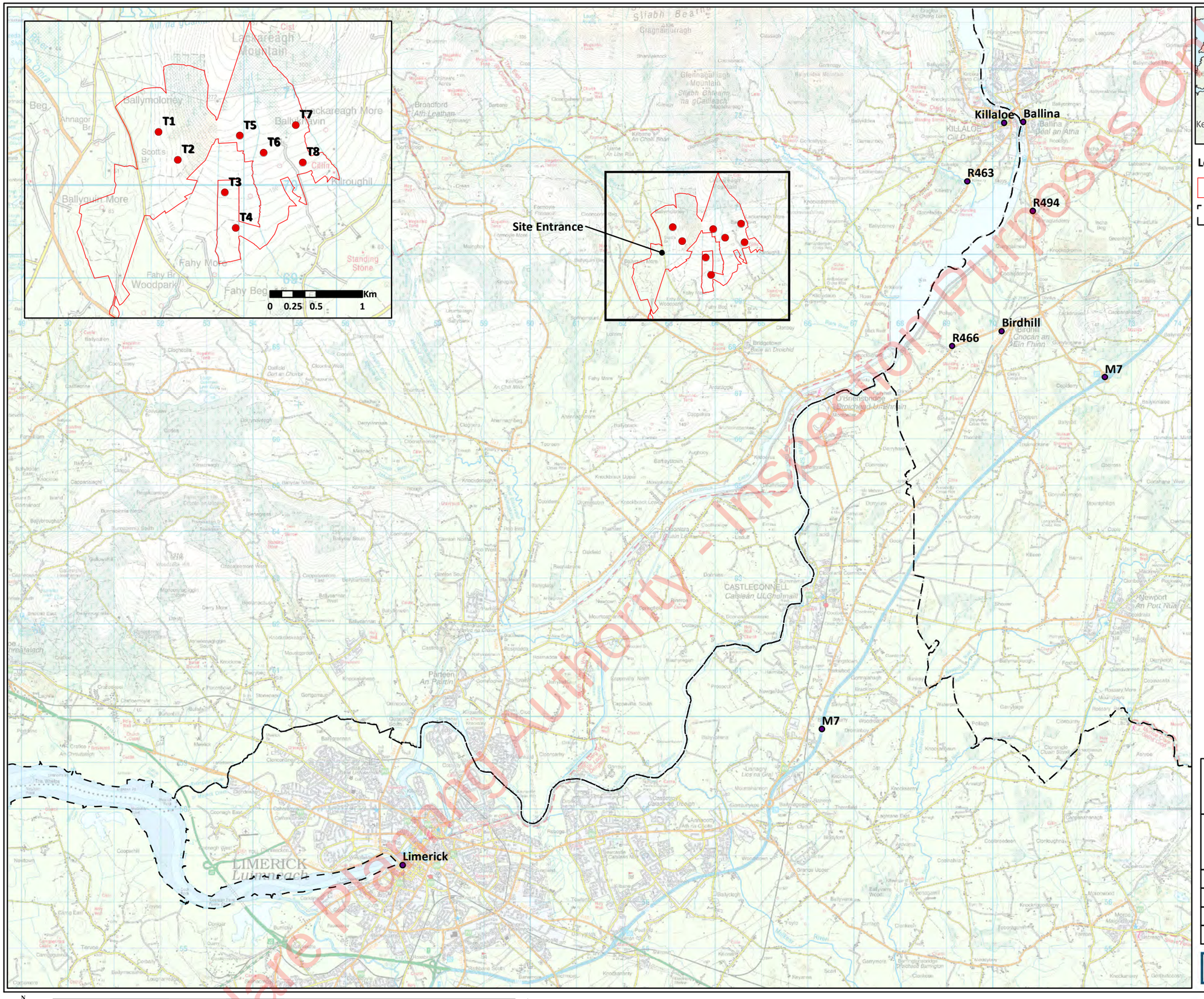

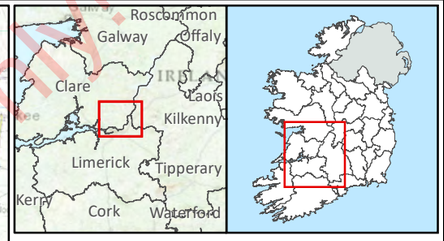

Legend

- Wind Farm Site Boundary
- County Boundaries
- Proposed Turbine Layout

TITLE:	Proposed Site Location and Surrounding Road Network		
PROJECT:	Fahy Beg Wind Farm, Co. Clare		
FIGURE NO:	13.1		
CLIENT:	RWE Renewables Ireland Ltd.		
SCALE:	1:80000	**REVISION:**	0
DATE:	25/08/2022	**PAGE SIZE:**	A3

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13.2 Assessment Methodology

The details of the proposed project are considered in relation to the construction, operation and decommissioning phases of the project.

The likely traffic that will be generated by each phase of the project is estimated to identify potential disruptions to existing road users within the study area. Based on the project construction methodologies described in Chapter 3 and the CEMP (Appendix 3.1), an estimate of the number of vehicles generated, as a result of the project is calculated. These estimates are used to assess the impact on the road network in numerical terms.

The potential for soiling or damage to public road infrastructure through poor construction practices as well as potential health and safety hazards through poor traffic management are also identified where applicable.

The effects of the project on the existing road network are then considered and described in terms of quality, duration and significance. Mitigation measures are then proposed followed by identification of residual impacts.

The potential for cumulative impacts from other developments are assessed in Section 13.9.

13.2.1 Construction Programming

As described in Chapter 3, the construction of the project in its entirety is expected to take between 12 – 18 months. A 12-month construction programme was assumed for construction traffic generation movement calculations as part of this assessment in order to assess for worst case (i.e. an accelerated construction programme leading to increased average vehicle movements per day).

The assessment uses a combination of field surveys, data counters, desktop studies and consultation.

13.2.2 Relevant Guidance

The following guidance was used during the assessment of traffic and transport in this EIAR:

- TII Publication: Traffic and Transport Assessment Guidelines, NRA, 2014;
- TII Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, 2021;
- EPA Guidelines on The Information to Be Contained In Environmental Impact Assessment Reports, 2022;
- Clare County Development Plan 2017 – 2023 (as varied), Clare County Council;
- Limerick Development Plan 2022-2028, Limerick City and County Council;
- TII Project Appraisal Guidelines for National Roads: Estimating AADT on National Roads, October 2016;
- NRA Project Appraisal Guidelines for National Roads: Unit 5.5 Link-Based Traffic Growth Forecasting, 2011.
- Guidance on the preparation of the Environmental Impact Assessment Report, European Commission, 2017;

- TII Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions) DN-GEO-03060 April 2017.

Traffic count data was obtained from open-source TII traffic counter information, Killaloe Bypass Route Selection Report March 2009, Shannon Bridge Crossing Route Selection Report Volume C – Appendices January 2006 and private traffic count data.

Other key sources of information used to assess traffic impacts include the following;

- Ordinance survey and aerial mapping;
- Project construction methodologies;
- Site Layout Plans;
- Route Survey Report for the Turbine Delivery Route carried out by Pell Frischmann, June 2022;

The above sources of information have been used to identify the study area and transport routes to be assessed.

13.2.3 Consultation

Transport Infrastructure Ireland (TII) were consulted through the EIAR scoping process. In a response dated 18th of March 2021, TII provided recommendations on consultation, potential traffic impacts and impacts (including visual impacts) on national roads for consideration in the EIAR.

Clare County Council were also consulted during the EIAR scoping phase, via a pre-planning consultation meeting on the 30th of July 2021.

The project liaison engineer for the Killaloe Bypass/Shannon Bridge Crossing/R494 Upgrade was consulted via a virtual meeting on the 6th of July 2022 to obtain a construction programme update. The worst case construction programme i.e latest commencement date for the project is a deferred start in March 2023. The construction works are expected to last 3 years. The estimated date of completion for the project is in 2026.

Consultation also took place with Limerick City and County Council who were issued a copy of the scoping information for the proposed project as well as a virtual meeting and follow up correspondence between FT and LCCC executive engineers on 20th October 2021. The consultation meeting was focused on Foynes Port, the port of entry (POE), and the proposed temporary accommodation requirements within LCCC's jurisdiction.

Details of the above and further consultations are contained in Appendix 13-2 and in Chapter 5 of this EIAR.

13.3 Existing Environment

13.3.1 Existing Road Network

Roads in the Republic of Ireland are classified as motorways, national (primary and secondary), regional and local roads. Transport Infrastructure Ireland (TII) has overall responsibility for the planning and supervision of the construction and maintenance of motorways, national primary and secondary roads. The local authorities have responsibility for all non-national roads. The hierarchy of roads throughout Ireland is outlined in Table 13.1:

Table 13-1: Road Categories

Road Category	Description
Motorways	These are high quality multiple lane roads with limited grade separated junctions. They are high speed (120kmph) road predominantly provided to facilitate strategic traffic with reduced journey times.
National Primary Roads	These are predominantly single carriageway, with some that are dual carriageway. Generally high speed (100kmph) roads that facilitate strategic traffic, with reduced journey times.
National Secondary Roads	These are medium distance through-routes connecting towns, serving medium to large geographical areas and link to primary routes to form a homogeneous arterial network.
Regional Roads	Predominantly single carriageway roads of regional and local importance. These roads generally receive more frequent maintenance criteria than Local Roads and therefore tend to be structurally sound.
Local Roads (Primary, Secondary and Tertiary)	The local road system is operated in three tiers defining local importance, usage and maintenance priorities. They form a network of single carriageway roads of varying quality.

Motorways

The nearest motorway to the site is the **M7** which connects Limerick City to Dublin. The M7 is located approximately 8km to the south east of the windfarm site. As part of the turbine delivery route it is proposed to utilise the M7 motorway for approximately 20km. The AADT for the M07 in 2019[1] according to TII automatic traffic counter data was approximately 21,110 with approximately 7.9% of this total comprised of HGV traffic.

The **M18** is located approximately 25km west of the proposed wind farm site. The M18 connects Shannon to the M6 near Athenry. The M18 is the primary artery between Limerick and Galway. The M18 does not form part of the TDR and is therefore not part of the study area for this assessment.

There are no other motorways located in proximity to the proposed wind farm site.

National Primary Routes

To the south the nearest national primary route is the **N18**. The N18 connects Shannon to Limerick city and is approximately 16km south of the proposed wind farm site. The AADT for the N18 in 2019[1] according to TII automatic traffic counter data was approximately 39,537 with approximately 4% of this total comprised of HGV traffic. The N18 forms part of the TDR for the proposed project.

The **N69** is a national primary route which connects Tralee to Limerick and is located approximately 15km to the south west of the proposed wind farm site. The AADT for the N69 in 2019 according to TII automatic traffic counter data was approximately 6,282 with approximately 7.5% of this total comprised of HGV traffic. The N69 forms part of the TDR for the proposed project.

Regional Roads

There are several regional roads in the vicinity of the proposed project. The turbine delivery route proposes the use of these regional roads to the southeast of the site. The closest regional road which connects the proposed site entrance to the R463 at O'Briensbridge Cross is the R466. Other nearby regional roads include the R525 to the southeast and the R465 to the west of the site.

Regional roads associated with the grid connection are located between the Ardnacrusha substation and the proposed on-site substation compound to the south west of the site boundary. The grid connection utilises the R466 regional road for approximately 0.4km before turning right onto the Fahymore local road and continues right onto the R471 for approximately 1.4km. The GCR will turn left onto the R465 for approximately 3.6km before using the local road network to access the Ardnacrusha 110kv Substation.

Local Roads

There are several local roads in the vicinity of the proposed project. The closest local road is located along the western boundary of the Ballyquinn quarry site. The proposed delivery route proposes the use of this local road to connect the quarry site to the main wind farm site.

There are no other local roads utilised for the turbine delivery route to the proposed wind farm site.

Local roads associated with the grid connection include the Fahymore local road for approximately 3.5km located between the R466 and R471. The grid connection utilises the L3046 for approximately 0.4km and the L3056 road for approximately 0.9km before turning left onto the Ardnacrusha access road for approximately 0.35km where it reaches the Ardnacrusha 110kV Substation.

The site location and existing road network is shown on Figure 13-1.

[1] Most recent full year of data available representing normal (pre-Covid 19) traffic conditions.

Table 13-2: Baseline Traffic Volumes

Road	Projected Baseline AADT		
	HGV	LGV	AADT
M07 - TMU M07 170.0 W M07 Between Jn27 Birdill and Jn28 Castletroy Birdhill, Co. Tipperary [2]	1,668	19,442	21,110
N18 - TMU N18 090.0 N N18 Between Jn4 Cratloemoyle and Jn5 Cratloe, Cratloe, Co Clare[2]	1,581	37,956	39,537
N69 - TMU N18 090.0 N N18 Between Jn4 Cratloemoyle and Jn5 Cratloe, Cratloe, Co Clare[2]	471	5,811	6,282
R494 (to the south of the R494-R496 junction)[3]	295	3,805	4,100
R463[4]	326	4,196	4,522
R466[4]	248	2,232	2,480

AADT figures were projected to a proposed construction commencement year of 2025 from 2019 source data for the M7, N18 and N69 in accordance with TII Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, 2021. AADT figures for the regional road network were projected to a proposed construction commencement year of 2025 from 2007 source data in accordance with NRA Project Appraisal Guidelines for National Roads: Unit 5.5 Link-Based Traffic Growth Forecasting, 2011, TII Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, 2016 and 2021.

