

16.0 TRAFFIC AND TRANSPORT

16.1 INTRODUCTION

16.1.1 Background and Objectives

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

For developments of this nature, the construction phase is the critical impact period, with impacts experienced on the surrounding road network. These impacts are both the short-term additional traffic volumes and the geometric requirements of the abnormally large loads associated with the turbine components. The locations requiring remedial measures to accommodate the turbine delivery will be temporary in nature and are outlined in this Chapter. To minimise the impact of the proposed development during the construction stage a Traffic Management Plan (TMP), has been prepared and is included in the Construction and Environmental Management Plan (CEMP), Appendix 2-7 of this EIAR.

16.1.2 Statement of Authority

This chapter of the EIAR has been prepared by the following staff of TOBIN Consulting Engineers:

Laura Gaffney (Senior Engineer Roads and Traffic) holds a BSc in Civil Engineering and MSc in Environmental Engineering from Queens University Belfast. She is a Chartered Member of Engineers Ireland and has over 8 years' experience in road and traffic design. She has extensive experience in preparation of EIAR and EIS for environmental projects including Wind Farms, Solar Farms, Mining Tailing Facility, AES Facilities, Drainage Scheme, and numerous Quarries.

16.1.3 Relevant Standards

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

- Traffic and Transportation Guidelines (TII PE-PAV-02045 May 2014);
- Kilkenny County Development Plan 2014-2020;
- Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions) (TII DN-GEO-03060 June 2017);
- Rural Road Link Design (TII DN-GEO-03031 June 2017);
- Guidance on Minor Improvements to National Roads (including Erratum No. 1, dated April 2013 and Erratum No. 2, dated June 2013 (TII DN-GEO-03030 March 2013);
- Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (TII PE-PAG-02017);
- Road Safety Audit (TII GE-STY-01024 December 2017); and
- 'Purple Book' – Guidelines for Managing Openings in Public Roads (Second Editions April 2017 DoTTS)

16.1.4 EIAR Scoping

Scoping is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information¹. Details of the scoping can be found in Chapter 1, including details of the EIAR Scoping Report and pre-planning meetings.

Due to the nature of this development, not alone is the jurisdiction of the site regarded as the only relevant Local Authority but also those whom the haul routes and grid connection works for the development transverse. Scoping with the Roads Departments in each of the jurisdictions was undertaken including:

- Kilkenny County Council
 - Site works at the site access junctions
 - Haul route for typical construction traffic and abnormal load traffic
 - Grid connection cable route
- Waterford County Council
 - Haul route for the abnormal load traffic

The main items identified in the scoping included:

- A need to assess the traffic impact associated with the construction and decommissioning stage only, as these stages have the largest associated traffic volumes.
- Suitable quarries in the vicinity of the site (i.e. currently / projected to be licensed at time of the construction stage).
- The Local Authority noted that historical traffic count data should be used in lieu of undertaking traffic surveys during COVID 19 restrictions.
- A need to undertake a Stage 1 / 2 Road Safety Audit for both the construction and operation stages, particularly at the R704 junction.

16.1.5 Proposed Project

The proposed Wind Farm development activities, with the potential to impact the road network, include:

- Upgrade works to the existing forestry access on the R704, regional road and new site access on the L7451 (Glenville) local road located approximately 180m north of the existing forestry access road to create a crossroad junction;
- Traffic associated with all related civil site works including:
 - forestry felling,
 - berms, landscaping, soil excavation
 - 2 no. temporary construction compounds with associated temporary site offices with parking areas,
 - Construction of approximately 11.1km of new internal site access tracks, and upgrade of approximately 11.4km of existing site roads, to include passing bays
 - All associated site drainage
- Construction of 1 no. 110kV electrical substation including 2 no. buildings, electrical infrastructure, parking, fencing, water services, associated landscaping and all associated underground electrical and communications cabling connecting the wind turbines to the proposed substation;

¹ Environmental Impact Assessment Report (Draft Guidelines), 2017

- Transport of 21 no. wind turbines with an overall blade tip height of up to 185m, blade length of up to 77.5m and all associated foundations and hard-standing areas in respect of each turbine;
- Improvements and temporary modifications to existing public road infrastructure on the N29, N25, N9, M9 and R704, to facilitate delivery of abnormal loads (i.e. hardstanding areas, demountable posts, utility diversions, hedgerow / vegetation cutting for oversail);
- Transport of components for a 100 m permanent anemometry mast;
- Excavation of stone material from 3 no. Borrow Pits within the site;
- All traffic and construction work associated with the connection of the proposed wind farm to the national electricity grid;
 - Installation of underground electricity cables between the proposed turbines and proposed on-site substation;
 - All works associated with the approximately 4km connection of the proposed wind farm to the national electricity grid at Ballyvool, Co. Kilkenny by underground cabling and direct drilling;
- Development of a permanent public car park including seating/picnic tables at the end of the construction phase on the footprint of the southern temporary construction compound. Permanent recreational facilities will be developed on the site including marked walking and cycling trails along the site access roads,.

A ten-year planning permission is being sought and a 35-year operational life permission from the date of commissioning the entire wind farm. The entire project as described in Chapter 2 (Description of Proposed Development) has been considered in this Chapter.

16.1.6 Methodology

This Chapter has been prepared following consultation with Kilkenny County Council and Waterford County Council's Roads Department and the TII response to scoping and takes their requirements into consideration, as outlined in Chapter 2.

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

- A review of the existing and future transport infrastructure in the vicinity of the Proposed Development, including an assessment of 2019 background traffic flows and traffic forecasts during an assumed construction completion year of 2025 (Chapter 16.2– Existing Environment);
- A description of the nature of the Proposed Development and the traffic volumes that it will generate during the different construction stages and when it is operational;
- A description of the abnormally large loads and vehicles that will require access to the site and a review of the traffic impacts on the proposed delivery routes;
- A review of the potential impacts of the proposed development (Chapter 16.3– Potential Impacts);
- An identification of mitigation measures – (Chapter 16.4– Mitigation Measures);
- An assessment of residual impacts – (Chapter 16.5– Residual Impacts); and
- An assessment of cumulative impacts – (Chapter 16.6 – Cumulative Impacts).

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



- The junction geometric design and sightline visibility of the site access has been assessed in accordance with the TII DN-GEO-03060 “Geometry design of junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions), June 2017” (formerly TD 41-42 as outlined in the Kilkenny Development Plan).
- The proposed geometry of the site access has been assessed using swept path analysis using Autodesk AutoCAD Vehicle Tracking for all associated construction vehicles.
- The existing geometry of the road network for the Abnormal Indivisible Loads² (AILs) haul route (or referred to as the Turbine Delivery Route (TDR) in other chapters) for the longest AIL, the turbine blade components have been assessed using swept path analysis using Autodesk AutoCAD Vehicle Tracking.

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

16.2 EXISTING ENVIRONMENT

16.2.1 Site Location

The site is located approximately 4.1km northeast of Mullinavat, Co. Kilkenny, as shown in Figure 16-1. The townlands in which the proposed development is located are outlined in Chapter 2. The site is bounded to the south by the R704 regional road, to the east by the L7451 (Glenville) local secondary road and to the west by the R448 regional road. The M9 motorway is located approximately 4km west of the L7451 / R704 crossroads. Existing internal forestry access tracks are located within the site

An existing access to the site for the existing forestry land use is available from the L7451, located approximately 1.8km north of the junction of the L7451 / R704. To the southeast of the main site (i.e. turbine area), another parcel of forestry land is accessed via a direct access on the R704, located approximately 650m east of the R704 / L7451 crossroads. A number of other existing access points are available to the forestry lands.

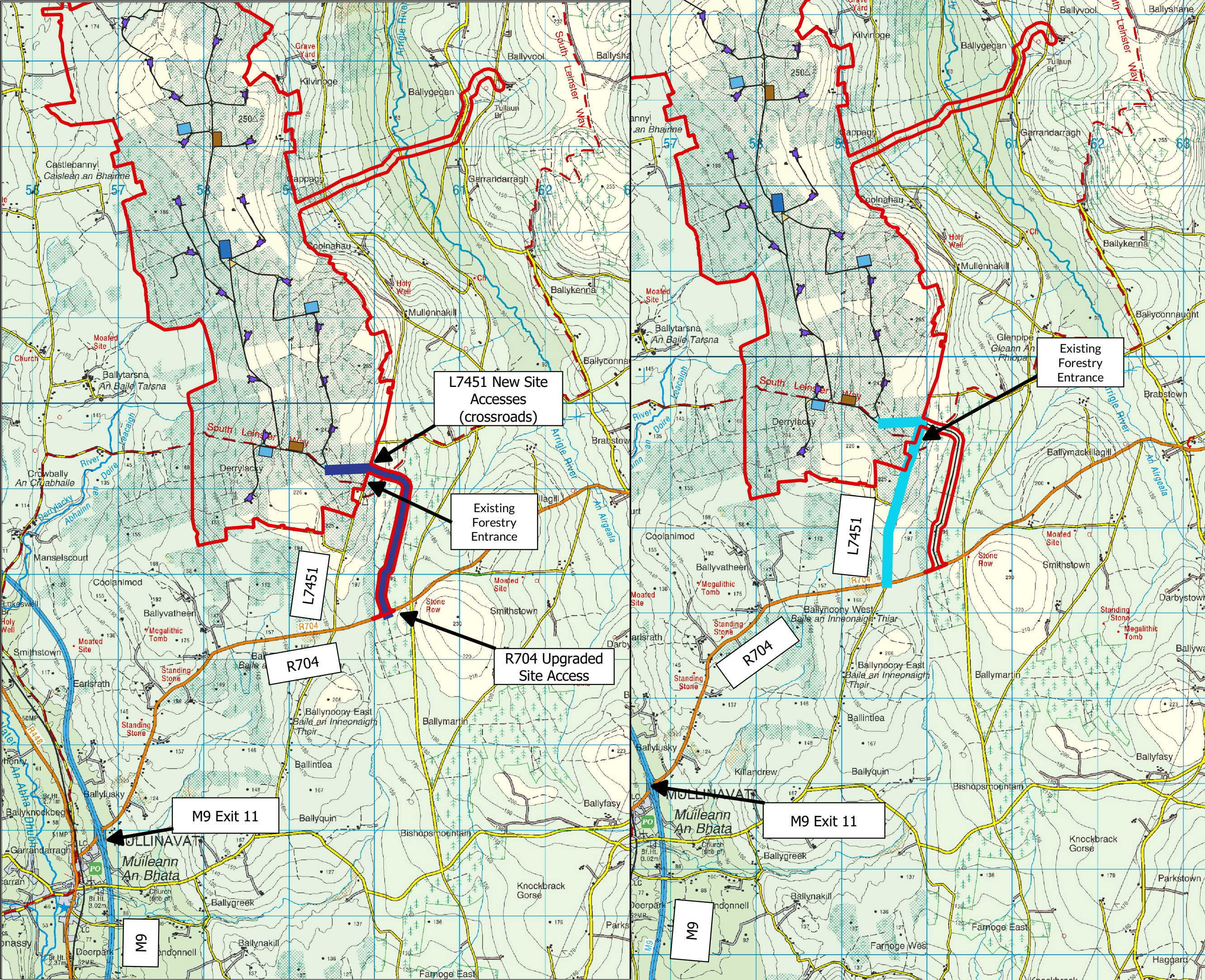
² Abnormal Indivisible Load - a load which cannot be divided or broken down e.g. containers, large equipment etc. and exceeds the weight, height, width or length limit(s) set out in the above road traffic regulation. (www.rsa.ie)

16.2.2 Construction Delivery Routes

16.2.2.1 Site Access

The proposed site access to the development will be via the existing forestry access on the northside of the R704, regional road, see Figure 16-2: . It is proposed to upgrade this junction to accommodate the proposed construction vehicles (including the abnormal loads for the turbine components). To access the development site, the existing internal access track within this parcel of forestry land to the south will be upgraded and a new section of internal access track constructed. The new access track will link the R704 to the L7451 via a new direct access onto the L7451 approximately 180m north of the existing forestry direct access on the L7451. Refer to the Site Master Plan drawing in Appendix 2-2 Drawing No. 10730-2005.