[2] Source: TII Traffic Count Data Website

[3] Killaloe Bypass and R494 Improvement Route Selection Report, Page 16
[4] Shannon Bridge Crossing Volume C Route Selection Report Appendices, Page A4

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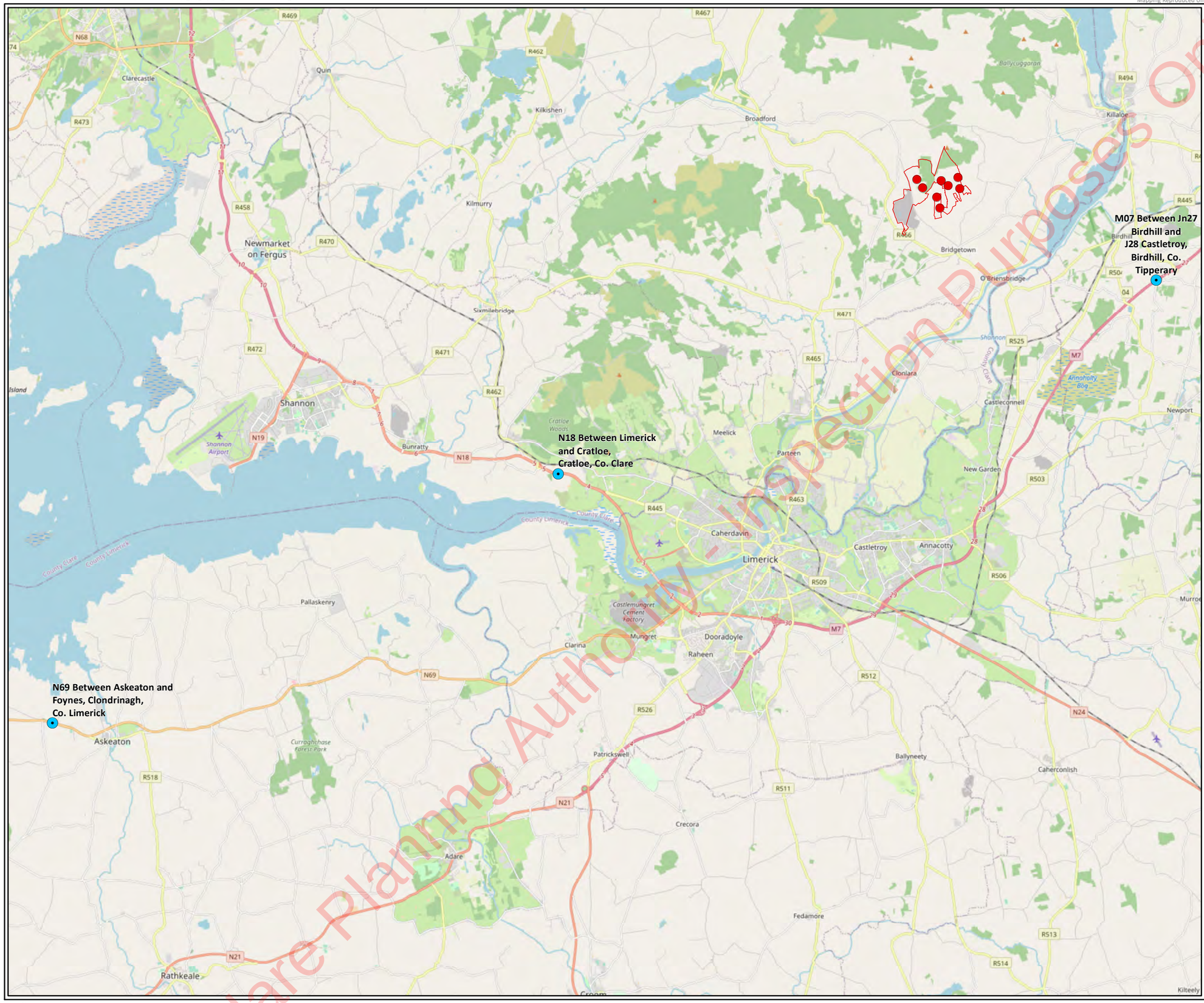

Legend

- Wind Farm Site Boundary
- Proposed Turbine Layout
- TII Traffic Counter Locations

N
W E
S

0 1 2 4 Kilometers

TITLE:	Traffic Counter Locations		
PROJECT:	Fahy Beg Wind Farm, Co. Clare		
FIGURE NO:	13.2		
CLIENT:	RWE Renewables Ireland Ltd.		
SCALE:	1:135000	**REVISION:**	0
DATE:	01/09/2022	**PAGE SIZE:**	A3

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13.4 Proposed Development

A detailed description of the project assessed in this EIAR is provided in Chapter 3 and is comprised of three main elements:

- The wind farm site (also referred to in this EIAR as 'the Site');
- The grid connection;
- The turbine delivery route (also referred to in this EIAR as 'the TDR');

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

The associated grid connection will consist entirely of underground cable and will connect the on-site substation to the existing 110kV substation at Ardnacrusha, Co. Clare. The GCR will be 10.612km, in length, with 10.335km to be constructed within the existing public road corridor. The proposed grid connection cable route is identified in Figure 13-11.

The turbine delivery route includes all aspects of the route from the Foynes port to the site entrance including proposed temporary accommodation requirements to facilitate the delivery of wind turbine components.

13.4.1 Construction Programme

The construction of the project in its entirety is expected to take between 12 – 18 months. A 12 month programme was assumed for purposes of assessing worst case for traffic volumes as it would result in greater levels of average daily traffic.

There are a number of items which will be conducted in parallel, but the basis of the construction programme will involve site establishment, site access road and drainage construction, hardstanding construction and substation works. The grid connection works are likely to be done in parallel with the site works and the turbine installation works and completed before the commissioning, reinstatement and landscaping phases are completed. However it is also possible that the grid route could commence prior to the on-site infrastructure or subsequent to the construction of the on-site infrastructure. Carrying out the grid connection works in parallel with the site works represents the worst-case scenario.

An indicative construction programme upon which vehicle trip distribution calculations are based is shown in Table 13-3.

Table 13-3 Proposed Construction Programme

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Mobilisation and site setup												
Site clearance and felling												
Internal access tracks												
Turbine hard standings												
Turbine foundations												
Turbine Installation												
Onsite substation												
Grid connection cable works												
Private electrical network												
Landscaping, reinstatement, demobilisation												

13.4.2 Main Wind Farm Site

As described above, the main wind farm site includes the wind turbines, internal access tracks, hard standings, the permanent meteorological masts, onsite substation, internal electrical and communications cabling, temporary construction compound, drainage infrastructure and all associated works related to the construction of the wind farm.

13.4.2.1 Site Access

Fahy Beg Wind Farm shall involve the use of one existing quarry entrance, one new quarry entrance and one agricultural entrance as access points from the public road. The locations of these access points are shown on Figure 13-13. An assessment of the existing geometry and sightlines from these entrances was carried out in September 2020 with existing visibility presented in Table 13-4.

The access points have been selected with consideration for safety of public road users and construction staff and to ensure they can be constructed to comply with the requirements of both Clare County Council and TII design requirements for direct accesses. Each of the access points are described in detail below.

Access Point 1: This is the main site entrance for the wind farm. An existing Roadstone quarry access shall be upgraded to facilitate the delivery of turbine components. All turbine components accessing the site shall use this entrance. The proposed grid connection export cable shall exit this site through this access point. This access point shall also be used for construction and operation vehicles and shall be used by both HGV's and LGV's. This access is already regularly used by HGV's and machinery associated with quarry activities and will continue to be used for such purposes during the construction and operation phases of the project.

The entrance is an existing entrance to the Roadstone Ballyquin quarry located on the R466 regional road. The R466 has a posted speed limit of 80kph. The minimum sight distance for an 80kph road is 160m in line with Transport Infrastructure Ireland (TII) standards (TII Publication DN-GEO-03060). Overhead lines traverse the entrance. At the road edge, the entrance bell-mouth is 45-metres wide.

Line of sight was first established at the center point of the entrance bell-mouth. Visibility at this point allows for 100m west (RHS) and 97m east (LHS). The LHS is constrained by vegetation which hinders visibility. Existing visibility at this access point is currently non-compliant with TII visibility distance requirements in both directions. It is proposed to widen the existing bellmouth and level the grass verge and kerb with the existing road surface to facilitate the over-sized turbine delivery vehicles entering the site at this point. The detail is shown on 0101-Series planning application drawings included with the planning application. Visual obstructions shall be removed to achieve target 'Y' visibility distances in both directions of 160m in accordance with TII design specifications.

Figure 13-3 Access Point 1

Figure 13-4 Access Point 1 View West (Right) Setback 3m from Road Edge

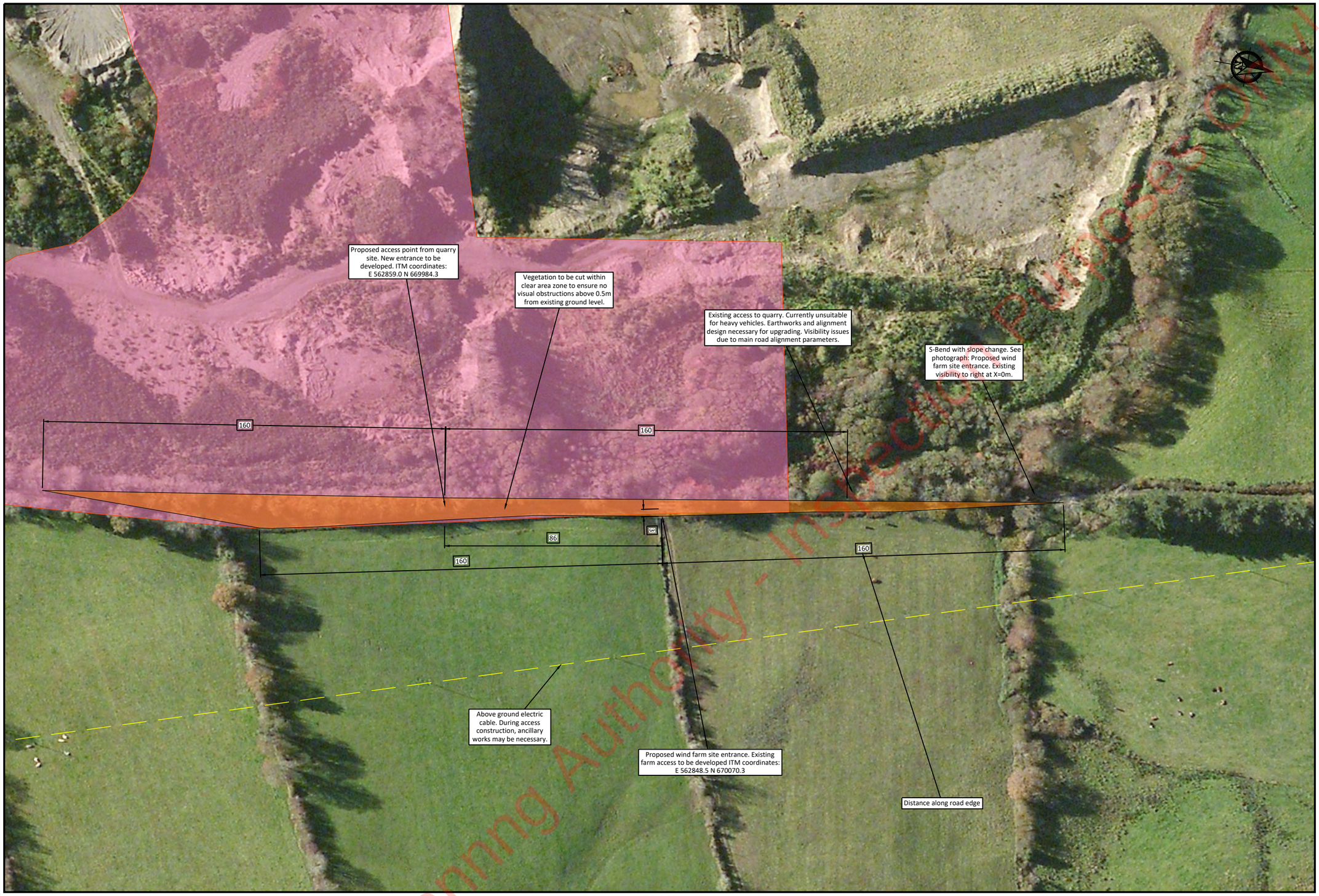
Figure 13-5 Access Point 1 View East (Left) Setback 3m from Road Edge

Access Point 2 : ITM coordinates: E 562859.0 N 669984.3. This access point in located in the center of the site boundary. It is approximately 1km North of Access point 1. An existing agricultural field access shall be upgraded to facilitate the delivery of turbine components. This access point shall be used for construction and operation by both HGV's and LGV's crossing the local road from the Quarry site. This access is already regularly used by HGV's associated with agricultural activities and will continue to be used for these activities during the construction and operation phases of the proposed project. When required, these entrances will be controlled by flagmen to assist traffic movements. The proposed crossing point from the quarry to the main wind farm site will be managed appropriately to allow the safe passage of construction vehicles in, out and across the public road. Priority will be maintained for public traffic. A concrete apron will be provided on both sides of the crossing point during the construction phase, constructed 40mm below road level and overlaid with surface course material.

The entrance is an existing agricultural access located on a local road. No posted speed limits were observed along the local road during the entrance assessment site visit. Speed limits applied to unposted rural local roads in the Republic of Ireland are 80kph. The minimum sight distance for an 80kph road is 160m in line with Transport Infrastructure Ireland (TII) standards (TII Publication DN-GEO-03060).

Line of sight was first established at the center point of the field access. Visibility at this point allows for 11-metres west (RHS) and 14-metres east (LHS) setback 3-metres from the road edge. Sightlines on the opposite side of the road for the entrance connecting the main windfarm site to the Ballyquin quarry site were also 11-metres west (RHS) and 14-metres east (LHS). Hedgerow vegetation hinders visibility in both directions. Existing visibility at these access points is currently non-compliant with TII visibility distance requirements in both directions. It is proposed to widen the existing bellmouth to facilitate the over-sized turbine delivery vehicles entering the site from the adjacent new quarry entrance at this point. The new site entrance has been designed in accordance with TII design guidelines DN-GEO-03060. The layout of this access point and the extents of visual obstruction removal details are shown in Figure 13-6 below and on 0101-Series planning application drawings included with the planning application. Visual obstructions which are 1-metre above ground level shall be removed to achieve target 'Y' visibility distances in both directions of 160-metres in accordance with TII design specifications.

Figure 13-6 Access Point 2



Legend

Clear Area For Visibility

Wayleave Row Option Area
(Available area inside quarry)

Proposed wind farm site entrance.
Existing visibility to right at X=0m

PLAN

Scale 1:1500

0m 8m 15m 23m 30m 38m 45m 53m 60m 68m 75m

Scale 1:1500

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Rev.	Description	App By	Date
A	FOR DISCUSSION	TB	23.09.20

PROJECT: FAHY BEG WIND FARM CO. CLARE

CLIENT: RWE RENEWABLES IRELAND LTD

SHEET: SITE ENTRANCE CLEARING REQUIRED

Date: 23.09.20
Project number: P20-003
Scale (@ A3): 1:1500
Drawn by: POR
Checked by: TB
Drawing Number: P20-003-INFO-0001
Rev: A

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Wednesday 23 September 2020

Figure 13-8 Access Point 2 View South (Left) Setback 3m From Road Edge

Figure 13-9 Access Point 2 View North (Right) Setback 3m From Road Edge

Table 13-4 Existing Visibility at Proposed Entrance Locations

Access Point	Coordinates	Y (m) at x=0m[5]		Y (m) at x=3m[6]		Major Road Average Width (m)	Major Road Speed Limit (kph)[7]
		To Right	To Left	To Right	To Left		
1	52°46'03.3"N, 8°33'19.0"W	160	130	100	97	6	80
2	52°46'49.4"N, 8°33'02.6"W	110	110	11	14	5	80

13.4.2.2 Felling

In addition to site entrance clearing, felling of coniferous forestry is required within and around the wind farm infrastructure to accommodate the construction of turbines, hardstands, crane pads, access tracks, the proposed onsite substation and to provide for mitigation for Bat species, as detailed in Chapter 8: Biodiversity.

13.4.2.3 Permanent Met Mast

1 no. permanent meteorological (Met) mast shall be erected on site. The permanent met mast shall be of the following configuration:

- 100m high free standing lattice steel mast with a shallow concrete foundation. The mast will include a concrete base measuring 10m by 10m and will be up to 1.5m in depth.

The mast will be accessed from the proposed wind farm internal access road network as shown on layout plans. The met mast access track will be 3.5m in width and will include drainage.

[5] The distance back along the minor road or direct access from which the full visibility is measured is known as the 'x' distance. It is measured back along the centreline of the minor road or direct access from the continuation of the line of the nearside edge of the paved surface (including hard strip or hard shoulder) of the major road. (TII Standard DN-GEO-03060: Geometric Design of Junctions, June 2017).

[6] From the point "x" metres back from the major road a driver approaching the junction along the minor road shall be able to see clearly points to the left and right on the nearer edge of the major road running carriageway at a distance measured from its intersection with the centreline of the minor road. This is called the 'y' distance. (TII Standard DN-GEO-03060: Geometric Design of Junctions, June 2017).

[7] Where no posted speed limit is available for public road in question, a speed limit of 80kph is assumed.

13.4.2.4 Construction Haul Routes

In constructing the wind farm, materials and plant will need to be delivered to the site. The material haul routes will include some of the surrounding road network which will need to cater for the additional traffic associated with the project. The Haul Route Map is shown in Figure 13-13.

The traffic impact assessment detailed in section 13.6 assumes the worst case for imported aggregate material from surrounding quarries. This assumes all imported material for roads, foundations, structural fill etc. will be transported from externally licensed quarries. The surrounding quarries currently in operation and indicative haul routes to the site have been identified. This is described in Section 13.4.2.4 and illustrated in Figure 13-10 below. The closest external quarry to the site is the Ballycar Quarry in Ardnacrusha, Co. Clare located approximately 8km (SW) from the wind farm site.

The location of licensed waste facilities are identified in Section 13.4.2.5. All materials required for the construction of the proposed wind farm shall approach the site from the south east along the R466 and R463 regional roads. This shall act as the main haul route for the construction phase of the project.

Traffic associated with the construction phase include:

- HGVs carrying aggregates, pipes and other materials associated with construction of the internal access tracks, hard standings and drainage infrastructure;
- HGVs (Concrete wagons) carrying concrete for turbine foundations and substation foundations;
- HGVs carrying building materials for the substation as well as electrical equipment and cabling;
- HGVs carrying plant and fuel;
- HGVs exporting site waste;
- Cranes and associated elements for erecting the turbines; and
- Private cars and vans for the commuting workforce.

The surrounding quarries currently in operation and indicative haul routes to the site have been identified in Figure 13-10. The nearest supplier of quarry stone (TII Class 6 products):

1. Roadstone Ballyquin Pit – Ballyquin, O'Brien's Bridge, Co. Clare
2. Ballycar Quarry - Ballycar, Ardnacrusha, Co. Clare. Located approximately 8km (SW) from the Fahy Beg Wind Farm site.
3. McGrath's Quarry - Fortane, O'Callaghan's Mills, Co. Clare. Located approximately 19.2km from the Fahy Beg Wind Farm site.

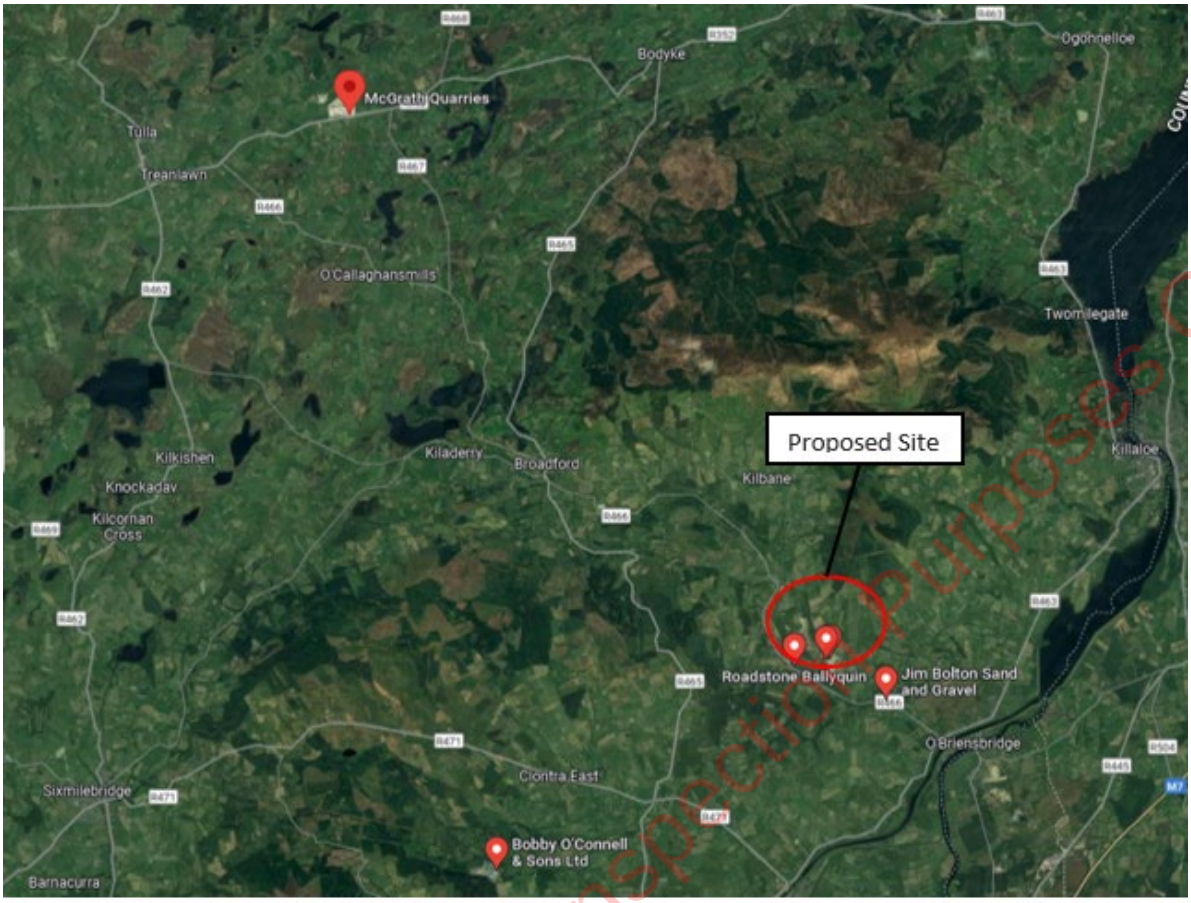

Figure 13-10: Surrounding Quarries near Fahy Beg Wind Farm Site

13.4.2.5 Waste Management

Authorised waste management facilities have been identified in the greater County Clare area as listed on the Local Authority Waste Facility Register by the National Waste Collection Permit Office. The authorised waste facilities utilised during the construction and decommissioning of the proposed project will depend on the contractors appointed and will depend on the capacity of the various facilities at the time of construction and decommissioning. A list of existing licensed waste facilities in proximity to the wind farm site are presented in Table 13-5 below. These facilities were identified at the time of the preparation of this EIAR.

Table 13-5: Licensed Waste Facilities in the Vicinity of Fahy Beg Wind Farm

Licensed Waste Facility Location	Type of Waste
Roadstone Ltd, Ballyquin More O'Brien's Bridge Co.Clare.	Soil and stones
Ballyquin Beg, Kilbane, Broadford Co Clare.	Mixture of concrete, bricks, tiles and ceramics. Soil and stones
O'Connell Quarries, Ballycar, Ardnacrusha, Co.Clare.	Concrete, mixture concrete, bricks, tiles, and ceramics, bituminous mixtures

Licensed Waste Facility Location	Type of Waste
Jim Bolton Sand and Gravel Ltd, Faheymore, O'Briens Bridge, Co Clare.	Soil and stones
10B Knockbeg Point, Ballyhennessy, Shannon Co. Clare	Waste metal, cables, mixed metals

13.4.3 Grid Connection

13.4.3.1 Grid Connection Cable Works

As described in Chapter 3, electricity generated from wind turbines shall be collected at medium voltage (20/33 kV) by an internal circuit of buried cables which primarily will follow on-site access tracks. This circuit shall be terminated at a proposed 38kV onsite substation and exported to the grid via a 38 kV buried cable to the existing Ardnacrusha substation.

The underground grid route connection works to Ardnacrusha substation will involve the installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables predominantly along the existing road network. These works shall be undertaken on a rolling basis with short sections (up to several hundred metres in length) closed for short periods before moving onto the next section. This will require delivery of plant and construction materials to the sections along the route, followed by excavation, laying of cables and subsequent reinstatement of trenches and road surfaces.

It is expected that full road closures will be put in place to facilitate cabling works in combination with lane closures, partial road closures and stop/go systems. This will enable the works to be completed as quickly and as safely as possible, with minimal disruption time for residents of the area.

A careful approach will be taken to planning the works to ensure minimal impacts on road users and the general public.

Due to the length of cabling within the road corridor (ca. 10.335km), these works are expected to be conducted over a 6-month period. Road closures will be applied for by the appointed contractor and will outline local diversions whilst always maintaining local access for residents, farms and businesses.

Road closures will be subject to the applicable statutory licensing processes as implemented by the roads authority. Road closures will be facilitated by the existing network of roads in the area.

The grid connection route including roads identified as requiring full closures are identified in Figure 13-11.

13.4.3.2 Trench Details

Details for trench reinstatement are contained in the CEMP Appendix 3-1 and shall be designed and constructed in accordance with Eirgrid specifications[8].

All materials used in the reinstatement of trenches will comply with the requirements of the Department of Transport guidelines for the Opening, Backfilling and Reinstatement of Trenches in Public Roads and the TII Specifications for Road Works.

It is proposed that all roads will be reinstated expeditiously on completion of the construction works. Roads will be reinstated to their pre-works condition or better and to the satisfaction of the roads authority.

Trench excavation, backfilling and road surface reinstatement methodologies are described in Chapter 3 and the CEMP. Details of trench reinstatement can be found in 0500-Series planning application drawings.

13.4.3.3 Watercourse Crossings Along the GCR

The following table summarises the proposed water crossing methods along the grid connection within the public road:

Table 13-6: Grid Connection Crossings within the Public Road

Feature ID	ITM_X	ITM_Y	Grid cable method crossing
GCR-WCC1	562590	668599	HDD in public road corridor
GCR-WCC2	559990	665894	HDD in public road corridor
GCR-WCC3	559336	665588	HDD in public road corridor
GCR-WCC4	559244	662663	HDD in public road corridor

There are four existing watercourses located along the proposed GCR on the public road. These watercourses are the Bridgetown (Clare) Stream, Glenlon South Stream, the River Blackwater and the Glenomra Wood stream. There are 4 major water crossings encountered on the proposed grid connection route. The first crossing may not require an HDD and will be passed in the form of ducting in a flat formation across the bridge, further survey is required for full route design to establish extent of existing services in the road and junctions either side of the bridge. The solution may be to cross via HDD to avoid any service crossing conflicts. The second crossing is over the river Blackwater and will require a HDD due to lack of cover in the bridge. Both bridge crossings will remain in the road corridor. The third crossing is located on R471 over the Glenomra wood stream and will require a HDD crossing. The fourth and final major water crossing is located on the R466 road approximately 100m before the entrance to the windfarm and is located on a tributary of the Bridgetown river. Therefore, construction and installation of the ducts shall not require works within the watercourse and shall not affect the watercourse. A description of construction methodologies for watercourse crossings is presented in in the CEMP and Chapter 3.

A careful approach will be taken to planning the works to ensure minimal impacts on road users and the general public. The cable trenching will be carried out with the aid of either a lane closure or road closure, which will ensure that the trenching works are completed as expeditiously as possible.

[8] https://www.eirgridgroup.com/customer-and-industry/general-customer-information/transmission-policies-and/

Due to the length of cabling within the road corridor, these works are expected to be conducted just over a 6 - month period (ca. 25 weeks, assuming 75m of cable laid per day). The road closures will be applied for by the appointed contractor and will outline local diversions whilst maintaining local access at all times for residents, farms and businesses.

Road closures will be subject to the applicable statutory processes as implemented by the roads authority. Road closures will be facilitated by the existing network of roads in the area. 'Rolling road closures' will be implemented, whereby the site will progress each day along a road, which will have the effect of reducing the impact for local residents.