It is proposed that the improved forestry access off the R704 will be the construction access for all vehicles arriving to the site during the construction period. For the operation of the site, the new access on the west side of the L7451 will be used by all operational traffic including both light vehicles (i.e. cars, small vans) and heavy goods vehicles (HGVs).. During the decommission phase of the project, the R704 junction will be utilised. Refer to Figure 16-2: .



Legend

- Study Area
- Construction traffic
- Operational traffic
- Decommissioning traffic

Site Layout

- Borrow Pits
- Compound
- Improved Forest Roads
- Passing Bay
- Proposed Roads
- Turbine hardstand
- Substation

Notes:

- All coordinates relate to Irish Transverse Mercator (ITM)
- All levels shown relate to ordnance survey datum at Malin head.
- Drawings for Planning Purposes only

Client

Project

Castlebanny Wind Farm

Title

Site Accesses & Site Access Route during Project Phases

Scale 1:40000 @A3

Prepared by:	Checked:	Date:
NOC	JS	Sept 2020

Project Director	Damien Grehan
Drawing Status	Information

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Drawing 10730 - 16.2

Issue

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16.2.2.2 Construction Material Delivery Route

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

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

During the scoping with Kilkenny County Council, several suitable local quarries with current extraction licenses were identified including:

- Roadstone Kilmacow
- Kent Quarry

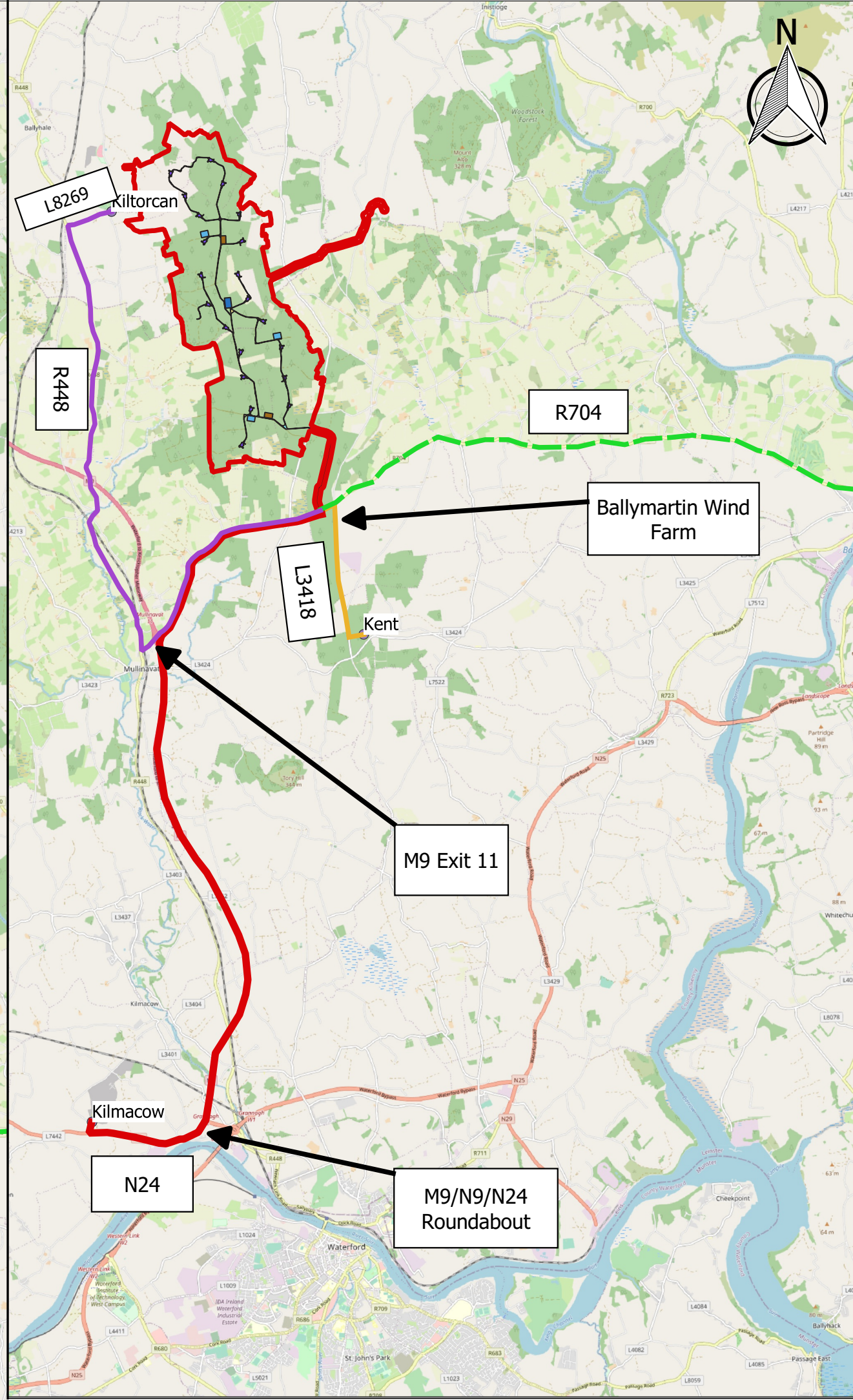
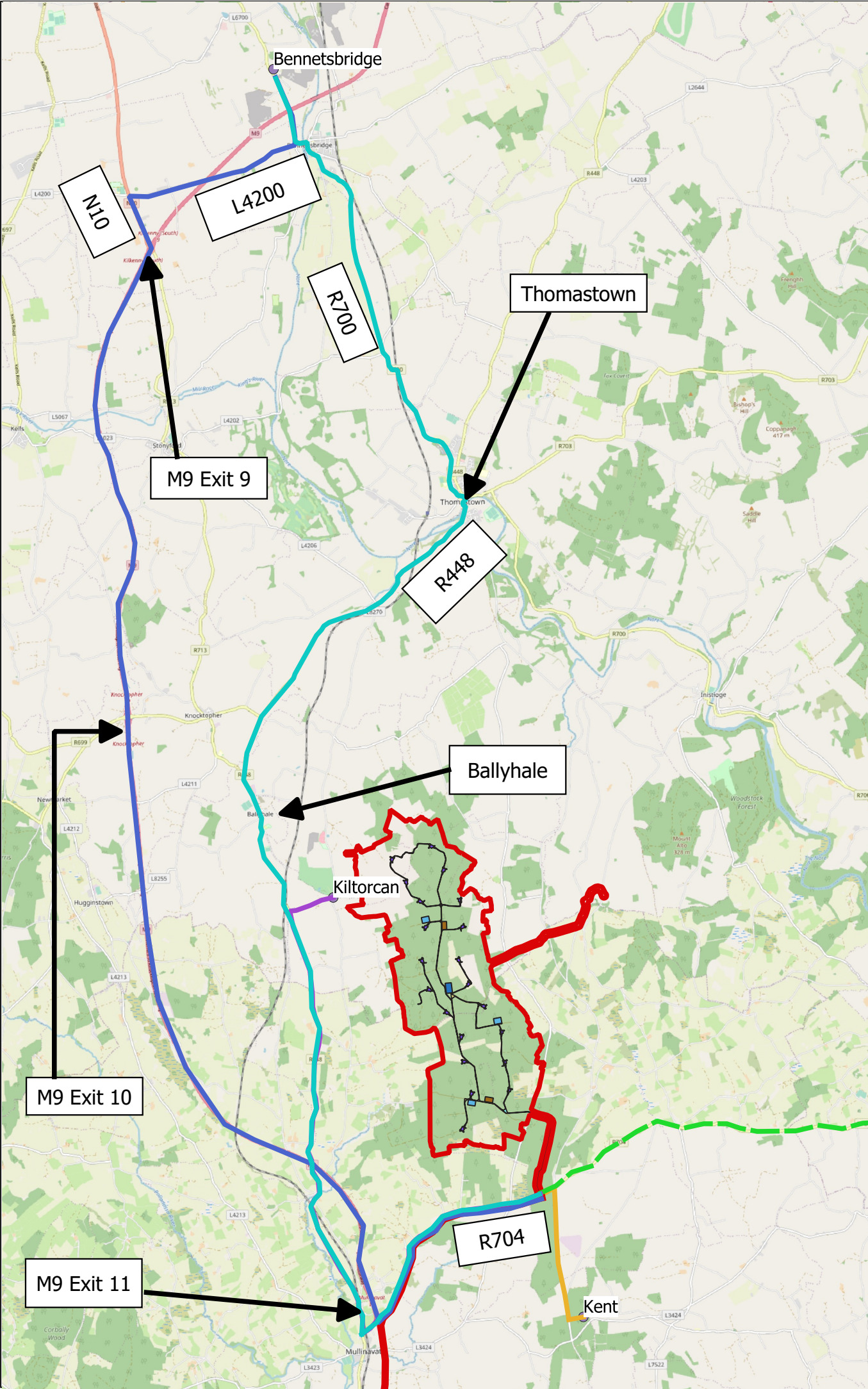
Note, as this development may not be constructed in the immediate 5 years, there is the potential that alternative local quarries may be available at the time of construction. At the construction stage the appointed contractor will liaise with Kilkenny County Council.

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

- Potential quarry location:
 - Roadstone Kilmacow
 - Kent Quarry
 - Kiltorcan Quarry
 - Quarries at Bennettsbridge, to the southeast of Kilkenny Town.
- Other materials including met mast, building materials, fencing, drainage, culverts, water treatment, substation materials, welfare facilities etc., are assumed to be sourced locally and arrive to site via the M9 and along the R704 to the site access. Occasional and infrequent deliveries may also arrive to the site along the R704 from the New Ross direction in Co. Wexford.
- The traffic volumes, peak and average are assessed as arriving from one direction only as a worst-case scenario, instead of reducing the traffic volume by splitting it into different scenarios for different directions.

The

Figure 16-3: C indicates various haul routes from the quarries in proximity to the site and material deliveries. The source of the quarry material will be determined on appointment of a contractor.



Legend

Study Area

Haul Delivery

Route 1 - N24/M9/R704

Route 2A - R700/R448/R704

Route 2B - R700/L4200/M9/R704

Route 3 - L3418/R704

Route 4 - L8269/R448/R704

Route 5 - R704

Quarries

Notes:

- All coordinates relate to Irish Transverse Mercator (ITM)

- All levels shown relate to ordnance survey datum at Malin head.

- Drawings are for Planning Purposes only

Client

COILLTE

Project

Castlebanny Wind Farm

Title

Construction Material Haul Routes

Scale 1:100000 @A3

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Checked: JS

Date: Nov 2020

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Drawing 10730 - 16.3

16.2.2.3 Abnormal Indivisible Load (AIL) Delivery Route

The AIL delivery route was assessed and selected based on several considerations including but not limited to the following:

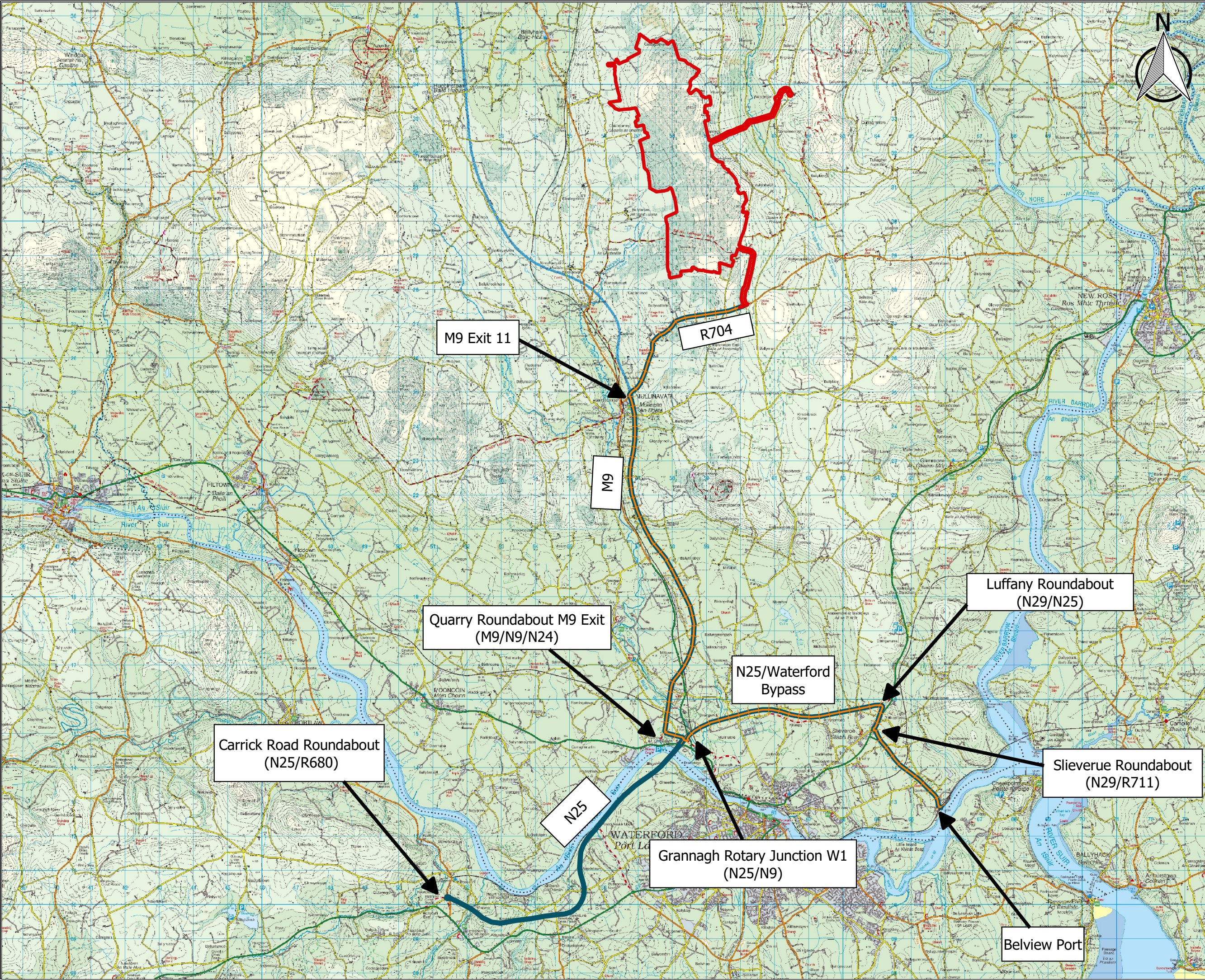
- Desk study and site visit of alternative AIL haul routes
- Ports suitable to receive the turbine components

The alternative routes for the AIL delivery are outlined in Chapter 3.

The port for delivery of the turbine components and transformer are subject to a procurement process at pre-construction stage. For the purpose of this assessment, Belview Port (i.e. Port of Waterford), Co. Kilkenny has been assessed as having sufficient capacity and infrastructure to accommodate the proposed turbine components and transformer.

The AIL selected utilises the national and regional road network and avoids the local road network. The national and regional road networks have a greater capacity for accommodating the movements of the abnormal loads. The abnormal loads will be delivered on the AIL route as follows and shown in : .

- From Belview Port along the N29, national road via the Slieverue Roundabout continuing onto the Luffany Roundabout.
- At Luffany Roundabout the route turns west onto the N25, national primary route known as the N25 Waterford Bypass.
- At the rotary grade separated junction W1 there are two potential routes:
 - continuing south on the N25 mainline crossing into Co. Waterford to the Carrick Road Roundabout (N25/ R680). At this roundabout junction, the AIL will perform a U-turns back in a northly direction, on the N25 northeast bound lane to the W1 junction and onto the N9 Quarry Link Road.
 - Alternatively, exiting off the N25 Waterford Bypass at the rotary grade separated junction (i.e. Grannagh Junction Roundabout) onto the N9 Quarry Link Road.
- At the Quarry Roundabout, M9 Junction 12, the route continues north on the M9 to Exit 11, Mullinavat.
- The final leg of the AIL is along the R704 turning to the site at the upgraded existing forestry direct access, located 650m east of the L7451 local road (Glenville) and crossing the new crossroad junction on the L7451 to the site.



Legend

Study Area

TDR A

TDR B

Notes:

- All coordinates relate to Irish Transverse Mercator (ITM)
- All levels shown relate to ordnance survey datum at Malin head.
- Drawings are for Planning Purposes only

Client

Project

Castlebanny Wind Farm

Title

Turbine Delivery Route (TDR) / Abnormal Indivisible Load (AIL) Delivery Route

Scale 1:100000 @A3

Prepared by: NOC	Checked: JS	Date: Nov 2020
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Issue

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Drawing 10730 - 16.4

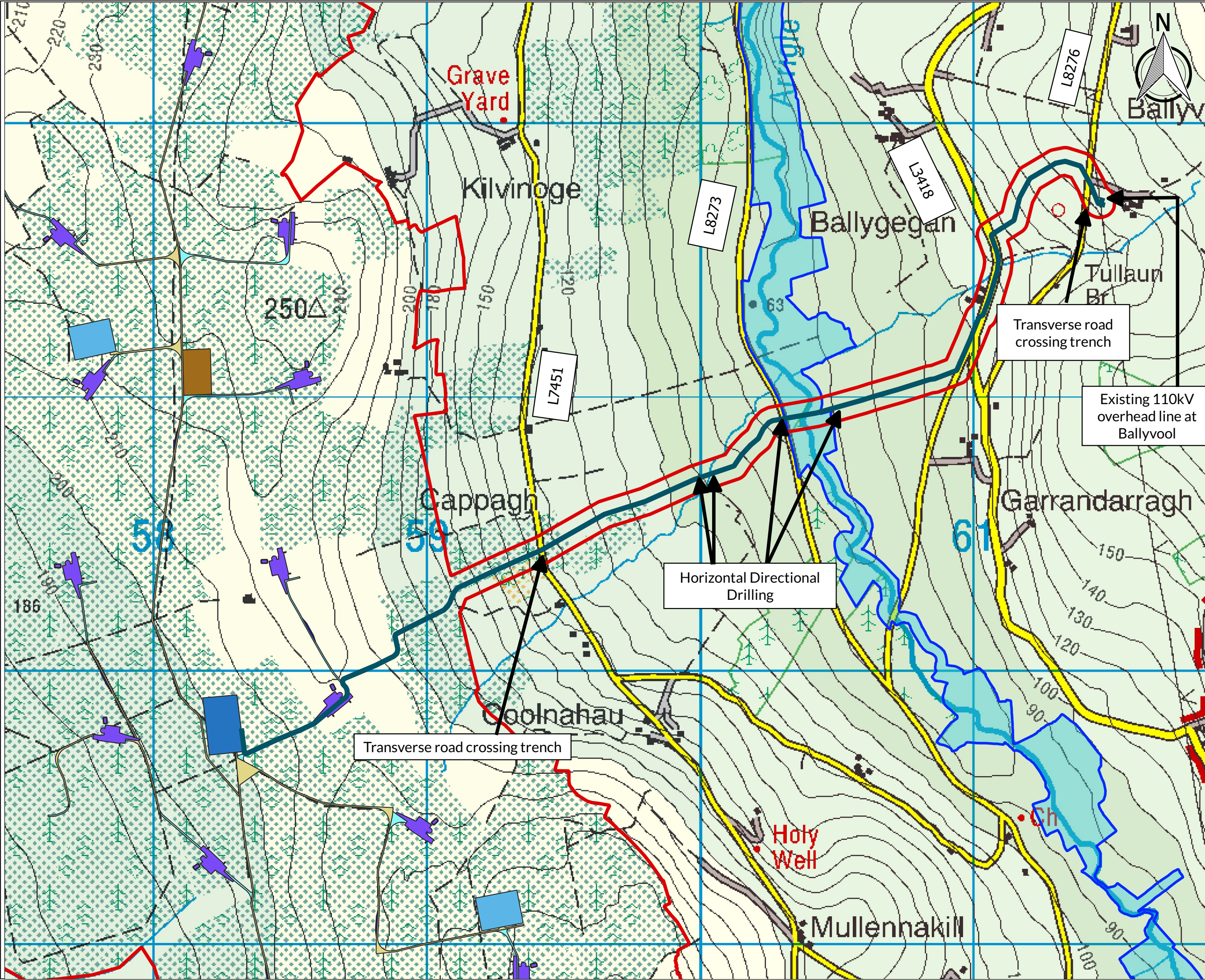
The assessment of the AIL is discussed further in Section 16.3.2.5 and the advanced works have been identified along the route including approximately 12 pinch points requiring temporary hardstanding, relocation / demountable street furniture, utility diversions, public lighting works and cutting back of vegetation to facilitate the delivery of the abnormal turbine component loads. This is discussed further under Potential Impacts in Section 16.3.