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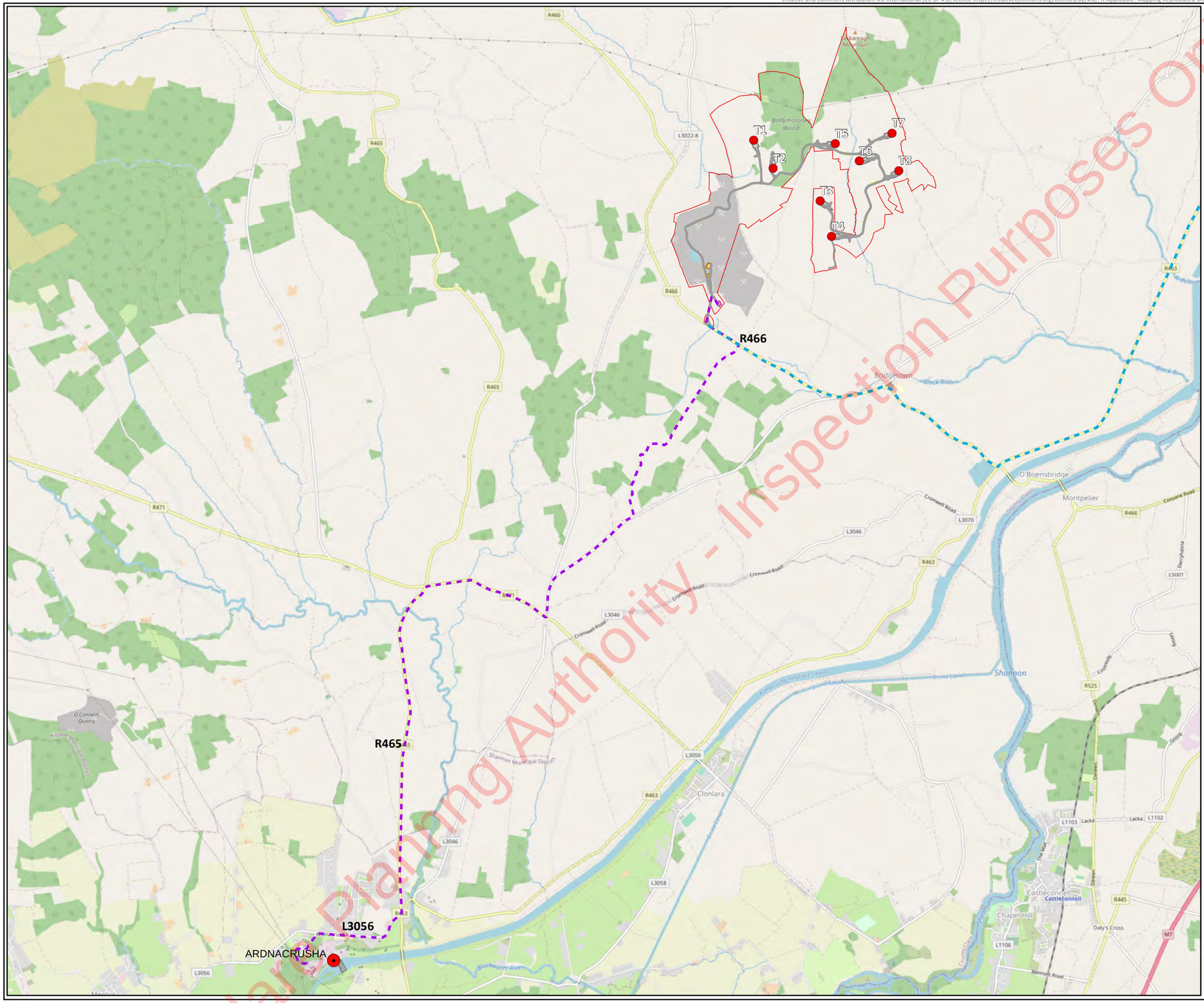

Legend

- Wind Farm Site Boundary
- Passing Bays
- Turbine Hardstanding Area
- Construction Compound
- Substation Compound
- Ardnacrusha Substation (110kV)
- Proposed Turbine Layout
- Met Mast Access Track
- Turbine Delivery Route
- Grid Connection Route
- Onsite Access Roads

N W E S

0 0.5 1 2 Kilometers

TITLE:	Grid Connection		
PROJECT:	Fahy Beg Wind Farm, Co. Clare		
FIGURE NO:	13-11		
CLIENT:	RWE Renewables Ireland Ltd.		
SCALE:	1:40000	**REVISION:**	0
DATE:	12/12/2022	**PAGE SIZE:**	A3

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13.4.4 Turbine Delivery Route

The proposed turbine delivery route is presented in Figure 13-12. A Delivery Route Selection and Assessment was carried out to identify the optimum delivery route to site and is presented as Appendix 13-2 of this EIAR.

Large components associated with the wind farm construction will be transported to site via the identified turbine delivery route (TDR). The proposed access route to site is as follows:

- Loads will depart Foynes Port and turn left onto the N69 travelling east;
- Join the eastbound N18 at Junction 2, Limerick and continue east onto the M7;
- Depart the M7 at Junction 27 and continue north on the R494 towards Killaloe;
- Turn left onto the proposed bypass and utilise the new Shannon River crossing before turning left onto the R463 travelling southbound;
- Continue south on the R463 before turning right onto the R466;
- Loads will continue north on the R466 to the proposed site entrance.

In some cases, temporary accommodation requirements are needed along the turbine delivery route such as hedge or tree cutting, relocation of powerlines/poles, relocation of street furniture (lampposts, signage) and local road widening. All temporary accommodation requirements to facilitate the delivery of wind turbine components are summarised in Table 13-7 and are assessed. Any accommodation requirements within the public road corridor will be carried out in advance of the turbine deliveries in agreement with the local authority and subject to a road opening license.

The location of accommodation requirements are shown in Figure 13-12.

Key elements of the temporary accommodation works for the delivery of turbines are summarised below. A full list of proposed temporary accommodation works are presented in Chapter 3.

Table 13-7: TDR Temporary Accommodation Works

TDR Node Reference Number (POI)	Location	Summary Description of Proposed Temporary Accommodation Works
27	R463/R466 Junction	Load bearing surface to be laid. One junction box, utility marker post, road signs and tree stumps should be removed. Existing utilities to be protected.
30	R466 Bends Northwest of O'Briensbridge Cross	Load bearing surface to be laid. Trees, vegetation and hedgerows to be trimmed.
31	R466 Bends Southeast of Bridgetown	Load bearing surface to be laid. Road sign, trees, fence and vegetation to be removed. Vegetation, road sign and trees to be removed. Embankment to be reprofiled.
32	R466 Left Bend at Bridgetown	Load bearing surface to be laid. Road sign, trees, fence and vegetation to be removed.

Pell Frischmann (PF) were commissioned by Fehily Timoney (FT) to undertake a study of the delivery route for wind turbine Abnormal Indivisible Loads (AIL) associated with the construction and development of Fahy Beg Wind Farm. The Route Survey Review (RSR) has been prepared to help inform the EIAR on the issues associated with the development of the site with regard to off-site transport and access for AIL traffic and includes a detailed swept path analysis (SPA). The report identifies the key issues associated with AIL deliveries and identifies remedial works, either in the form of physical works or as traffic management interventions that will be required to accommodate the predicted loads. A copy of this report is contained in Appendix 13-1. The use of the Vestas V136 turbine at the site was considered. Following a review of the components, it is considered that the V136 blade and combination of the mid tower with the width of the base tower represents the largest components for further assessment based on the possible combinations available. Their details are contained in The Route Survey Review (RSR) in Appendix 13.1.

13.4.4.1 Existing Utilities and Overhead Lines

All overhead utilities and obstructions shall be removed at any locations that the blades are raised on the blade lifting trailer, namely at O'Briensbridge Cross, upon entering Bridetown along the R466 and turning right to access the Ballyquin quarry site entrance from the R466. The removal of overhead utilities will be either temporary disconnections or permanent re-routing. Such works will be carried out by the utility providers in advance of turbine delivery to site.

The permanent re-routing of overhead utilities will result in a temporary disruption to power and telecommunications services for existing residents and business and will also involve temporary road works to 'underground' these services. The location of the rerouting will be agreed with the utility provider.

A traffic management plan will be agreed with Clare County Council in advance of any such works. Any trenching and road reinstatement works associated with utility diversions will be subject to a road opening license and is expected to be carried out in such a way as to ensure one lane of traffic will be open to traffic at all times. Such works will be carried out over a number of days (estimated 1 day per service).

However, if the permanent re-routing of overhead utilities is not possible, temporary disconnections of overhead lines will be required on several occasions to facilitate the delivery of turbine blades and will be carried out during the delivery of the components. Advance disconnection works will be required before the first turbine deliveries.

The schedule of turbine component deliveries will be determined by the turbine supplier however it is reasonable and worst case to assume that four convoys will be required to deliver all of the turbine components to site over the course of the turbine installation works which is expected to take place over the course of 4 months. This is based on a total of 7 no. loads per turbine to deliver blades, tower sections and nacelles, with each convoy consisting of components for two turbines at a time. Over the course of the 4 -month installation period, it has been assumed convoys will be scheduled to deliver components to site every 4 weeks. It is reasonable to assume a worst-case scenario where temporary disconnections will be required during off peak times, on four different occasions over the course of four months (approximately once every month) to facilitate convoys, with a duration of several hours between disconnection and re-connection of services on each occasion. The impact on residents and businesses is assessed in Chapter 11, Population, Human Health and Material Assets.

Temporary disconnections of overhead utilities will result in a significantly greater impact on local residents and businesses in terms of disruption to services than permanent diversions. It will also result in greater disruptions to traffic flows as the delivery of components through the town on each occasion will take slightly longer due to additional temporary works each time.
At TDR nodes where it has been identified that relocation of existing utilities is required to facilitate the temporary accommodation requirements, all such works will be carried out in advance of the formation of groundworks associated with the creation of new load bearing surfaces and all such activities shall take place within the immediate vicinity of the proposed TDR node areas assessed in this EIAR.

13.4.4.2 Existing Structures Along TDR

There are a number of existing watercourse crossing structures along the turbine delivery route that will be crossed by the proposed oversized loads associated with the delivery of turbine components.

The Route Survey Review (RSR) identifies the key issues associated with AIL deliveries and identifies remedial works, either in the form of physical works, vehicle modifications or traffic management interventions that will be required to accommodate the predicted loads. Vehicle modifications including blade lifts and increased ground clearance at vertical constraint locations are identified at the Ardclooney Bridge crossing on the R463 (POI 23) and the N69 bridge crossing (POI 7) respectively. No structural reinforcement of existing structures is predicted to be required to facilitate the delivery of the proposed loads along the TDR.

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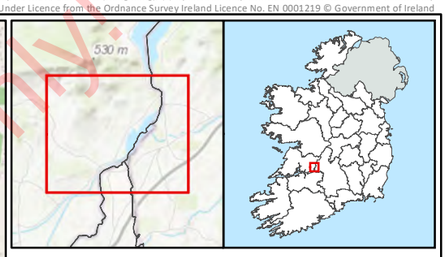

Legend

- Wind Farm Site Boundary
- Turbine Delivery Route
- TDR Nodes

N W E S

0 0.5 1 2 Kilometers

TITLE:	Turbine Delivery Route		
PROJECT:	Fahy Beg Wind Farm, Co. Clare		
FIGURE NO:	13-12		
CLIENT:	RWE Renewables Ireland Ltd.		
SCALE:	1:35000	**REVISION:**	0
DATE:	12/12/2022	**PAGE SIZE:**	A3

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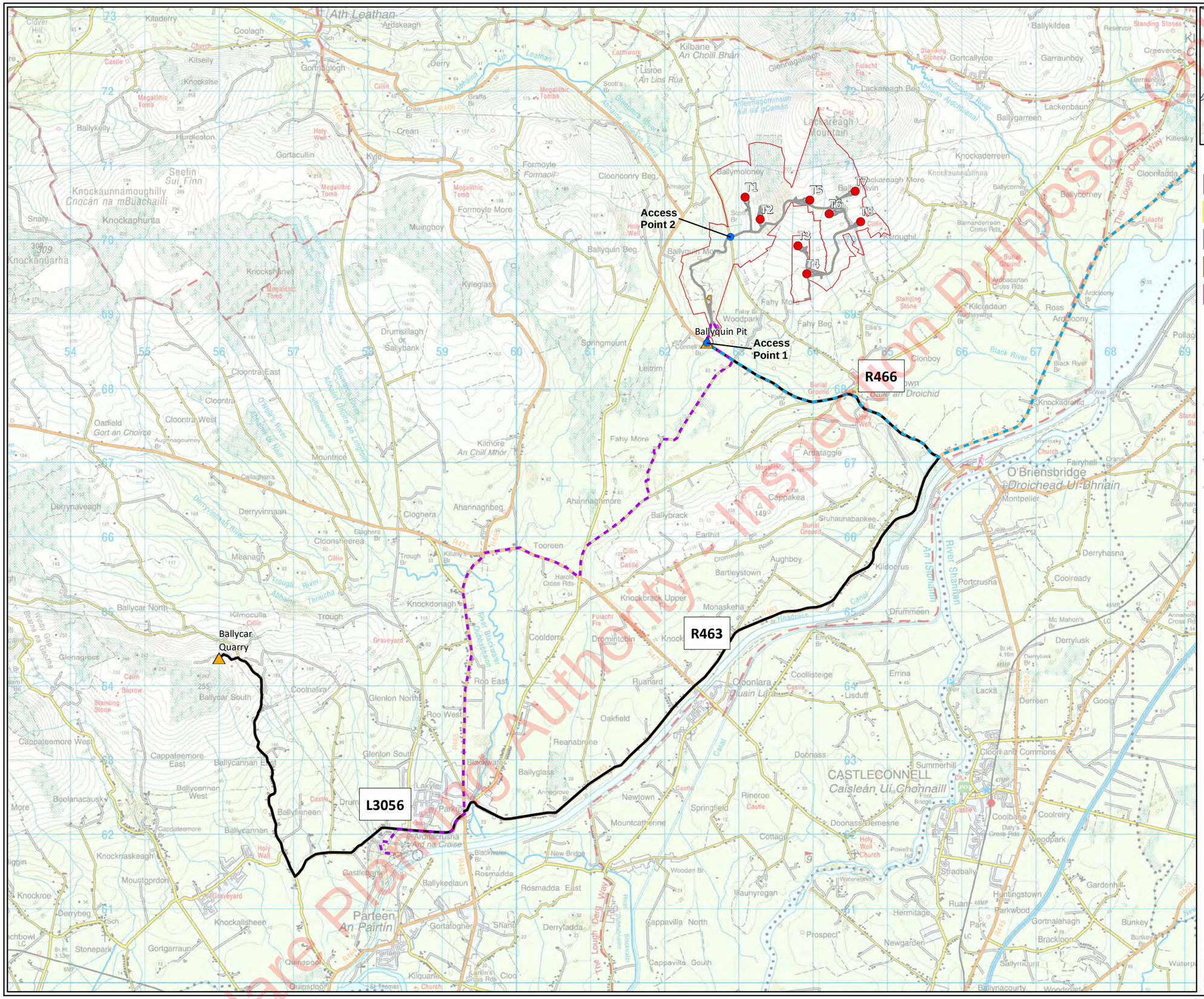

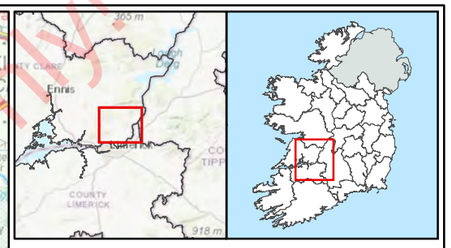

Legend

- Wind Farm Site Boundary
- Passing Bays
- Turbine Hardstanding Area
- Construction Compound
- Substation Compound
- Proposed Turbine Layout
- Active Quarries
- Access Points
- Turbine Delivery Route
- Grid Connection Route
- Onsite Access Roads
- Proposed Haul Route

N W E S

0 1 2 4 Kilometers

TITLE:	Haul Routes		
PROJECT:	Fahy Beg Wind Farm, Co. Clare		
FIGURE NO:	13-13		
CLIENT:	RWE Renewables Ireland Ltd.		
SCALE:	1:50000	**REVISION:**	0
DATE:	12/12/2022	**PAGE SIZE:**	A3

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13.5 Potential Impacts of Proposed Development

Potential impacts of the proposed project are outlined below, these are categorised in relation to the construction phase, operational phase and decommissioning of the project. The Do-nothing Scenario is also detailed.