16.2.3 Grid Connection

The grid connection connects the on-site substation at Castlebanny with the existing 110 kV overhead line at Ballyvool. The proposed route of this underground grid connection is outlined in

. The overall length of the grid connection between the proposed substation and the existing overhead line is approximately 4km, of which, approximately 1km is within the site of the proposed wind farm, and approximately 0.3km is located along the public road corridor of the L3418. The remaining approximately 2.7km is located off road. The route will cross greenfield lands, trench across 3 no. roads (L7451, L8273 and L8276) and run along 1 no. road (L3418) to the masts connecting the cables to the overhead line at Ballyvool.

The cable will be laid within the public road corridor with draw / joint pits within the fields. Directional drilling will also be required to facilitate the cabling works under the L8273 and the Arrigle SAC.



Legend

- Study Area
- Grid Route
- Site Layout Elements
- Substation
- River Network
- River Barrow & River Nore SAC

Notes:

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- All levels shown relate to ordnance survey datum at Malin head.
- Drawings are for Planning Purposes only

Client		
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Project		
Castlebanny Wind Farm		
Title		
Grid Connection Route		
Scale 1:12500 @A3		
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16.2.4 Existing Road Network & Existing Traffic Volumes

The following section details the existing environment of the road networks and traffic volumes impacted by the proposed development.

16.2.4.1 Site Access

R704

The R704 is a regional road between New Ross and Mullinavat. The construction site access is located on the R704 approximately 650m east of the crossroad junction of the R704 /L7451. The R704 has an 80km/h speed limit in the vicinity of the existing forestry accesses. The R704 is similar to a Type 3³ single carriageway, with 5.5m carriageway width to the south of the site access and 5.0m wide carriageway north of the site access with grass verges to both sides. No hardshoulders are present. . Road marking (i.e. centreline and road edge) and road signage are present on the R704. Drainage on this road is by over the edge drainage. No street lighting or overhead utilities are present in the vicinity of the site.

L7451

The L7451 is a local secondary road. The road has a carriageway width of 3.1m with grass verges to both sides. The road has a default speed limit of 80km/h. An existing forestry access is located on the L7451 approximately 1.8km from the junction of the L7541 / R704. Two adjacent domestic properties and sheds are located approximately 80m from the existing forestry access. A small number of other properties are located between the R704 junction and the existing forestry access or have an access off the L7451 along that stretch.

The proposed new crossing point of the L7451 is located an additional 180m north of the existing forestry access. No road markings are present in the vicinity of either accesses, with road markings and signage only present at the junction with the R704. Overhead utilities run along the eastern and western side of the carriageway within the verge for a distance of 750m between the main site and the parcel of forestry land for access from the R704.

16.2.4.2 Construction Material Delivery Route

As outlined in Section 16.2.2.2 and

³ Type 3 Singe Carriageway – An all-purpose road with a 3.00m lane in each direction constructed to the geometric standards of DN-GEO-03031 and CC-SCD00003. *(TII DN-GEO-03031, June 2017)*

Figure 16-3: C, there is the potential for a number of different haul routes to the site for the various construction materials to be delivered. Each of the potential haul routes for the delivery of the construction materials are detailed below:

1. Route 1 - Construction Material Haul Route – N24 /M9 / R704
2. Route 2 - Construction Material Haul Route – R700 / R448 / R704 or R700 / L4200 / N10/M9 / R704
3. Route 3 - Construction Material Haul Route – L3418 / R704
4. Route 4 - Construction Material Haul Route – L8269 / R448 / R704
5. Route 5 - Construction Material Haul Route – R704

Route 1 Construction Material Haul Route

N24

The N24 is a national primary road from Limerick to Waterford. This road is a Type 1⁴ / Type 2⁵ single carriageway with ghost island junction in the rural section with varying speed limits of 100km/h and 80km/h. In the rural sections, road markings and signage are present, no street lighting is present. The road surface condition appears to be in good condition.

M9

The N24 meets the N9 and M9 at the Quarry Roundabout. The M9 is a national motorway with a speed limit of 120km/h. The M9 is a standard dual carriageway motorway⁶, i.e. a dual carriageway road with two lanes of 3.65m lane and minimum of 2.5m hardshoulder, with each direction of travel separated by a median barrier. Road marking and signage is present on the road. Street lighting is present at the junctions, however, not at the diverging and merging lanes. The route exits the M9 at Junction 11 New Ross / Mullinavat to the R704 via the dumbbell grade separated junction.

R704

The R704 to the east of the M9 Exit 11 is a regional road of Type 1 single carriageway cross section with kerbed footway adjacent to the southbound lane for approximately 300m from the eastern roundabout of the M9. Street lighting, road markings and signage are present along this section of the road.

The R704 has a speed limit of 60km/h at the grade separated junctions over the M9 to a point 40m north-east of the junction with the L74511 at Ballynoony West. The speed limit on the road is 80km/h from this point to the urban boundary at New Ross.

No road markings are present from a point 300m north-east of the M9 Exit 11 eastern junction over approximately 1.2km. The road markings recommence here and continue past the site access on the R704.

L7451

The L7451 is a local secondary road as described in Section 16.2.4.1.

Route 2 Construction Material Haul Route

R700

⁴ Type 1 Single Carriageway: An all-purpose road with a 3.65m lane in each direction constructed to the geometric standards of DN-GEO-03031 and CC-SCD00001. (TII DN-GEO-03031, June 2017)

⁵ Type 2 Single Carriageway: An all-purpose road with a 3.50m lane in each direction constructed to the geometric standards of DN-GEO-03031 and CC-SCD00002. (TII DN-GEO-03031, June 2017)

⁶ Standard Dual Carriageway Motorway: A divided multi-lane road as defined in Section 43 of the Road Act. - Two 3.5m wide lanes and 2.5m wide hard shoulder in each direction constructed to the geometric standards of DN-GEO-03031 and CC-SCD-00007. (TII DN-GEO-03031, June 2017)



The R700 is a regional road from Kilkenny to New Ross. The R700 is a rural carriageway with two-way traffic, no hardshoulders and bounded by grass verges / hedgerows. South of Kilkenny the R700 passes through the village and town of Bennettsbridge and Thomastown. The road has a rural speed limit of 80km/h and an urban / transition speed of 50km/h and 60km/h. Road marking and signage are present with street lighting present in urban areas.

In the village of Bennettsbridge, the local road L4200 Danesfort Road links to the N10 and the M9 at Exit 9. In the town of Thomastown, the R700 meets the R488 which continues south to Waterford.

L4200

The L4200 is a rural local road, with a speed limit of 80km/h. The road has a narrow cross section, with no hardshoulders, road markings (except at junctions) or street lighting present. The L4200 is a 10km link road between the R700 and the N10.

N10

The N10 is a national primary road connecting Kilkenny to the M9 Dublin-Waterford route. It is a ring road around Kilkenny. The N10 has a speed limit of 100km/h. It is a Type 1 single carriageway from the junction of the L4200 to the M9 Exit 9. A ghost island is present at the junction to the L4200. Road marking and signage are present on this section of the N10 but no street lighting until the approach to the M9 Exit.

M9

The M9 as described in Section 16.2.4.2 in Route 1 Construction Material Haul Route.

R448

The R448 is a regional road from Carlow to Waterford. The R448 has a speed limit of 80km/h. It has a rural carriageway with two-way traffic, no hardshoulders and bounded by grass verges / hedgerows. Road markings and signage are present on the R448. The R448 travels through the town and villages of Thomastown, Kiltorcan, Ballyhale and Mullinavat. Street lighting, kerbs and footways are present in the urban areas only. In Mullinavat, the R448 connects to the R704 to New Ross, with the M9 Exit 11 approximately 350m from the R448/R704 junction.

R704

The R704 as described in Section 16.2.4.2 in Route 1 Construction Material Haul Route.

Route 3 Construction Material Haul Route

L3418

The L3418 is a local primary road, with a carriageway width of approximately 4-5m bounded by vegetation / hedgerows / trees on both sides. No street lighting or road markings (except junctions) are present. To the east of the road before the junction with the R704 is the Ballymartin Wind Farm. The L3418 continues to the north of the R704 on the other side of a crossroad junction as discussed in Section 16.2.4.4.

R704

The R704 as described in Section 16.2.4.2 in Route 1 Construction Material Haul Route. This construction route will be from the east of the site entrance on the R704 from the junction with the L3418 to the south.

Route 4 Construction Material Haul Route

L8269

The L8269, is a local road with a speed limit of 80km/h. The L8269 connects to an unnamed local road with access to Kiltorcan Quarry. The L8269 is a narrow rural road with no road markings or signage except at junctions. A passing bay is evident along the 1km section of the L8269, between the R448 and the unnamed road.

R448

The R448 as described in Section 16.2.4.2 in Route 2 Construction Material Haul Route. The L8269 ties into the R448 approximately 2km south of Ballyhale and continues to Mullinavat.

R704

The R704 as described in Section 16.2.4.2 in Route 1 Construction Material Haul Route.

Route 5 Construction Material Haul Route

R704

The R704 as described in Section 16.2.4.2 in Route 1 Construction Material Haul Route. This construction route is for traffic travelling from the east of the site from the New Ross direction.

16.2.4.3 Abnormal Indivisible Load Delivery Route (AIL)

N29

The N29 (Belview Port Road) is a national primary road, with a Type 1 single carriageway from the Belview Port to the Slieverue Roundabout. From the Slieverue to the Luffany Roundabout, the road is a Type 1 dual carriageway⁷ with concrete central median. The road commences with a speed limit of 60km/h at Belview Port to a point north of the L7582 and then transitions into a 100km/h speed limit to the Luffany Roundabout.

Safety barriers are present within the 100km/h section of the road. Road marking and signage is present on this road, with the pavement in good condition. Street lighting is present on approach to Belview Port and from the northbound approach to the Slieverue Roundabout along the N29 to the Luffany Roundabout.

⁷ Type 1 Dual Carriageway: A divided all-purpose road with a minimum of two lanes and hard shoulder in each direction constructed to the geometric standards of DN-GEO-03031 and CC-SCD-00006. (TII DN-GEO-03031, June 2017)

N25

The N25 (Waterford Bypass Road) is a Type 1 dual carriageway with concrete central median. The N25 has a speed limit of 100km/h. Street lighting is present at Luffany Roundabout and recommences again on the approach to the grade separated junction W1 and continues to a point past the W2 junction. Along this section of the N25, the road crosses the River Suir at the Silver Bridge. Immediately south of the Silver Bridge is the N25 Southlink Toll Plaza. The N25 dual carriageway terminates at the Carrick Road Roundabout where it continues southwest as a Type 1 single carriageway. Street lighting is present on approaches to the Carrick Road Roundabout.