13.5.1 Do Nothing Scenario

If the proposed project is not constructed, there will be no change to the current road network and existing traffic patterns within the study area.

13.5.2 Construction

13.5.2.1 Main Wind Farm Site

The construction activities associated with the main wind farm site will lead to additional construction related traffic on the existing public road network over the duration of the construction works. These impacts will include:

- Heavy Goods Vehicles (HGVs) transporting materials to and from the site, including road making materials, concrete, building materials, drainage/ducting materials, cabling, electrical components and excavated material.
- HGVs transporting conventional earthworks machinery such as excavators, dumper trucks and rollers.
- Fuel trucks transporting fuel for plant to each site compound during the construction phase
- Light Goods Vehicles (LGVs) such as cars, 4x4s and vans used by the workers and supervisory staff involved in the construction works.
- Oversized loads including turbine components.

Without appropriate mitigation measures, the proposed works have the potential to lead to a negative impact on the existing road network including:

- Delay and disruption to road users;
- Road safety issues should the works not be carried out in line with good traffic management practices;
- Inappropriate parking of construction related vehicles along the route of the works;
- Soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads;
- Damage to existing road surface.

For the purposes of assessing worst case, it has been assumed that clearance felling for the project shall take place at the start of the construction programme as opposed to in advance of the commencement of the main balance of plant construction works. HGV's associated with the felling works shall approach and leave the site via the routes identified in Figure 13-13.

Felling of existing forestry is required for the project and felled material will be sent to the following sawmills that are located in the vicinity of the proposed development:

- Ballinderry Mill, Stonepark, Co. Tipperary;
- Dundrum sawmill, Station Road,Co. Tipperary;
- Sheehan Patrick Sawmills Ltd., Ballyporeen, Co. Tipperary;
- Butler Sawmills, Mullauns, Co. Tipperary;

The construction of the permanent met masts shall be erected by a specialist supplier and will be carried out by a small crew using the following mobile plant:

- Low-loader
- Flatbed trucks
- Works Van
- Telescopic Handler
- Mobile Crane

The mast will be accessed from the proposed wind farm internal access road network as shown on layout plans. The met mast access track will be 3.5m in width and will include drainage.

Construction of the met mast shall take place over a number of days. Construction traffic shall consist of a small number of truck movements for delivery of mast sections and construction plant and crew.

13.5.2.2 Grid Connection

Cable Works

The potential traffic impact associated with the grid connection cable works will fall into two main categories, the construction traffic related impacts and the road/lane closure related impacts.

The proposed grid connection is shown in Figure 13-11.

Construction Traffic Related Impacts

The cable route construction works will involve constantly moving the working area as the cable installation works progress. Grid works within the public road corridor are estimated to take approximately 6 months on the assumption that an average of 75m of cable is installed each day. These works will lead to additional construction traffic associated with the cable route construction.

Road/Lane Closure Related Impacts

The grid connection construction works will require a combination of temporary road closures with traffic diversions and temporary lane closures along the proposed route.

All road works will be subject to a road opening license, but it is anticipated that the cable installation along local roads will be advanced using a combination of rolling lane closures and temporary road closures where the existing road width is insufficient to accommodate an open lane for traffic to pass the works area.

The grid connection cable works by its nature will be isolated to a relatively small works area which will move on a daily basis. Impacts associated with the works will be experienced on the road network in the immediate vicinity to the works area.

Off-line sections of the proposed grid connection through private lands will not generate an impact to existing traffic flows.

Temporary road closures will be required at specific locations for the installation of joint bays and cable pulling and jointing operations at later dates. These activities are isolated and carried out in under a day at each location.

Without appropriate mitigation measures, the proposed works have the potential to lead to a negative impact on the existing road network including:

- Delay and disruption to road users.
- Road safety issues should the works not be carried out in line with good traffic management practices;
- Inappropriate parking of construction related vehicles along the route of the works;
- Soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads;
- Damage to existing road surface.

13.5.2.3 Turbine Delivery Route

The delivery of turbine components including blades, tower sections and nacelles is a specialist transport operation owing to the oversized loads involved. As described in Chapter 3, the proposed turbines will have a blade tip height range from 169 m to 176.5 m, a hub height range from 102.5 m to 110 m and a rotor diameter range from 131 m and 138 m as illustrated in the plans and particulars submitted with this application for consent. This assessment has considered all components (blades and tower sections) within this range of dimensions in order to assess worst case.

Turbine component deliveries will be carried out during off-peak times and will be done using a convoy and a specialist heavy haulage company. Turbine deliveries will also be escorted by An Garda Siochána. This will ensure the impacts of the turbine deliveries on the existing road network are minimised.

As described in Section 13.4, temporary accommodation requirements are needed along the turbine delivery route such as hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and temporary local road widening through the laying of compacted aggregate to verges.

Without appropriate mitigation measures, the construction of the proposed temporary accommodation requirements have the potential to lead to a negative impact on the existing road network including:

- Delay and disruption to road users;
- Road safety issues should the works not be carried out in line with good traffic management practices;
- Inappropriate parking of construction related vehicles in the public road in the vicinity of the works areas;
- Soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads;
- Damage to existing public road infrastructure.

13.5.2.4 Biodiversity Enhancement and Management Plan (BEMP) Measures

A Biodiversity Enhancement and Management Plan (BEMP) has been prepared to outline a set of land management prescriptions (commitments and monitoring) as part of proposed Fahy Beg Wind Farm Development. The BEMP measures are described in detail in Chapter 3 Appendix 3.4 of this EIAR.

13.5.3 Operation

Traffic associated with the operational phase of the project will be associated with the wind farm owner/operator and grid network operator personnel visiting the substation, and maintenance staff. There will also be a limited infrequent attendance by routine environmental monitoring/compliance staff.

Routine turbine maintenance is generally conducted by personnel climbing inside the tower. However, there may be circumstances where a crane may need to be mobilised to site to conduct non-routine maintenance.

The proposed substations have been designed in accordance with network operator requirements with welfare facilities. However, they will not require full time operational staff and shall be largely automated with occasional visits from maintenance teams.

Unforeseen or unplanned events such as emergency turbine repair works could potentially require the mobilisation of construction plant and personnel to site. The replacement of a large turbine component such as a blade will require a crane and the re-installation of some TDR temporary accommodation requirements.

A cable fault along the grid connection could potentially require temporary road works for intrusive investigations and repair. The above unplanned events are extremely unlikely to occur.

13.5.4 Decommissioning

On decommissioning, cranes will disassemble the above ground turbine components which will be removed off site for recycling. All the major component parts are bolted together, so this is a relatively straightforward process.

The foundation pedestals will be covered over and allowed to re-vegetate naturally. Leaving the turbine foundations in situ is considered a more environmentally sensible option as to remove the reinforced concrete associated with each turbine would result in environmental nuisances such as noise and vibration and dust.

It is proposed that all the internal site access tracks and turbine hard standings will be left in place. These will continue to be used for recreation, forestry and agriculture. Turbine hardstandings shall be covered over with topsoil previously stripped and used for landscaping purposes during the construction stage and left to revegetate naturally. The recreational trails and associated signage shall be left in situ.

The temporary accommodation requirements along the TDR will not be required for the decommissioning phase as turbine components can be dismantled on site and removed using standard HGVs.

Grid connection infrastructure including the on-site substation and ancillary electrical equipment shall form part of the national grid and will be left in situ.

It is expected that the decommissioning phase will take no longer than 6 months to complete.

The traffic impact associated with the decommissioning phase will be significantly less than the construction phase due to the considerably lower number of vehicle movements.

The decommissioning phase of the project is described in Chapter 3 of this EIAR.

13.6 Impact Assessment

13.6.1 Construction

In order to assess the impact of the additional construction related traffic on the existing road network it is first required to estimate the amount of construction traffic that will be generated (trip generation) as a result of the proposed project.

This assessment was done by estimating the amount of traffic, in the form of heavy goods vehicles (HGV) and light goods vehicles (LGV) that will be generated during the construction phase and then distributing it over the duration of the construction programme. In determining the number of 'trips' the estimated number of HGV vehicles was multiplied by a factor of 2 to account for a single trip 'in' and a corresponding single trip 'out'.

In the case of LGVs, the estimated number of vehicles was multiplied by 2.5 to account for some additional LGV movements e.g. some workers taking lunch breaks in the local area. The analysis allowed for a total number of trips per month to be calculated. This is translated to annual average trips per day (AADT).

Some key assumptions taken when preparing the trip generation estimates include:

- An average ready mix concrete truck carries a load of approximately 8m3 of concrete;
- An average tipper truck carries approximately 10 m3 of soil/rock/aggregate;
- A construction period of 12-18 months is expected based on the nature and scale of the proposed works. In order to assess for worst case in terms traffic volumes per day, a 12-month construction programme has been assumed here;
- It has also been assumed that cable trenching works associated with the construction of the grid connection, which is expected to take 6 months to complete, shall be carried out in parallel with the wind farm construction and shall follow different roads to those used for the wind farm construction;
- It is expected following intrusive site investigations that site won material from turbine hardstanding excavations will provide suitable material for general fill purposes at these locations. However, it has been assumed that the import of all engineering fill material and surface course aggregates shall all be imported from local quarries. More detail on material volumes and quarries can be found in Chapter 9;
- An average of 1m of engineering fill shall be imported for the formation of wind turbine foundations per turbine;

Project related traffic will vary over the course of the construction programme. Activities can be broken up into the following main categories:

- Mobilisation and site setup
- Site clearance and felling
- Internal access tracks

- Turbine hard standing
- Turbine foundations
- Turbine Installation
- Onsite substation
- Grid connection cable works
- Private electrical network.
- Landscaping, reinstatement, demobilisation.

Figure 13-14 shows construction stage vehicle trips and their distribution across the 12-month construction programme for the entire project.

Table 13-8 Vehicle Trip Distribution

	One-Way	Month											
Activity	**Movements**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Total Trips per month	46369	2928	4958	5468	5468	5567	5924	4872	3097	2117	1983	1983	2003
Total HGV Trips per month (x2)	35243	2122	4152	4662	4662	4761	4796	3662	1887	1230	1096	1096	1116
Total LGV Trips per month (x2.5)	11126	806	806	806	806	806	1129	1209	1209	887	887	887	887
Total Trips Per Week	10783	681	1153	1272	1272	1295	1378	1133	720	492	461	461	466
Total HGV Trips Per Week	8196	494	966	1084	1084	1107	1115	852	439	286	255	255	260
Total LGV Trips Per Week	2588	188	188	188	188	188	263	281	281	206	206	206	206
Total Trips Per Day	1797	114	192	212	212	216	230	189	120	82	77	77	78
HGV Trips Per Day	1366	82	161	181	181	185	186	142	73	48	42	42	43
LGV Trips Per Day	431	31	31	31	31	31	44	47	47	34	34	34	34
Total Trips Per Hour	180	11	19	21	21	22	23	19	12	8	8	8	8
Total HGV Trips Per Hour	137	8	16	18	18	18	19	14	7	5	4	4	4
Total LGV Trips Per Hour	43	3	3	3	3	3	4	5	5	3	3	3	3

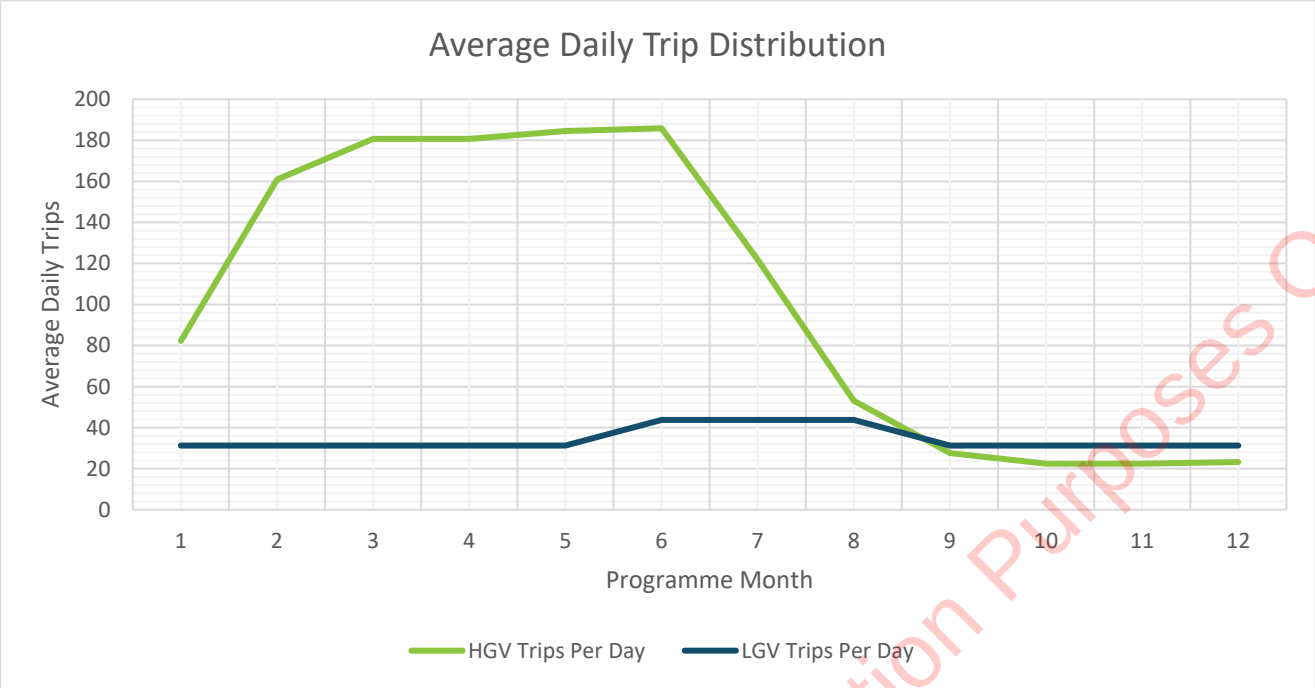

Figure 13-14 Average Daily Trip Distribution

The construction phase for the entire project (wind farm site, TDR and GCR) will lead to 35,243 additional HGV trips (two-way) over the duration of the construction works.

Calculations of HGV movements associated with the construction of the project indicate an average daily increase of 114 HGV trips per day over a construction period of 12 months. This increases to an average of 186 HGV trips per day during the peak month which occurs in month 6.