The N25 had a rotary grade separated junction (Grannagh Junction Roundabout) with the N9, which links the N25 with the M9 / N24, at junction W1. The rotary has a two-lane circulatory carriageway with a wide offside hardshoulder. A vehicle restraint system circles the inner diameter of the rotary roundabout, with street lighting within the verge on the nearside grass verge.

N9

The N9 is a short link of approximately 500m between the N25 and the M9. The road is a Type 1 dual carriageway with a speed limit of 100km/h. The road has a concrete central median with street lighting within the nearside grass verge.

M9

The M9 is a national motorway as described in Section 16.2.4.2 in Route 1 Construction Material Haul Route

R704

The R704 is a regional road as described in Section 16.2.4.2 in Route 1 Construction Material Haul Route

16.2.4.4 Grid Connection Route

L7451

The grid connection commences within the site, crossing forestry lands and crosses the L7451 local secondary road circa 3.55km north of the new L7451 access road crossing. The road has a narrow carriageway width, with narrow grass verges on both sides and bounded by vegetation and trees. No street lighting or road markings are present at the grid crossing location.

L8273

The L8273 is a local secondary road. In the vicinity of the cable crossing, the road has a narrow cross section with grass evident along the road centre. Narrow grass verges and vegetation (primarily trees) bound the L8273. At the cable crossing point, this local road is bounded to the east by a marshy field, adjoining the River Arrigle, part of the River Barrow & River Nore Special Area of Conservation (SAC), see

. No street lighting or road markings are present at the crossing location. The grid connection at this location will be constructed by horizontal directional drilling to pass under this road and the River Arrigle and associated SAC.

L3418

The L3418 is a local primary road as described in Section 16.2.4.2 in Route 3 Construction Material Haul Route. This section of the road is located on the north side of the R704 and requires laying of approximately 300m of cable within the carriageway and 250m within the field adjacent to the carriageway. The L3418 has a narrow carriageway width and is bounded by vegetation / hedgerows / trees on both sides. Approximately 550m to the west of the road is the River Arrigle part of the River Barrow and River Nore SAC. No street lighting or road markings are present in the vicinity of the cable works.

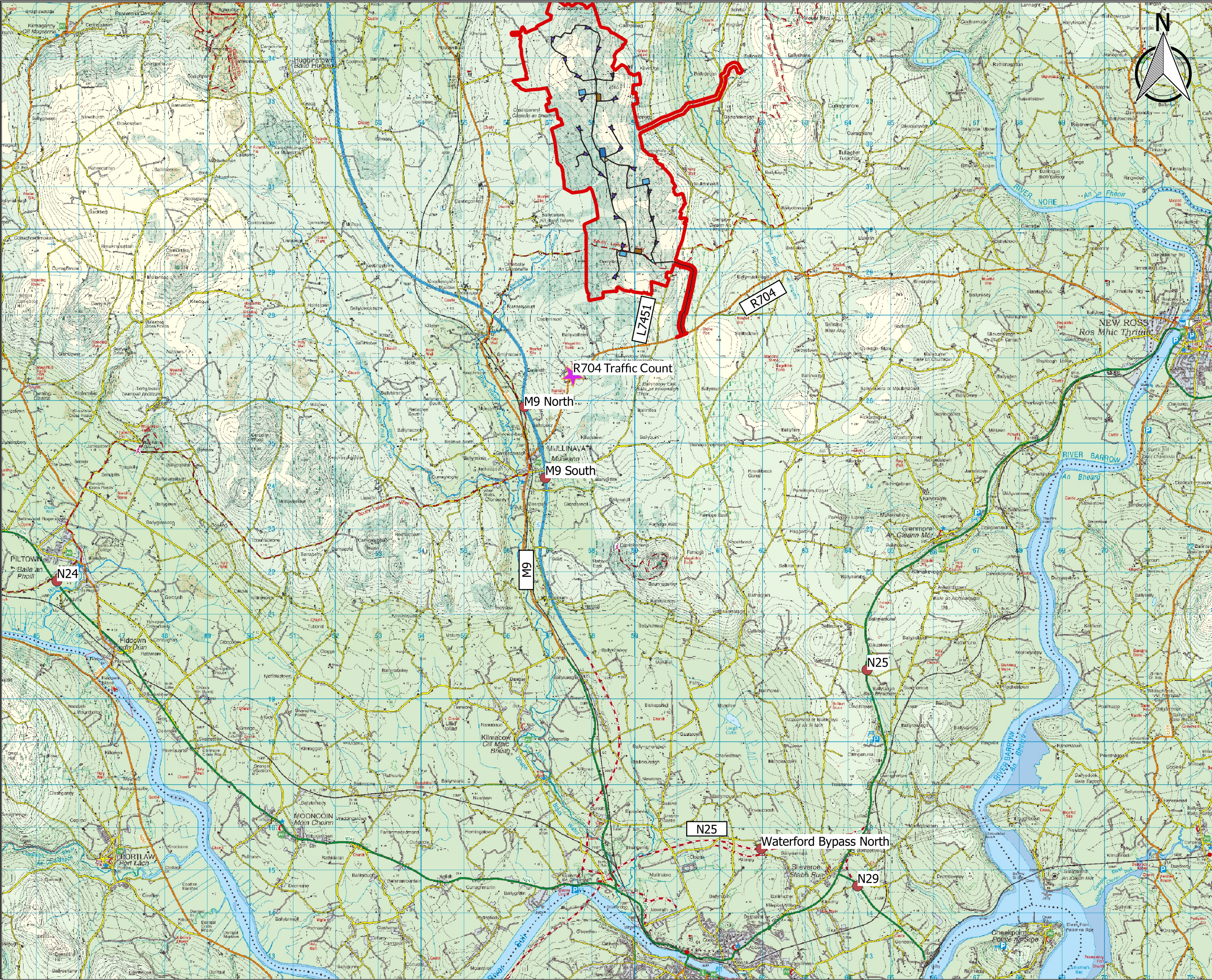
L8276

The L8276 is a local secondary road, with a narrow carriageway cross section with narrow grass verges bounded by hedgerows and mature trees. No street lighting or road markings are present at the crossing location.

16.2.5 Existing Traffic Volumes

16.2.5.1 Existing Traffic Volumes

The existing traffic volumes or baseflow traffic volumes without development generated traffic are outlined below. Due to the impact of COVID-19 on the traffic flows and distributions, the traffic scoping with the local authorities identified that only historical data should be used in the traffic assessment. A review of available historical traffic count data on the proposed typical construction haul route was undertaken. The local authority highlighted the significance of the impact on the R704 as the key consideration in this assessment. The following traffic count locations have been assessed, see : .



Legend

Study Area

TII Traffic Counts

Kilkenny CoCo Traffic Counts

Notes:

- All coordinates relate to Irish Transverse Mercator (ITM)
- All levels shown relate to ordnance survey datum at Malin head.
- Drawings are for planning purposes only

Client

Project

Castlebanny Wind Farm

Title

Traffic Location Counts on Typical Construction Routes

Scale

1 : 80000 @A3

Prepared by:

NOC

Checked:

JS

Date:

Sept 2020

Project Director

Damien Grehan

Drawing Status

Information

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Issue

Drawing 10730 - 16.6

A

The historical traffic counts available on the R704, were provided by Kilkenny County Council. The location of the traffic count is within the 60kph zone at Ballynooney and was undertaken in November 2019. TII Live traffic count data was also reviewed in the assessment based on Average Annual Daily Traffic (AADT⁸) and percentage heavy good vehicle (HGV) content in 2019.

Table 16-1: outlines the AADT, the % HGV content and the HGV vehicle numbers at the locations identified in : .

Table 16-1: Existing Baseflow Traffic 2019

Route	2019		
	AADT	%HGV	HGV
R704 Ballynooney	1,356	5.5%	75
M9 South Between Jn11 Mullinavat and Jn12 M9/N24/N25 Grannagh, Mullinavat, Co. Kilkenny	11,803	8.5%	1,003
M9 North M09 Between Jn10 Knocktopher and Jn11 Mullinavat, Co. Kilkenny	12,276	8.6%	1,056
N24 N24 Between Carrick-on-Suir and Waterford, Piltown, Co. Kilkenny	7,320	8.1%	593
N29 N29 Between Slieverue and Belview Port, Rathpatrick, Co. Kilkenny	2,510	34.2%	859
N25 N25 Between New Ross and Waterford City, Glenmore, Co. Waterford	12,340	8.6%	1062

Note:

- (1) Traffic Count data for the R704 was made available by Kilkenny County Council
- (2) Due to COVID 19 restrictions and associated impacts on baseflow traffic, historical data from 2019 has been utilised in this EIAR.
- (3) The traffic count location on the N25 is not located on the Waterford Bypass as no details were available from TII at location N25 (N09-N29).
- (4) Note traffic counts on the AIL delivery route were not assessed as these traffic movements will be night-time works during low traffic volumes and under traffic management and Garda escort.

16.2.5.2 Forecasted Background Traffic Volumes

The baseflow traffic volumes have been forecasted to the year corresponding to the end of the construction period in the year 2025 (i.e. construction commencing in 2024 and programmed for 2 year). As discussed with the Local Authority, as the operation traffic is low, assessment of the operational year, design years plus 5 years and plus 15 years have not been assessed. This is in accordance with the TII *Traffic and Transportation Assessment Guidelines*, as the operational traffic will be sub-threshold.

⁸ Annual Average Daily Traffic (AADT) is the total volume of traffic in vehicles passing a point or segment of a road for one year, divided by the number of days in the year.

Table 16-2 shows the forecasted baseflow traffic in the year 2025 based on Central Growth Rates for each associated route county value in accordance with TII *Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (May 2019)*.

Table 16-2: Forecasted Baseflow Traffic 2025

Route	2025		
	AADT	%HGV	HGV
R704 Ballynooney	1,468	6.0%	88
M9 South Between Jn11 Mullinavat and Jn12 M9/N24/N25 Grannagh, Mullinavat, Co. Kilkenny	12,805	9.2%	1,177
M9 North M09 Between Jn10 Knocktopher and Jn11 Mullinavat, Co. Kilkenny	13,320	9.3%	1,238
N24 N24 Between Carrick-on-Suir and Waterford, Piltown, Co. Kilkenny	7,939	8.8%	695
N29 N29 Between Slieverue and Belview Port, Rathpatrick, Co. Kilkenny	2,785	36.2%	1,007
N25 N25 Between New Ross and Waterford City, Glenmore, Co. Waterford	13,389	9.3%	1,245

16.2.6 Existing Road Safety

16.2.6.1 Site Access Road Safety

During the scoping process the Local Authority requested a Stage 1 / 2 Road Safety Audit (RSA) be undertaken on the proposed upgrade to the existing site access on the R704 and at the proposed site access road crossing the L7451. The audit includes for both construction and operational stages. The R704 site access is proposed to be the main construction access with vehicles crossing the L7451 to the main site, with no other vehicles associated with the project travelling on the L7451 during construction. At operational stage, the main access will be via the L7451 to the site. The RSA is included in Appendix 16-1 of this EIAR.