An average workforce of 30 persons is anticipated, increasing to 40 persons during peak periods. This is estimated to give rise to an increase of LGV traffic of 36 trips per day on average rising to 47 trips during peak construction periods which occur for LGV traffic during months 7 and 8.

The combined HGV and LGV average daily increase is 150 trips per day throughout the construction programme.

Table 13-9: Predicted AADT with Average Daily Construction Phase Traffic

Location	Predicted AADT During Construction (Estimated Site Start 2025)	HGV AADT Pre-Development	Average Daily HGV Trips Generated by Development	Predicted HGV AADT During Construction	% Increase	LGV AADT Pre-Development	Average Daily LGV Trips Generated by Development	Predicted LGV AADT During Construction	% Increase	Average Daily Trips Generated by Development (Combined)	Predicted Combined AADT During Construction	% Increase
M07 - TMU M07 170.0 W M07 Between Jn27 Birdill and Jn28 Castletroy Birdhill, Co. Tipperary	22,648	1,964	114	2,078	5.8%	20,684	36	20,720	0.17%	150	22,798	0.66%
R494	5,379	498	114	612	22.8%	4,880	36	4,916	0.74%	150	5,528	2.78%
R463	5,932	550	114	663	20.7%	5,383	36	5,418	0.67%	150	6,082	2.52%
R466	3,282	419	114	532	27.2%	2863	36	2,899	1.26%	150	3,431	4.56%

The busiest period during the construction programme is expected to occur in month 6 when multiple construction activities take place concurrently including construction of access tracks and hard standings, turbine installation, turbine foundations, the onsite substation and grid connection works.

It should be noted that the traffic increases presented include all construction stage traffic associated with the project including the grid connection cable works, and therefore represents an absolute worst-case. In reality, traffic impact on roads associated with the grid connection route will be considerably less than shown here due to the nature of grid connection cable works which are spread over a distance of approximately 10.4km of public roadway.

The following sub-sections assess the impacts associated with the various elements of the project. The construction of the proposed grid connection cable works has been separated from the rest of the project as these works will be isolated from the main wind farm site and carried out by a largely independent construction team.

The following subsections analyse the traffic impact of the construction works from the various elements of the project on the surrounding road network.

The predicted AADT for the project during peak months of the construction phase of the proposed project is presented in Table 13-10.

Table 13-10: Predicted AADT with Peak Construction Phase Traffic

Location	Predicted AADT During Construction (Estimated Site Start 2025)	HGV AADT Pre-Development	Average Daily HGV Trips Generated by Development during Peak Construction Month	Predicted HGV Daily Trips During Peak Construction Month	% Increase	LGV AADT Pre-Development	Average Daily LGV Trips Generated by Development during Peak Construction Month	Predicted LGV AADT During Construction	% Increase	Average Daily Trips Generated by Development (Combined) During Peak Construction Month	Predicted Combined AADT During Peak Construction Month	% Increase
M07 - TMU M07 170.0 W M07 Between Jn27 Birdill and Jn28 Castletroy Birdhill, Co. Tipperary	22,648	1,964	186	2,150	9.5%	20,684	47	20,731	0.23%	230	22,878	1.01%
R494	5,379	498	186	684	37.3%	4,880	47	4,927	0.96%	230	5,608	4.27%
R463	5,932	550	186	735	33.8%	5,383	47	5,429	0.87%	230	6,162	3.87%
R466	3,282	419	186	605	44.4%	2,863	47	2,910	1.64%	230	3,511	7.00%

The construction of the proposed grid connection cable works has been separated from the rest of the project as these works will be isolated from the main wind farm site and carried out by an independent construction team.

13.6.1.1 Main Wind Farm Site

The volume and distribution of vehicle trips generated by the construction of the main wind farm site are presented in Table 13-11 and Figure 13-15.

Table 13-11: Vehicle Trip Distribution - Project Excluding Grid Connection Cable Works

Total Trips per month	42777	2928	4958	5468	5468	5567	5924	4273	2498	1518	1385	1385	1405
Total HGV Trips per month (x2)	32135	2122	4152	4662	4662	4761	4796	3144	1369	712	578	578	598
Total LGV Trips per month (x2.5)	10643	806	806	806	806	806	1129	1129	1129	806	806	806	806
Total Trips Per Week	9948	681	1153	1272	1272	1295	1378	994	581	353	322	322	327
Total HGV Trips Per Week	7473	494	966	1084	1084	1107	1115	731	318	166	135	135	139
Total LGV Trips Per Week	2475	188	188	188	188	188	263	263	263	188	188	188	188
Total Trips Per Day	1658.0	114	192	212	212	216	230	166	97	59	54	54	54
HGV Trips Per Day	1245.5	82	161	181	181	185	186	122	53	28	22	22	23
LGV Trips Per Day	412.5	31	31	31	31	31	44	44	44	31	31	31	31
Total Trips Per Hour	165.8	11	19	21	21	22	23	17	10	6	5	5	5
Total HGV Trips Per Hour	124.6	8	16	18	18	18	19	12	5	3	2	2	2
Total LGV Trips Per Hour	41.3	3	3	3	3	3	4	4	4	3	3	3	3

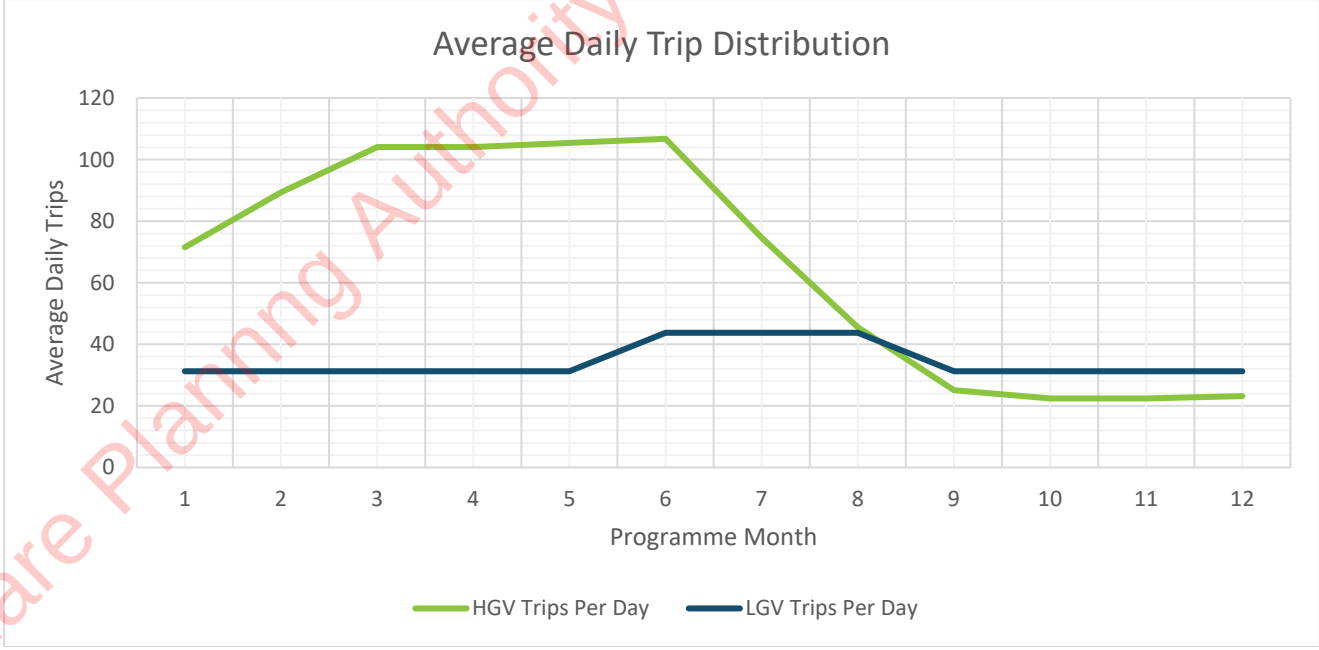

Figure 13-15: Average Daily Trip Distribution - Project Excluding Grid Connection Cable Works

It is estimated that the construction phase for the main wind farm site will lead to 32,135 additional HGV trips (two-way) over the duration of the construction works.

Calculations of HGV movements associated with the construction works indicate an average daily increase of 104 HGV trips per day over the course of the construction programme. The peak month for HGV trips occurs in month 6 where average daily HGV trips rises to 186.

An average workforce of 25 persons is anticipated, increasing to 35 persons during peak periods. This is calculated to give rise to an average daily increase of 34 LGV trips per day over a construction period of 12 months. The peak month for LGV trips occurs in month 6, 7 and 8 where average daily LGV trips rises to 44.

The combined HGV and LGV average daily increase for the wind farm site excluding grid connection works is 138 trips per day throughout the construction programme.

The predicted AADT during the construction phase of the main wind farm site is presented in Table 13-12. The impact on predicted future traffic on the surrounding road network is also presented in this table.

Table 13-12: Predicted AADT with Construction Phase Traffic - Main Wind Farm Site Only

Location	Predicted AADT During Construction (Estimated Site Start 2025)	HGV AADT Pre-Development	Average Daily HGV Trips Generated by Development	Predicted HGV AADT During Construction	% Increase	LGV AADT Pre-Development	Average Daily LGV Trips Generated by Development	Predicted LGV AADT During Construction	% Increase	Average Daily Trips Generated by Development (Combined)	Predicted Combined AADT During Construction	% Increase
M07 - TMU M07 170.0 W M07 Between Jn27 Birdhill and Jn28 Castletroy Birdhill, Co. Tipperary	22,648	1,964	104	2,068	5.3%	20,684	34	20,719	0.17%	138	22,786	0.61%
R494	5,379	498	104	602	20.8%	4,880	34	4,915	0.70%	138	5,517	2.57%
R463	5,932	550	104	653	18.9%	5,383	34	5,417	0.64%	138	6,070	2.33%
R466	3,282	419	104	522	24.8%	2,863	34	2,897	1.20%	138	3,420	4.21%

The works will result in a 5.3% temporary increase in traffic volumes on the M7. The regional road network to the site will see a more significant temporary increase in traffic volumes over the course of the construction phase of 20.8% on the R494, 18.9% on the R463 and 24.8% on the R466 according to the table. These roads form part of the TDR and haul routes for the construction of the project. The R466 forms part of the proposed grid connection cable route, TDR and haul routes.

Based on the above, negative or adverse effects on the receiving environment associated with the construction works at the main wind farm site are considered to be short-term in duration and moderate in significance without appropriate mitigation.

13.6.1.2 Grid Connection

The volume and distribution of vehicle trips generated by the construction of the grid connection cable works are presented in Table 13-13 and Figure 13-16.

Table 13-13: Vehicle Trip Distribution - Grid Connection Cable Works

	One-Way	Month											
Activity	**Movements**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Grid connection cable works	1554							259	259	259	259	259	259
Site staff	194							32	32	32	32	32	32
Total Trips per month	3592	0	0	0	0	0	0	599	599	599	599	599	599
Total HGV Trips per month (x2)	3108	0	0	0	0	0	0	518	518	518	518	518	518
Total LGV Trips per month (x2.5)	484	0	0	0	0	0	0	81	81	81	81	81	81
Total Trips Per Week	835	0	0	0	0	0	0	139	139	139	139	139	139
Total HGV Trips Per Week	723	0	0	0	0	0	0	120	120	120	120	120	120
Total LGV Trips Per Week	113	0	0	0	0	0	0	19	19	19	19	19	19
Total Trips Per Day	139.2	0	0	0	0	0	0	23	23	23	23	23	23
HGV Trips Per Day	120.5	0	0	0	0	0	0	20	20	20	20	20	20
LGV Trips Per Day	18.8	0	0	0	0	0	0	3	3	3	3	3	3
Total Trips Per Hour	13.9	0	0	0	0	0	0	2	2	2	2	2	2
Total HGV Trips Per Hour	12.0	0	0	0	0	0	0	2	2	2	2	2	2
Total LGV Trips Per Hour	1.9	0	0	0	0	0	0	0.3	0.3	0.3	0.3	0.3	0.3

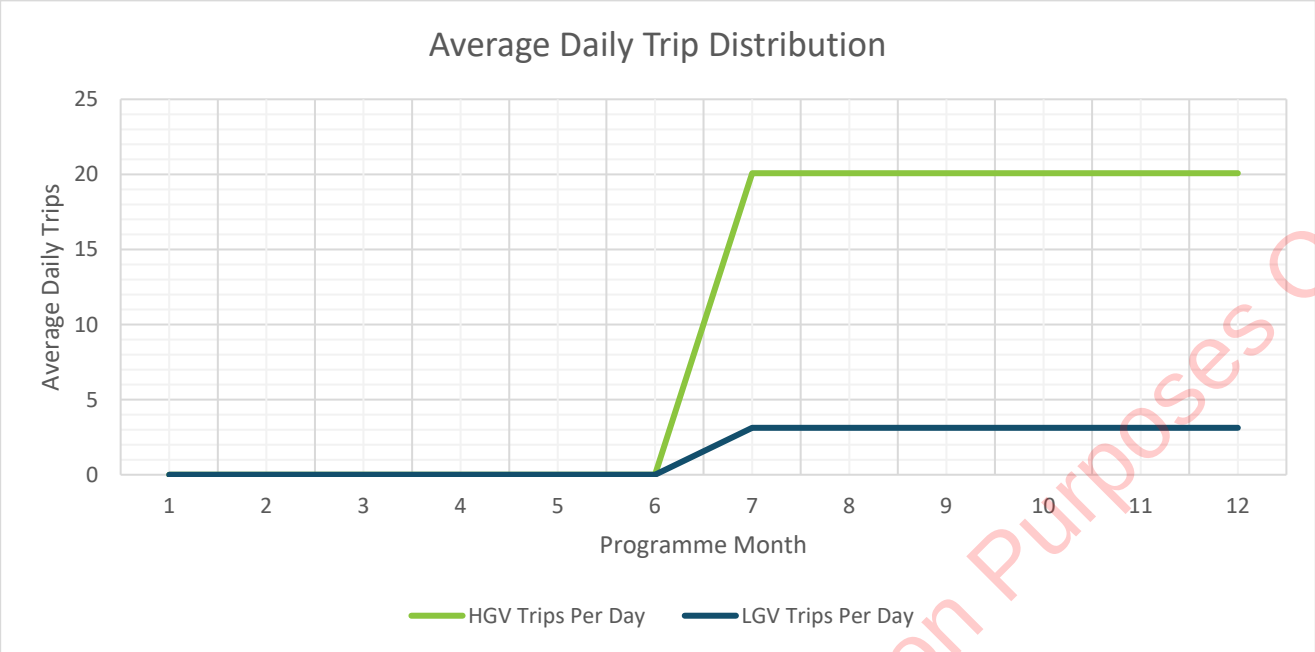

Figure 13-16: Average Daily Trip Distribution - Grid Connection Cable Works

It is estimated that the construction phase for the grid connection cable works will lead to 1,554 additional HGV trips (two-way) over the duration of the construction works.

Calculations of HGV movements associated with the construction works indicate an average daily increase of 10 HGV trips per day over the course of the overall project construction programme. The pattern of HGV trips shall remain relatively steady throughout the construction works and does not exceed 20 HGV trips per day on average over a 6-month duration.

The workforce associated with this activity is expected to give rise to an average daily increase of 2 LGV trips per day over a total construction programme period of 6 months. The pattern of LGV trips shall remain relatively steady throughout the construction works and does not exceed 3 LGV trips per day on average over a 6-month duration.

The combined HGV and LGV average daily increase is 12 trips per day throughout the overall project construction programme and 26 over a 6-month grid connection works construction programme.

As described in Section 13.5.2.2, the grid connection cable works by its nature will be isolated to a small works area which will move on a daily basis as the construction progresses along the route. Adverse impacts associated with the works will therefore be experienced on the road network in the immediate vicinity to the works area. Should the construction of the grid connection works be split over two or more works areas, this would result in a significant reduction in overall construction time. This approach would also have the effect of increasing the overall average number of construction vehicle trips per day associated with the construction of the grid connection, albeit over a shorter timeframe.

13.6.2 Operation

The trip generation for the project once operational is anticipated to be minimal as both the wind farm and substations will be operated remotely. as described in Section 13.5.3.

Effects on the receiving environment associated with the operation phase of the project are considered to be neutral in terms of quality, long-term in duration and imperceptible in significance.

For unforeseen or unplanned works described in Section 13.8, it is predicted that negative or adverse effects on the receiving environment will be temporary in duration and slight in significance without appropriate mitigation.

13.6.3 Decommissioning

Impacts associated with the decommissioning of the project will be similar in nature to the construction stage but of a much lower magnitude primarily due to the following key reasons:

- Wind farm access tracks will be left in-situ;
- The grid connection will form part of the grid network and will be left in place;
- Wind turbine components will be dismantled on site and can be removed on standard HGV's eliminating the requirement for temporary accommodation requirements needed at construction stage.

Negative or adverse effects on the receiving environment associated with decommissioning works at the main wind farm site are considered to be temporary in duration and slight in significance without appropriate mitigation.

Infrastructure associated with the grid connection will form part of the national transmission and distribution system and will be left in-situ. Therefore, no impacts are envisaged upon decommissioning of the grid connection and no mitigation is required.

Negative or adverse effects on the receiving environment associated with the turbine delivery route are considered to be temporary in duration and slight in significance without appropriate mitigation.

13.7 Mitigation Measures

13.7.1 Construction

13.7.1.1 Main Wind Farm Site

This section outlines the mitigation measures that will reduce, minimise or eliminate the potential impacts created by the project and outlined above.

The following mitigation measures are proposed to reduce the impact of the construction activity in relation to the construction phase of the project:

Traffic Management Plan

A detailed traffic management plan (TMP) has been submitted with this EIAR in Appendix 3.1. This shall be developed further at construction stage by the main Contractor and in consultation with the roads authority and An Garda Siochána prior to commencing construction and shall include all of the mitigation measures described in the TMP in Appendix 3.2.

The following traffic management measures shall be implemented:

Traffic Management Co-Ordinator – A dedicated Traffic Management Coordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management on the project.

Roads and Routes: The TMP clearly identifies roads that will be used to access the project site and roads that are not to be used. Turbine component and quarry material deliveries shall use the R494, R463 and R466 as the primary haul route as identified in Figure 13-13.

- R494 towards Killaloe;
- Turn left onto the proposed bypass and utilise the new Shannon River crossing before turning left onto the R463 travelling southbound;
- Continue south on the R463 before turning right onto the R466;
- Loads will continue north on the R466 to the proposed site entrance.

One-way Systems: as some of the local roads are relatively narrow, the roads authority may want to introduce a system of one-way construction traffic movements during the construction of the development. Any such one-way systems will be identified in the construction stage TMP in agreement with the roads authority.

Road Condition Survey: a pre-condition survey will be carried out on all public roads that will be used in connection with the development to record the condition of the public roads in advance of construction commencing. A post-construction survey will also be carried out after the works are completed. The specification and timing of the surveys will be agreed with the roads authority. Joint surveys shall be completed if the roads authority requests.

Road Reinstatement: All roads will be reinstated expeditiously on completion of the construction works. Roads will be reinstated to their pre-works condition or better and to the satisfaction of the roads authority.

Site Inductions: All workers will receive a comprehensive site induction which will include a section on traffic management and clear guidance on the routes to be used/not used to access the site.

24-Hour Emergency Contact: a 24-hour emergency phone number will be maintained for the duration of the construction works and the number will be noted on temporary signage at each works area (for grid connection) and the site entrance for the wind farm site.

Traffic Management Guidance: all necessary temporary traffic management will be planned and executed in accordance with best practice, including Chapter 8 of the Traffic Signs Manual published by the Department of Transport.

Letter Drops: a letter drop will be carried out to notify members of the public living near the proposed site and cable route to advise them of any particular upcoming traffic related matters e.g. temporary lane/road closure or delivery of turbine components.

Signage: Clear signage relating to the development, both temporary and permanent, will be provided for accessing the site.

Road Sweeping: Appropriate steps will be taken to prevent soil/dirt generated during the works from being transported on the public road. When, if necessary, a road sweeper will be used to maintain the public roads in a clean condition during the construction activities of the project.

Temporary Road Crossing Point: Site entrances from and to the wind farm will be secured and locked when not in use. Where required, the entrances will be controlled by flagmen to assist traffic movements. The proposed crossing point will be managed appropriately to allow the safe passage of construction vehicles in, out and across the public road. Priority will be maintained for public traffic. A concrete apron will be provided on both sides of the crossing point during the construction phase, constructed 40mm below road level and overlaid with surface course material.

Site Entrances: The entrances to the site will be secured when the site is not in use. When necessary, a flagman will be used to assist traffic movements at the site entrance or in other areas as required.

Abnormal Load Deliveries: Abnormal loads will require an abnormal load permit prior to delivery and will be delivered at times and frequencies directed by An Garda Siochána.

13.7.1.2 Grid Connection Works

Mitigation measures proposed for the grid connection works include:

Road Opening Licence: The road works associated with the grid connection cabling will be completed in line with the requirements of a road opening license as agreed with the local authority.

Route Proofing: In advance of the main grid connection works an assessment will be carried out to define the precise alignment of the cable route within the corridor which has been assessed. This will include slit trenching with the aim of minimising the construction impacts and avoiding existing services in the road.

Maintaining Local Access: reasonable access to local houses, farms and businesses will be maintained at all times during any road closures associated with the grid connection works. The details of this will be agreed with the roads authority in advance of the grid connection works commencing.

Road Cleanliness: Appropriate steps will be taken to prevent soil/dirt generated during the works from being transported on the public road. Road sweeping vehicles will be used when necessary, to ensure that the public road network remains clean.

Temporary Trench Reinstatement: Trenches on public roads, once backfilled, will be temporarily reinstated to the satisfaction of the roads authority.

Road Reinstatement: All roads will be reinstated expeditiously on completion of the construction works. Roads will be reinstated to their pre-works condition or better and to the satisfaction of the roads authority.

Traffic management for the HDD operations in the public road shall be carried out in accordance with the TMP submitted with this EIAR see Appendix 3.1 of this EIAR.

13.7.1.3 Turbine Component Delivery Mitigation

The turbine delivery route has been assessed using a detailed appraisal of potential routes and the identification of the most appropriate route including the accommodation requirements along the route to mitigate the impact of the turbine delivery. The impact of the deliveries on traffic is mitigated by delivering components during off-peak or night-time deliveries.

Mitigation measures proposed for the turbine delivery route also include:

Programme of Deliveries: a programme of deliveries will be submitted to the roads authority in advance of deliveries of turbine components to the site. The programme will include details of the dates and times of each component delivery along with the route to be taken.

Turbine component deliveries will be carried out during off-peak times and will be done using a convoy and a specialist heavy haulage company.

Garda Escort: Turbine deliveries will be escorted by An Garda Siochána. This will ensure the impacts of the turbine deliveries on the existing road network are minimised.

Reinstatement: Any area affected by the works to facilitate turbine delivery will be fully reinstated to its original condition.

Consultation: Consultation with the local residents and Clare County Council will be carried out in advance to manage turbine component deliveries.

13.7.2 Operation

It is considered that no further mitigation measures are necessary for the operational stage of the project.

13.7.3 Decommissioning

The traffic impact associated with the decommissioning phase will be significantly less than the construction phase.

Traffic and transportation impact mitigation for decommissioning of the project will be the same as those identified here and in the TMP in Appendix 3.2 for construction stage works and will be tailored to suit the existing environment conditions of the day and technology available.

Infrastructure associated with the grid connection will form part of the national electricity network and will be left in-situ. Therefore, no impacts are envisaged upon decommissioning of the grid infrastructure and no mitigation is required.

Mitigation measures adopted for project decommissioning shall be in line with those identified for the construction phase of the project.

Traffic management measures identified and described in this chapter will be included in the decommissioning plan for the wind farm.

13.8 Residual Impacts

The implementation of mitigation measures outlined in Section 13.7 will ensure that residual impacts are minimised throughout the duration of the proposed activities.

13.8.1 Construction

Negative or adverse effects on the receiving environment associated with the construction works on the main wind farm site are considered to be short-term in duration and slight in significance following mitigation.

Negative or adverse effects on the receiving environment associated with the turbine delivery route are considered to be temporary in duration and slight following mitigation.

Negative or adverse effects on the receiving environment associated with the construction of the grid connection are considered to be short-term in duration and slight to moderate in significance following mitigation.

13.8.2 Operation

The trip generation for the project once operational is anticipated to be minimal.

Effects on the receiving environment associated with the operation phase of the project are considered to be neutral in terms of quality, long-term in duration and imperceptible in significance.

For unforeseen or unplanned works such as emergency turbine repair works described in Section 13.8, it is considered that negative or adverse effects on the receiving environment will be temporary in duration and not significant to slight following appropriate mitigation.

13.8.3 Decommissioning

Negative or adverse effects on the receiving environment associated with decommissioning works at the wind farm site are considered to be temporary in duration and not significant following mitigation.

Negative or adverse effects on the receiving environment associated with the turbine delivery route are considered to be temporary in duration and not significant following mitigation.

Infrastructure associated with the grid connection will form part of the national transmission network and will be left in-situ. Therefore, no impacts are envisaged upon decommissioning of the project and no mitigation is required.

Table 13-14: Summary of Residual Impacts

Phase	Project Element	Main Receiving Environment	Description of Potential Effect		
			Duration	Quality	Significance
Construction	Wind Farm	M7, N69, N18, R494, R463, R466 and surrounding local road network	Short-term	Negative/Adverse	Slight to moderate
	Turbine Delivery Route	M7, N69, N18, R494, R463, R466 and surrounding local road network	Temporary	Negative/Adverse	Slight
	Grid Connection Route	R466, R471, R465, Local road network along Grid connection, L3056, L3046	Short-term	Negative/Adverse	Slight
Operation	Wind Farm	M7, N69, N18, R494, R463, R466 and surrounding local road network	Long-term	Neutral	Imperceptible
	Trubine Delivery Route	M7, N69, N18, R494, R463, R466	Long-term	Neutral	Imperceptible
	Grid Connection Route	R466, R471, R465, Local road network along Grid connection, L3056, L3046	Long-term	Neutral	Imperceptible
Decomissioning	Wind Farm	M7, N69, N18, R494, R463, R466 and surrounding local road network	Temporary	Negative/Adverse	Not significant
	Turbine Delivery Route	M7, N69, N18, R494, R463, R466	Temporary	Negative/Adverse	Not significant

Phase	Project Element	Main Receiving Environment	Description of Potential Effect		
			Duration	Quality	Significance
	Grid Connection Route	R466, R471, R465, Local road network along Grid connection, L3056, L3046	N/A	N/A	N/A
Unplanned Events (i.e. Accidents)	Wind Farm	M7, N69, N18, R494, R463, R466 and surrounding local road network	Temporary	Negative/Adverse	Not significant - Slight
	Trubine Delivery Route	M7, N69, N18, R494, R463, R466	Temporary	Negative/Adverse	Not significant - Slight
	Grid Connection Route	R466, R471, R465, Local road network along Grid connection, L3056, L3046	Temporary	Negative/Adverse	Not significant - Slight

13.9 Cumulative Impacts of Proposed Development

All known existing and proposed projects within the study area that could potentially generate a cumulative impact with Fahy Beg Wind Farm in relation to traffic and transportation during construction, operation and decommissioning were identified and examined as part of this assessment. Table 13-15 provides details of the projects within the study area that were considered for cumulative impacts.

Further details on existing and proposed projects assessed in the EIAR for cumulative impacts are contained in Chapter 1.

Table 13-15 Existing and Proposed Projects Assessed for Cumulative Impacts

Project	Existing/Proposed	Reason for Assessment
Existing Quarry and waste facility activities on the Ballyquin Quarry site.	Existing	Proximity to proposed wind farm site and sharing of haul routes.
Carrownagowan Wind Farm (Applicant - FuturEnergy Ireland Development DAC (FEID)) Ref. ABP - 314127	Proposed	This type of development gives rise to construction traffic and its proximity to the proposed wind farm site and GCR has the potential for cumulative traffic and transport impacts.

13.9.1 Ballyquin Pit, O'Briensbridge County Clare

The Ballyquin pit is located in the townlands of Ballyquin More, O'Briensbridge and is approximately 1.5km northwest of the village of Bridgetown County Clare. The pit is within the site boundary for the proposed wind farm, providing access to the main wind farm site via a crossing point to the northeast of the site.

The sand and gravel pit is owned and operated by Roadstone Wood Ltd. The site is approximately 105.7 Ha and consists of sand and gravel processing, washing plant, fuel storage and handling area, wheel wash and sprinkler system, weighbridge, settlement lagoons, administration office, garage, car park and access roads.

Access to the Ballyquin pit is via a gated road off the R466 regional road. The Fahy Beg Wind Farm proposes the use of this entrance and construction of roads within the Ballyquin Pit to access the main wind farm site. This entrance will facilitate the turbine delivery and grid connection routes.