A review of the collision statistics on the Road Safety Authorities website⁹ indicates one serious collision in 2009 on the R704 between the junction of the R704 /L7451 and the proposed site access, see Figure 16-7.

⁹ Note the RSA database is not a comprehensive record of collisions and should be reviewed in conjunction with the Local Authority / Gardaí records for the site.

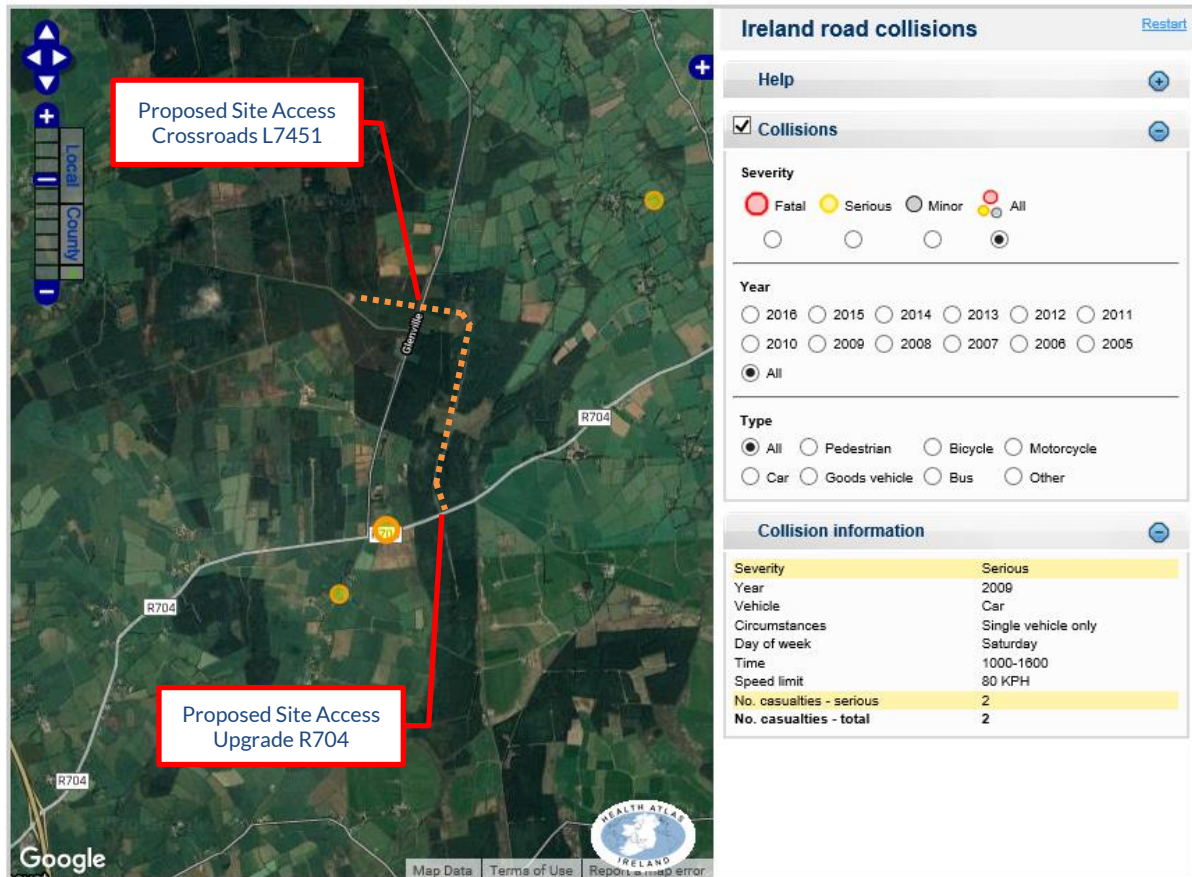


Figure 16-7: Road Safety Authority Collision Statistics (Source www.rsa.ie)

16.3 POTENTIAL IMPACTS

16.3.1 “Do Nothing” Impact

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

16.3.2 Construction Stage Potential Impact

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

16.3.2.1 Construction Programme & Hours, Construction Works & Construction Vehicles

The phasing and scheduling of the main construction task items are outlined in Figure 2.8 of this EIAR, with construction envisaged to commence in January 2024 and take approximately 2 years.

Construction Programme

The Wind Farm construction programme can be broken down into 5 no. main phases as follows:

- | | |
|------------------------------|-----------|
| • Phase 1 Civil | 14 months |
| • Phase 2 Turbine deliveries | 12 months |
| • Phase 3 Electrical | 4 months |
| • Phase 4 Installation | 4 months |
| • Phase 5 Commissioning | 2 months |

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

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

In parallel with Phase 1, Phase 2 will commence with an estimated up to 3 turbines delivered per month over the 12 month period for erection in sequence with the foundation pours.

Construction Hours

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

Wind Farm External Site Works

In addition to the onsite works, to facilitate the development the following external construction activities will be required:

- **Cabling Works**
Cable installation works will be required to connect the wind farm to the existing 110kV overhead line in Ballyvool.
- **Advanced Works for Abnormal Indivisible Loads (AILs)**
Temporary construction works will be required along the AIL haul route to accommodate the transport of the turbine components and transformers. These works will include temporary hardstanding areas, works to make road signage demountable, utility diversions, street lighting, vehicle restraint systems and hedgerow and vegetation cuttings to accommodate the oversail of the turbine blade.

Construction Staff

The number of construction staff will vary dependant on the phase of the construction activities. At the peak construction on the Wind Farm site, a maximum of approximately 100 personnel are estimated.

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

For the advanced works on the AIL delivery route requiring hardstanding, it is envisaged that a maximum of 10 construction staff (including the TTM operatives) will be required at each location. Once the final delivery of the turbine components has been completed, these hardstanding works areas will be reinstated. These reinstatement works will require similar staff levels and construction vehicles. At the identified locations, signs and posts will be made demountable (i.e. retention sockets) in advance of AIL movements. For a short temporary period, the signs and posts will be removed to facilitate the AIL convoy movement and re-erected immediately after the AILs pass the relevant location. A maximum of 2-3 construction staff will remove and re-erect the signage.

For the grid connection cabling works within the public road there will be three road crossings and a 300m section of cable laying within the L3418 road carriageway. As outlined in Chapter 2 Section xx, the crossing of the L7451 and L8276 will be by standard cable trench laying traversing the road. At the L8273, due to the proximity to the SAC and the River Arrigle, hydraulic directional drilling is the construction method. Cable laying by trenching within the road longitudinally will be used along the L3418. For trenching in the carriageway, the construction staff numbers will be 4/5, while the directional drilling will require 7/8 staff.

Construction Vehicles

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

The turbine component delivery is a specialist operation due to the size of the loads transported. These loads are referred to as Abnormal Loads¹⁰ or Abnormal Indivisible Loads (AILs). The abnormal load vehicles will accommodate transport of the tower, nacelle, blades and substation transformers. For the purpose of this assessment, a blade length of 77.5m has been assessed using a rear actuated vehicle. As indicated in Chapter 2, the turbine is estimated to have a hub height of 100-110m with the following estimated dimensions:

- Tower:
 - Delivered in 3 to 6 sections
 - Base of the tower is 4-5m in diameter
 - Top of the tower is 2-3m in diameter
- Nacelle:
 - Typically, 4m in width
- Blade
 - 77.5m in length
 - 4.5m approximate width.

16.3.2.2 Site Access & Internal Access Tracks Design

The existing upgraded site access is located along the R704 regional road and is proposed as the only access to the site for the construction phase from the public road network. A new crossing point of the L7451 local road will facilitate access from the forestry lands accessed from the R704 to the main site for delivery of materials and for staff movements, refer to Figure 16-2: . No construction traffic is envisaged on the L7451 to access the main site, except at the crossing point which will be controlled by traffic management and for cabling crossing works on the L7451. These two accesses will be utilised by both the typical standard construction vehicles and for the AIL deliveries during the construction phase.

The horizontal geometric design of the existing R704 site access has been modified based on swept path analysis of the typical construction vehicles and the AIL vehicles with the largest impact (i.e. turbine blade). During the construction stage standard HGVs may access and depart the R704 access from either direction. The AIL deliveries will be eastbound on the R704 to the site access only. Where the access road crosses the L7451, the traffic will travel straight through only to the main site area. Additional hardstanding area, road marking and signage works are proposed at the R704 access to facilitate AIL's and

¹⁰ A load which exceeds the weight, height, width or length limit(s) outlined in S.I. No. 5 of 2003 of Road Traffic Construction Equipment and Use of Vehicles Regulations 2003. (www.rsa.ie)

construction traffic and for associated road safety. The details of the swept path analysis at the accesses are including in Appendix 2-2.

Due to modifications of the geometry of the existing R704 access a Road Safety Audit Stage1 / 2 was undertaken as per scoping with Kilkenny County Council, refer to Appendix 16-1 for details. Review of the vertical geometry and assessment of the site access visibility splays in the vertical plane in accordance with TII DN-GEO-03060 (formerly TD41-42) identified that the current visibility splays are not to standard. The visibility requirements for a regional road with an 80km/h speed limit is 2.4m x 160m. The visibility splay is currently achievable to the east. However, to achieve the visibility splay to the west, realignment of the vertical geometry of the R704 road is required. As evident in Figure 16-8 and Drawing No. 10730-2050 in Appendix 2-2, the proposed realignment will result in the achievement of the required visibility in both directions to both the object heights of 1.05m and 0.26m as required in Section 2.1 of TII DN-GEO-03031¹¹

The construction works on the R704 and modification to the existing access will have a slight to moderate temporary negative effect on traffic using the R704 due to delays associated with traffic management on the road and the slight increase in construction traffic in the area. It is envisaged that these works will take a maximum of 6 weeks to complete.

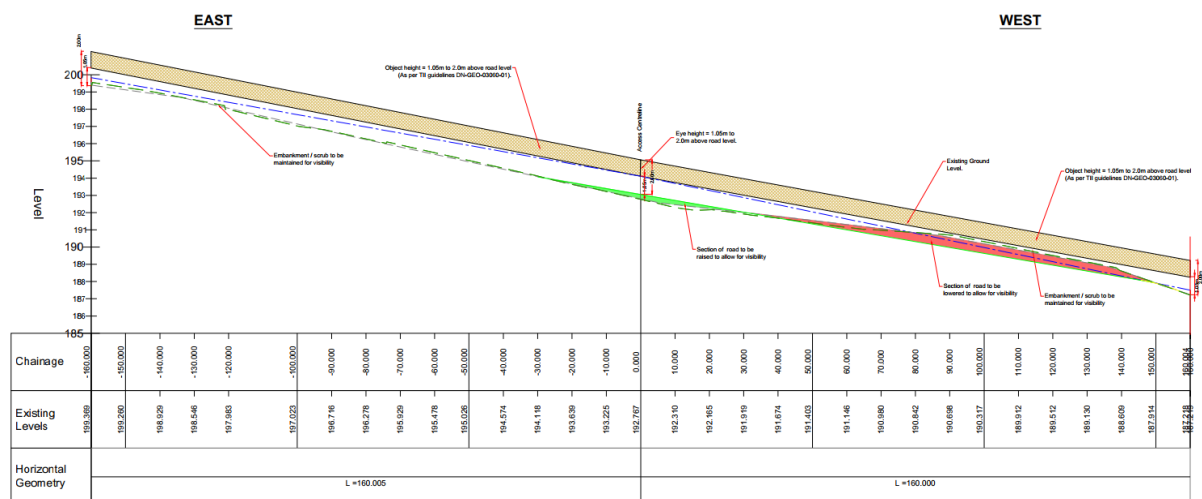


Figure 16-8: Site Access Vertical Visibility Splay on the R704

The proposed site access on the L7451 is located within an 80km/h speed limit. The required visibility splays are 2.4m x 160m. As evident in Drawing No. 10730-2051 in Appendix 2-2, the visibility is achieved from both sides of the carriageway in both directions. Figure 16-9: shows the proposed works to the new accesses on the L7451 as detailed on Drawing No. 10730-2053. The works will require new road construction, road markings and signage, drainage works, gates and diversion of overhead utilities. Over a distance of 50m on approach to the crossing point on the L7451, the internal access tracks will be widened to a width of 7.0m. The widened approaches will accommodate queueing construction vehicles off the public road in advance of the crossing point.

¹¹ TII DN-GEO-03031 Rural Road Link Design, June 2017 (formerly TD 9)

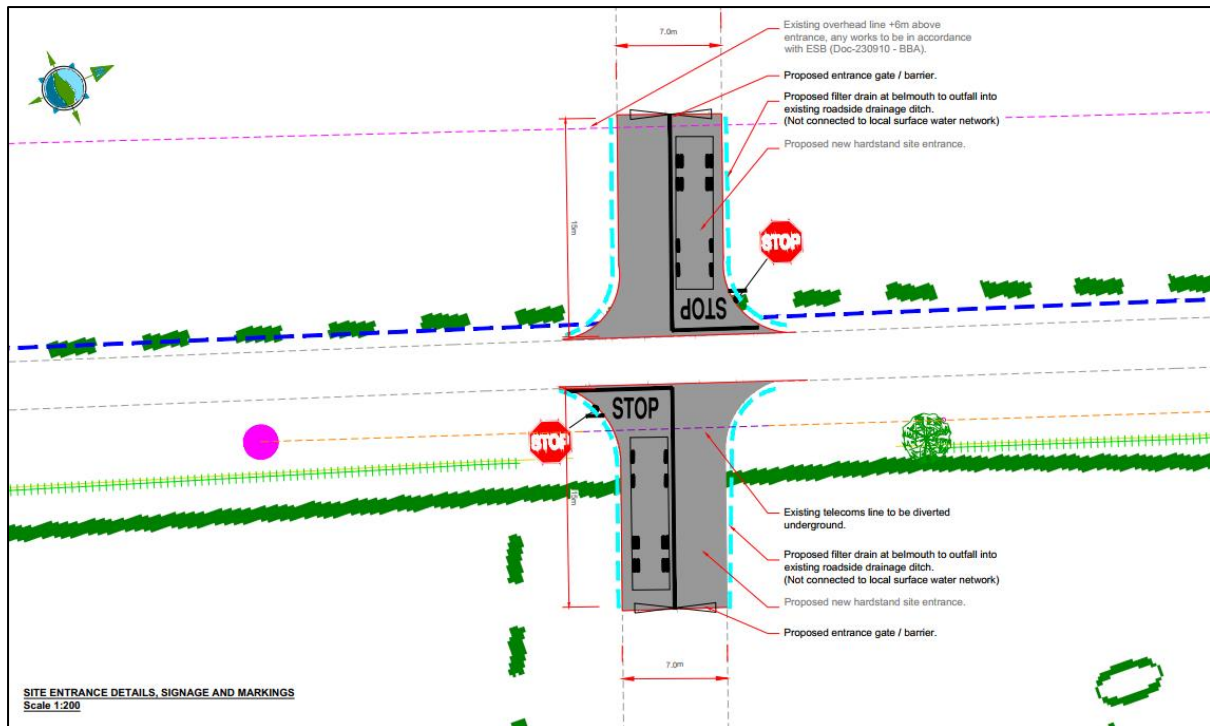


Figure 16-9: Site Access L7451 Crossing Point Works (extract from Drawing No. 10730-2053)

The construction works on the L7451 to construct the accesses will have a temporary moderate negative impact on the traffic on the L7451, due to delays by traffic management and additional construction traffic on the road. On completion of the L7451 crossroad, the accesses will have a slight adverse short-term effect due to delays to local traffic on the L7451 by traffic management to facilitate crossing to / from the site by construction vehicles.

Internal access tracks will have a cross section width of 5.0-5.5m, with local widening on corners and approach to turbine locations, refer to Chapter 2 Section 2.10.1 for road types, figures and appendices detailing the internal access track construction details. Passing bays will be strategically located within the site on the internal access haul tracks and designed in accordance with the TII DN-GEO-03030¹². Based on the internal access track layout of the proposed development, a one-way system can be used by construction delivery vehicles in significant parts of the site reducing the requirement for passing bays. Refer to Section 16.4.1.2 and

¹² TII DN-GEO-03030 *Guidance on Minor Improvements to National Roads (including Erratum No. 1, dated April 2013 and Erratum No. 2, dated June 2013 (TII DN-GEO-03030 March 2013))*

for proposed passing bay layout. At the site accesses (i.e. R704 and L7451) localised widening of the approaches to the accesses over a distance of 50m will supplement the passing bays and provide safe locations for vehicles to queue clear of the public road network.

The potential traffic impact associated with the internal access tracks are discussed in Section 16.3.2.7. The construction works associated with the internal access tracks are within the internal site area and not on the public road resulting in a likely neutral short-term effect.

16.3.2.3 Site Access and Internal Access Track Drainage

Widening of the existing access, construction of a new accesses, upgrade of existing internal site access tracks, construction of new site access tracks, construction of new hardstanding areas have the potential to impact the existing drainage flow patterns. Full details of the surface water management are outlined in Section 2.8 and the hydrology and hydrogeological impacts are outlined in chapter 8.5.3.

With regards to drainage works to offset the impact of the traffic and transport and associated road works it is proposed to culvert any existing minor forestry drain crossings at the internal access tracks during periods of dry weather. Existing minor forestry and field drains that become displaced due to widening of internal access tracks, junctions, passing bays etc will be constructed as new interceptor ditches and filter drains. A clear span bridge is proposed at one watercourse crossing to avoid instream works, thereby reducing the potential for adverse effects on the watercourse. The proposed site drainage is discussed in detail in Chapter 2 (Description of the Proposed Development) and Chapter 9 (Hydrology & Hydrogeology).

16.3.2.4 Typical Construction Traffic Haul Route

The impact of the typical construction traffic associated with the construction of the Wind Farm has been assessed as a peak and an average traffic impact. The peak traffic impact will be associated with the concrete pours for the turbine foundations which will occur at 21 locations and hence only impacting on 21 days of the construction programme.

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

The maximum construction staff on site is expected to be 100 during peak activities with reduction in construction personnel numbers at various phases (i.e. that are more technical and less labour intensive).

Trip Generation

The proposed trip generations by the Wind Farm construction are summarised in Table 16-3. As mentioned in the mitigation chapter, on the days of the concrete pours (worst case traffic volumes) all other construction deliveries will be limited to essential deliveries at other works areas onsite. For this reason, the traffic volumes associated with these concrete pours have not been included in the average traffic in Table 16-6, as these large volumes of material deliveries will be isolated from other deliveries, as much as reasonably practicable, by the appointed

contractor. The potential impacts of the average and peak traffic generations on the existing road network are discussed in Section 16.3.2.8.1

In the development of the traffic generations it is assumed that the subbase material and concrete are to be sourced locally. Borrow pits have been identified on the site which are assumed to provide the capping material.

Table 16-3: Typical Construction Traffic Volumes – Potential Impact

	Construction Daily Traffic Volumes (1-way)																							
	Mont h 1	Mont h 2	Mont h 3	Mont h 4	Mont h 5	Mont h 6	Mont h 7	Mont h 8	Mont h 9	Mont h 10	Mont h 11	Mont h 12	Mont h 13	Mont h 14	Mont h 15	Mont h 16	Mont h 17	Mont h 18	Mont h 19	Mont h 20	Mont h 21	Mont h 22	Mont h 23	Mont h 24
General Civil Works: access tracks & junction improvements	5	5	5	5	5	5	5	5	5	5	5	5	5	5										
Tree Felling	2	2	2	2	2	2	2	2	2															
Drainage & Culvert	1				1																			
Substation & Compound: building materials		4	4	4	4	4	4																	
Substation: foundation concrete (daily load)				11		11																		
Substation: fencing					7		7																	
Turbine: hardstanding (aggregate)		7	7	7	7	7	7	7	7	7	7													
Turbine: foundation concrete (daily load)			94	94	94	94	94	94	94	94	94	94	94	94										
Turbine Deliveries			3	3	3	3	3	3	3	3	3	3	3	3										
Electrical															1	1	1	1						
Installation																			1	1	1	1		
Commissioning																							1	1
Staff (LV)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Total HGV Per Day (1-way)	8	18	21	21	29	21	28	17	17	15	15	8	8	8	1	1	1	1	1	1	1	1	1	1
Total HGV Per Day (2-way)	16	36	42	42	58	42	56	34	34	30	30	16	16	16	2	2	2	2	2	2	2	2	2	2
Total HGV Per Day (1-way) (incl. Concrete)	8	18	115	126	123	126	122	111	111	109	109	102	102	102	1	1	1	1	1	1	1	1	1	1
Total HGV Per Day	16	36	230	252	246	252	244	222	222	218	218	204	204	204	2	2	2	2	2	2	2	2	2	2