A five year planning permission for a Waste Facility Permit for Ballyquin Pit was granted conditional permission by Clare County Council on the 10th of April 2018. The conditions included the importation of inert excavation spoil limited to 95,000 metric tonnes over the lifetime of the permission and the maximum annual rate of intake shall not exceed 35,000 metric tonnes unless without a prior grant of planning permission. The operation of the proposed development, including associated deliveries, is permitted within the hours of 07:00 to 19:00 from Monday to Friday, 07:00 to 14:00 on Saturdays and not at all on Sundays, Bank or Public Holidays.

Table 13-16: Average HGV Arrivals for the Ballyquin Pit Waste Permit

Average HGV Arrivals to Ballyquin Pit				
Volume Arriving (tonnes per annum)		Arrivals per year[9]	Arrivals per week[10]	Arrivals per hour[11]
Total	35,000	1350	26	0.4

9 - It is assumed that 80% of HGV's carrying excavation spoil had a payload of 28 tonnes and the remaining 20% had a 20 tonne payload.
10 - It is assumed there are 52 working weeks within the year.
11 - 67 hour working week assumed based on the operating hours conditioned in the grant of the planning permission.

The average number of HGV's arriving per hour to the site was 0.4 movements, resulting in approximately 0.8 HGV trips per hour (HGV's arriving loaded and departing empty). Staff and visitors on site would generate light vehicle movements estimated at 8 movements on average per day resulting in approximately 1 light vehicle trip per hour.

A substitute consent was granted for the Ballyquin Pit in 2015 under S261A of the Planning and Development Act 2000 by Clare County Council (03.SU.0040/EUQY93). Requirements in relation to s.261 of the Planning and Development Act, 2000 (as amended) were fulfilled.

A Remedial Environmental Impact Statement (rEIS) was prepared by Tobin Consulting Engineers in May of 2013 for the Ballyquin pit. The rEIS states that records of materials leaving the site have been maintained for the previous seven years for the quarry site. The HGV traffic generated by the quarry has been estimated using the records of material volumes and annual average volumes have been calculated.

Table 13-17: Average HGV Departures for the Ballyquin Pit Substitute Consent

Average HGV Departures from Ballyquin Pit				
Volume Arriving (tonnes per annum)		Arrivals per year[12]	Arrivals per week[13]	Arrivals per hour[14]
Total	248,400	9,581	184	2.2

The average number of HGV's arriving per hour to the site was 2.2 movements, resulting in approximately 4.4 HGV trips per hour (HGV's departing loaded and arriving empty). Staff and visitors light vehicles on site already accounted for in the waste permit traffic generation estimate are anticipated to be similar for the substitute consent quarry activity. It is assumed that the traffic volumes calculated for the substitute consent will be similar for future quarry activities.

The import of excavated spoil under the waste facility permit and quarrying of materials under the substitute consent permissions will have resulted in an average increase of approximately 5.2 HGV trips per hour on the R466 and public road network. However, these activities are not expected to occur at the same time.

Negative or adverse effects on the receiving environment associated with wind farm construction activities and the activities at the Ballyquin Pit coinciding is considered to be short-term in duration moderate in significance.

12 It is assumed that 80% of HGV's carrying excavation spoil had a payload of 28 tonnes and the remaining 20% had a 20 tonne payload.
13 It is assumed there are 52 working weeks within the year.
14 82 hour working week assumed based on operations occurring between 06:00 and 20:00 on weekdays and 06:00 and 18:00 on Saturdays.

13.9.2 Proposed Carrownagowan Wind Farm East, County Clare

The development consists of construction and operation of 19 wind turbines, 19 Wind Turbine foundations and Hardstand areas, 1 Permanent Meteorological Mast (100m height) and associated foundation and hardstand areas, 1 Substation (110kV) including associated ancillary buildings and electrical components, New and upgraded internal site service roads (8.4km of existing tracks to be upgraded and 11.4km of new service roads to be constructed), security lighting and ancillary infrastructure and all associated works including security fencing, Tree felling for wind farm infrastructure and ancillary grid infrastructure on lands at Ardnacrusha, County Clare. The site is located within forested lands on the northern slopes of Slieve Bernagh mountain, approximately 4 km northeast of the village of Broadford and 7km north-west of Killaloe.

A 30 year planning permission is being sought for the proposed Carrownagowan Wind Farm (Ref. ABP-303105-18). It is likely the development will be constructed in advance of Fahy Beg Wind Farm. In the situation where construction works take place at the same time as Fahy Beg Wind Farm, the main overlap between the developments will be associated with the construction of the grid connection at Ardnacrusha 110kV Substation. The Carrownagowan Wind Farm project shares a common route with Fahy Beg Wind Farm for grid connection cable works along the L3046 for approximately 0.4km, the R471 for approximately 1.4km, L3056 and the local road entering the Ardnacrusha 110kV substation for approximately 0.35km. The grid connection route for the Carrownagowan Wind Farm is shown in Figure 13-17 below.

To mitigate potential traffic disruption, the TMP will be agreed with local authority for construction of the grid connection if construction phases for the two projects overlap to ensure disruption to the local road network is minimised. This can include coordination on timing of specific works associated with the projects.

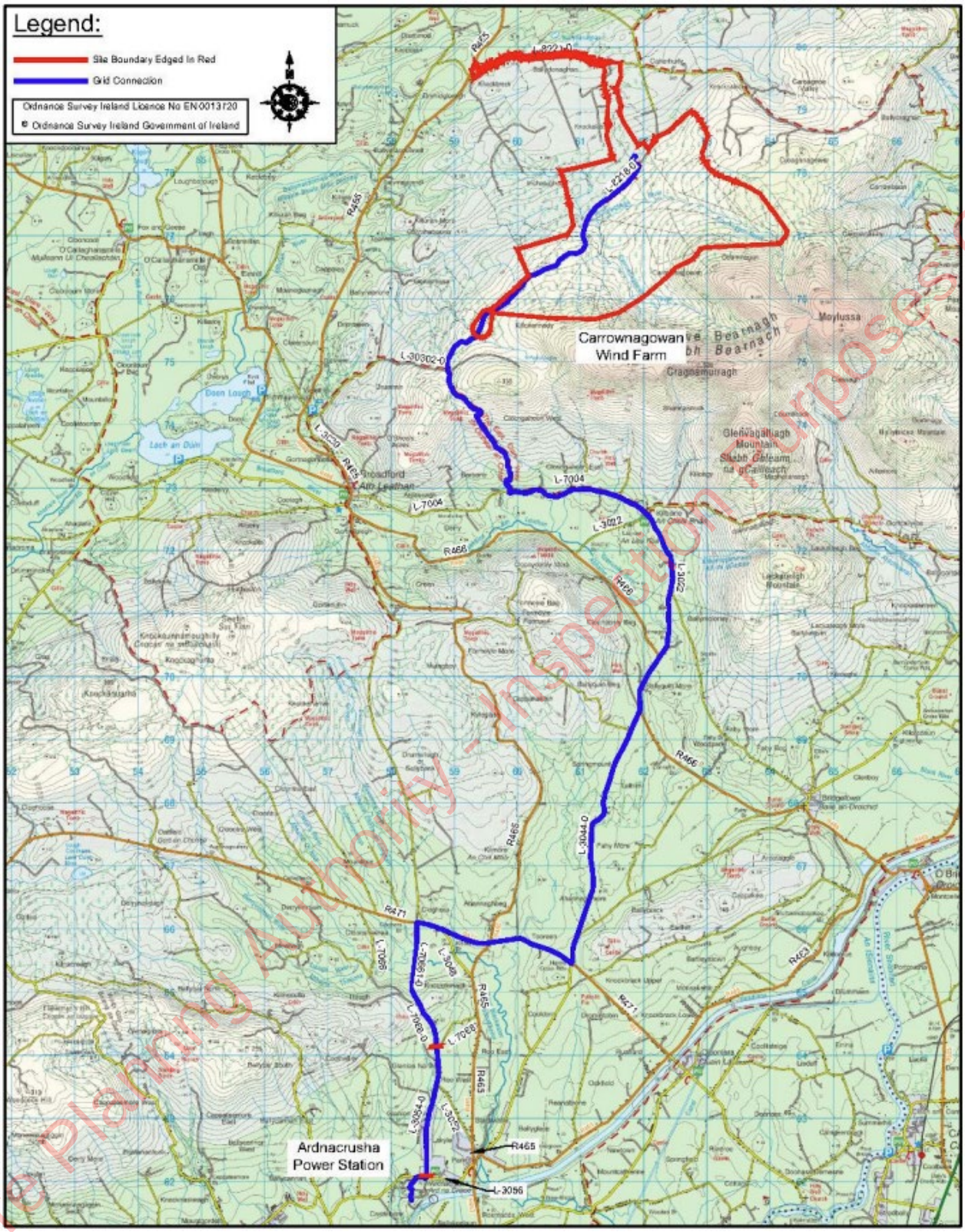

Figure 13-17: Carrownagowan Grid Connection Route

The Carrownagowan Wind Farm TMP presents two turbine delivery route options for the delivery of turbine components. The components will be transported from either Foynes Port or Galway Port to the site along the Motorway, National, Regional and Local road network. The TDR utilising Galway port as the POE will not impact the Fahy Beg Wind Farm TDR or construction haul routes. The second TDR, utilising Foynes Port as the POE shares the N69 national road at the start of the route for approximately 34km with the proposed Fahy Beg Wind Farm TDR.

The turbine delivery routes for the Carrownagowan Wind Farm is shown in Figure 13-18 below.

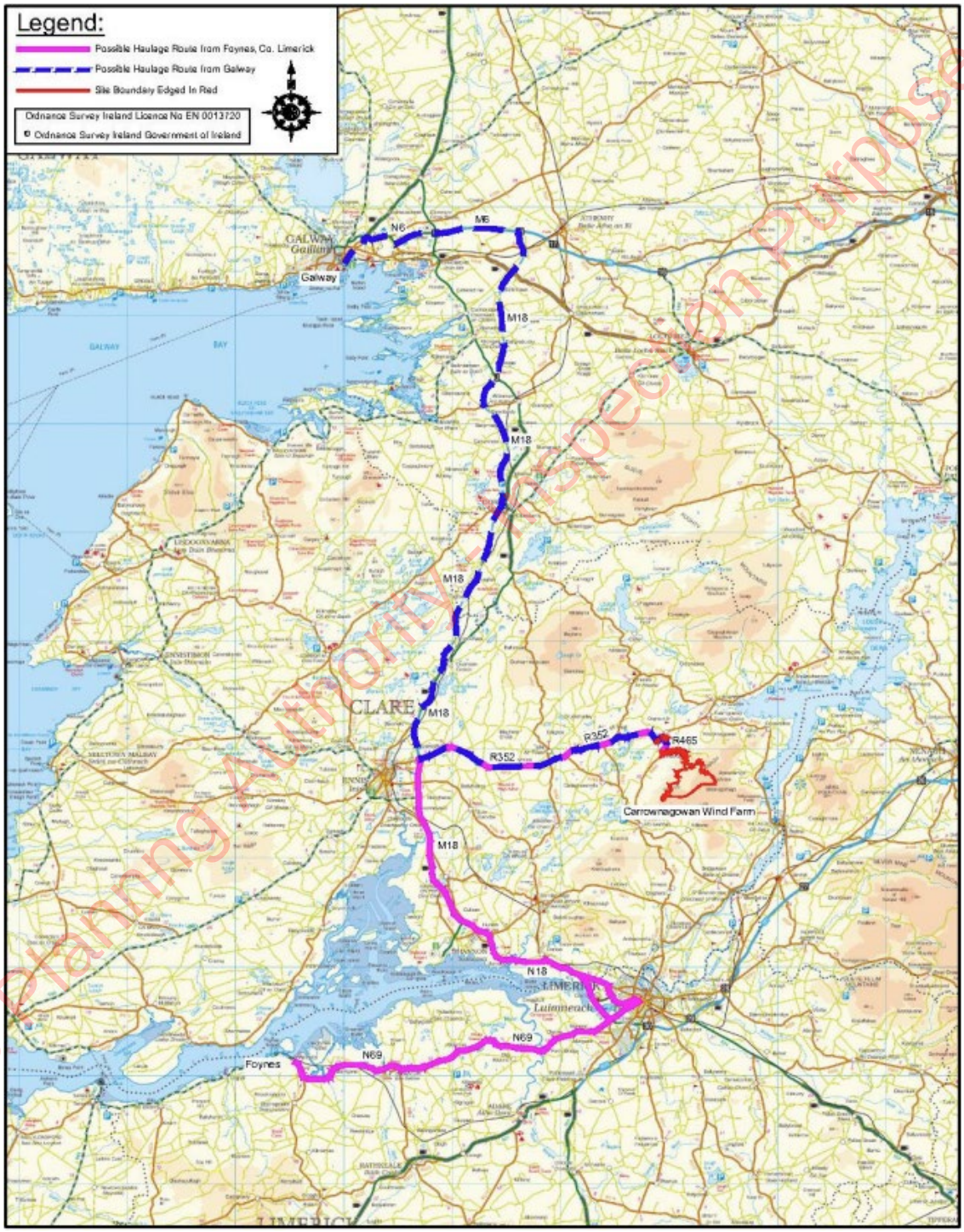

Figure 13-18: Carrownagowan Turbine Delivery Routes

The combined HGV traffic associated with the above elements of the Carrownagowan Wind Farm project amount to up to 196 trips per day.

According to documents submitted to Clare County Council with the planning application, the development's construction stage is anticipated to take 18 months and generate a maximum of 330 HGV trips per day. The majority of HGV movements associated with this development are associated with the enabling works, wind turbine foundation construction, delivery of road building materials and grid connection works.

Negative or adverse effects on the receiving environment associated with these activities coinciding is considered to be short-term in duration and moderate in significance.

13.10 Conclusion

There are no significant impacts expected on the receiving environment as a result of the construction, operation and decommissioning of the proposed project.

The proposed project is likely to result in a moderate short-term negative impact on the existing road network during the construction phase if adequate mitigation measures are not implemented.

Following implementation of mitigation measures outlined herein, residual impacts during the construction phase shall be reduced and are not expected to exceed 'slight to moderate' in significance.

Residual Impacts during operation and decommissioning are considered imperceptible to slight.

There are no significant cumulative impacts expected on the receiving environment as a result of other existing or proposed projects.

The mitigation measures identified in this Chapter will be adopted and implemented by the Contractor and have been incorporated into the construction stage CEMP and TMP for the project.

A TMP is contained in the Construction Environmental Management Plan (CEMP) which is included in Appendix 3-1 of Volume 3 of this EIAR. In the event planning permission is granted for the proposed development, the final TMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned.

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