(2-way) (incl. Concrete)																							
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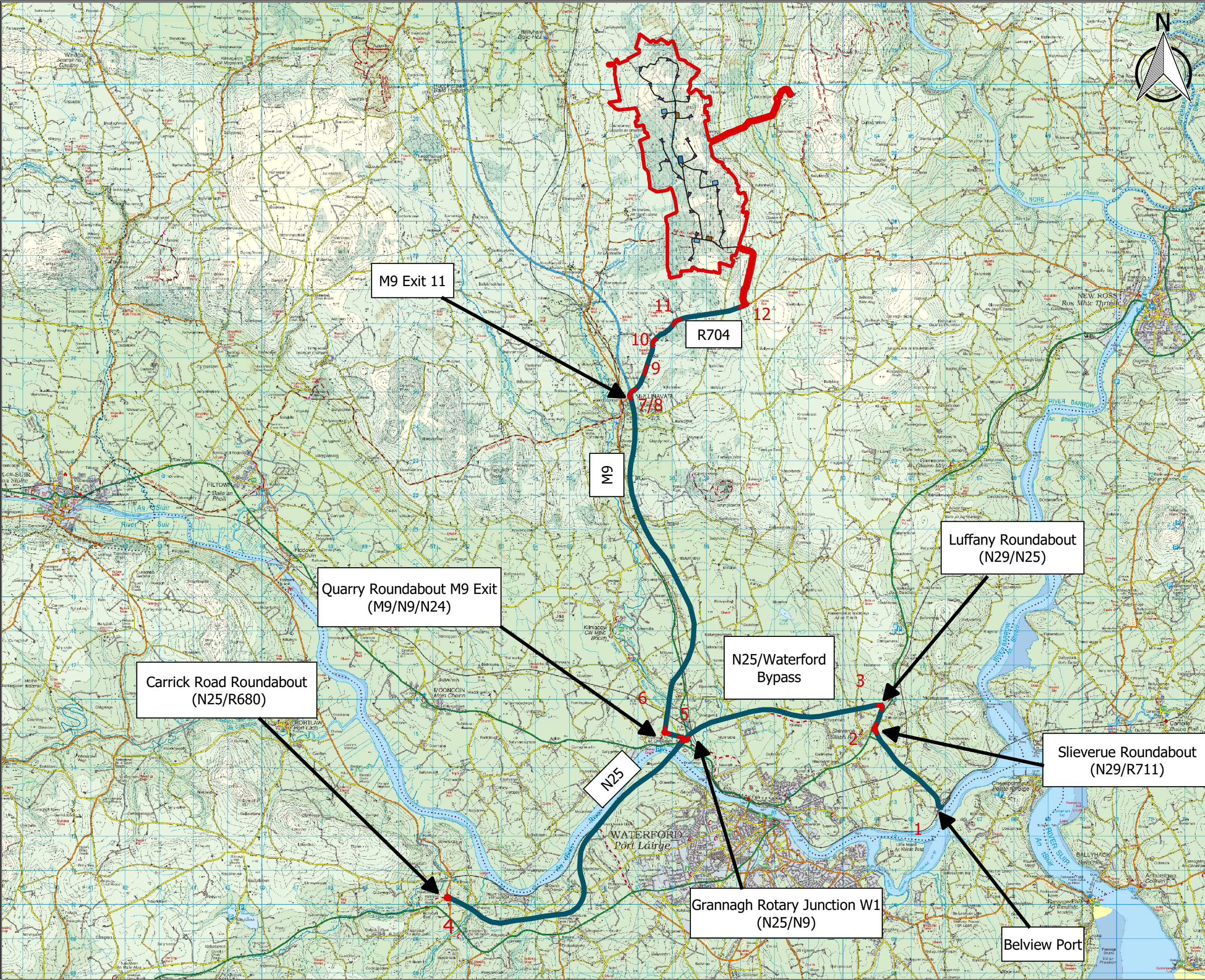
- Notes:
- (1) The concrete pours are assumed to be completed on 1 day each within a 12-hour period. On the days of the concrete pours, limited other deliveries will occur at the site, hence, they have not been added to the daily traffic volumes in this table. These values have been highlighted in red in the above table.
 - (2) All construction deliveries (excl. concrete pours) have been averaged over the Monday-Saturday working week.
 - (3) The turbine deliveries will occur during night-time with traffic management and garda escort. As this traffic will be isolated from other daily traffic movements, it has not been added into the daily traffic volumes in this table.
 - (4) 1 no. delivery per week is anticipated in Months 19 to 24. This small value averaged is less than 1.
 - (5) This construction traffic table is a simplified traffic volume table against programme and a more detailed delivery schedule will be developed by the appointed contractor.

16.3.2.5 Abnormal Indivisible Load (AIL) Delivery Route

The impact of the AIL deliveries on the existing road network have been assessed based on the longest component to be delivered to site, the turbine blade. Swept path analysis has been undertaken in conjunction with a site visit to develop the AIL Delivery Route / Turbine Delivery Route (TDR) Assessment report including in Appendix 2-2. The TDR Assessment Report initially assessed a 75m length blade. The swept path for the turbine blade utilises a rear actuated articulated vehicle, to independently steer the front and rear of the tractor and trailer. Further to the initial TDR Assessment report, additional swept paths have been undertaken with a blade up to 77.5m long as per the drawings in Appendix 2-3 and outlined in Table 16-4.

The swept path analysis of the up to 77.5m long blade was carried out at 15 no. locations on the AIL delivery route which identified 12 no. pinch points as per Figure 16-10. To accommodate the delivery of the turbine components advanced works will be required on the AIL delivery route as outlined in Table 16-4. The advanced works will typically consist of hedgerow cutting for oversail with upgrade of signs to demountable retention sockets, removal of street furniture (i.e. road signage, fencing), temporary removal of public lighting, temporary removal of vehicle restraint system, some utility diversions and temporary hardstanding areas to accommodate the wheel track of the delivery vehicle.

Table 16-4 should be read in conjunction with the pinch points overview map Figure 16-10 and the Drawing No.'s listed in Table 16-4 for the individual pinch point locations made available in Appendix 2-3.



Legend

- Study Area
- Turbine Delivery Route
- Pinch Points

Notes:

- All coordinates relate to Irish Transverse Mercator (ITM)
- All levels shown relate to ordnance survey datum at Malin head.
- Drawings are for Planning Purposes only


Client					
Project					
Castlebanny Wind Farm					
Title					
Abnormal Indivisible Load Delivery Route – Overview of Pinch Point Locations					
Scale		1:100000		@A3	
Prepared by:		Checked:		Date:	
NOC		JS		Nov 2020	
Project Director			Damien Grehan		
Drawing Status			Information		
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Table 16-4: AIL Delivery Route Advanced Works Potential Impacts

Pinch Point	Location	Hardstand Area (m ²)	Street Furniture Works	Oversail Area (m ²)	Drawing No.
1	Port Exit (See Note 1)	NA	NA	NA	NA
2	N29 / N29 Roundabout (Slieverue)	640	Yes	0	342068-30A1.1
3	N29 / N25 Roundabout (Luffany)	265	Yes	0	342068-40A1.1
4	N25 / R680 Roundabout (Carrick Road)	1,360	Yes	0	342068-50A1.1
5A	N29 / N9 Rotary – Northbound (W1 Grannagh)	0	Yes	585	342068-60A1.1
5B	N29 / N9 Rotary – Southbound (W1 Grannagh)	0	Yes	0	342068-60B1.2
6	N9 / M9 Roundabout (Quarry)	660	Yes	0	342068-70A1.1
7	M9 / R704 Roundabout (West side of M9)	75	Yes	165	342068-80A1.1
8	M9 / R704 Roundabout (East side of M9)	70	Yes	0	342068-90A1.1
9	R704	0	No	Refer to Note 3	NA
10	R704 (Right hand bend)	140	Yes	180	342068-100A1.1
11	R704 (Right hand bend)	70	No	0	342068-110A1.1
12	R704 Site Access	825	Yes	375	10730-2052
Total		4,105		1,305	

Notes:

- (1) Pinch point 1 in the TDR Report (see Appendix 2-2), recommended upgrade works within the Port of Waterford. Works at the Port of Waterford that will facilitate passage of loads such as the proposed turbine blades and AILs is being prepared separately by the Port of Waterford.
- (2) Note there are two route options at the N25/N9 Grannagh Rotary Junction W1:



- a. N25 southbound from Luffany Roundabout (i.e. Pinch Point No. 5B) and
 - b. N25 northbound from a U-turn at Carrick Road Roundabout (i.e. Pinch Point No. 4 and 5A).
- (3) Limited tree pruning at pinch point no. 9.

The hardstanding areas are to be temporary in nature and the land reinstated on completion of the works. Temporary drainage works may be required adjacent to hardstanding areas at pinch points 10 and 11 in the form of temporary relocated interceptor ditches and a permanent filter drain at pinch point 12 (R704 Site Access). The hardstanding areas will be laid in advance of the delivery of the AILs to site and removed immediately after delivery of the final AIL with the exception of the hardstanding area at the site access on the R704. A part of this hardstanding area is only being retained as shown on Drawing No. 10730-2050 in Appendix 2-2, to improve the safety of the existing R704 site access through the improvement of visibility to approaching vehicles.

The construction of the temporary AIL hardstanding areas will have a likely moderate negative brief / temporary effect at each pinch point requiring hardstanding. The negative effect is due to delays caused to traffic due to the works and the associated traffic management. The hardstanding works at all the pinch points is envisaged to take less than 2 weeks in total, with works at each pinch point varying from 1 day to 5 days. The removal of the hardstanding will be similar in nature and duration to the construction with a similar potential impact. On completion of the removal of the hardstanding at all pinch points (except pinch point 12), it will result in a reversible impact.

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

Advanced works for the street furniture will be both temporary and permanent. At locations requiring removal of traffic signs, these will be made demountable will retention sockets instead of fixed posts in foundation. The permanent works will be the installation of the retention sockets. This will facilitate the temporary removal of the sign face and post immediately in advance of the AIL movement through the pinch point location and erecting after the AIL convoy has passed the pinch point. Reducing the duration of impact at these locations and allowing for them to be readily open to background traffic without the need for significant temporary traffic management.

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

Trip Generation

The total trip generation associated with the AIL delivery route hardstanding advanced works will result in approximately 207 HGV one-way movements (based on a 0.5m¹³ depth of

¹³ Depth of 0.5m assumed as the majority of these AIL works are within existing roundabouts at grade and not required to raise the level of adjacent fields / grass verges.

hardstanding) over a 2-week period. The number of light vehicle (LV) movements will vary at each pinch point location depending on the construction works (i.e. hardstanding and street furniture works) and traffic management operators required. No works zone is envisaged to have more than 10 construction personnel and a total of 5 LV movements to the works zone daily, see Table 16-6.

All improvement works for the AIL except for the Site Access on the R704 (i.e. pinch Point 12), the 2 bends on the R704 (i.e. Pinch Points No. 10 & 11) and 2 roundabouts at the M9 Exit 11 (i.e. Pinch Point No. 7 & 8) will be remote from the site and the R704. These pinch points listed will not contribute to significant traffic activity on the R704 with the worst-case scenario of 32 HGV one-way movements at Pinch Point No. 12 over a three-day delivery period, see Table 16-6.

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

The trip generations associated with the delivery of the AILs are summarised in Table 16-5. Assuming 3 components in a convoy the delivery will take 64 nights and with 5 per convoy this is reduced to 39 nights.

Table 16-5: Abnormal Indivisible Load Traffic - Potential Impacts

AIL Elements	No. of Turbines	Parts	Components per element	Total Components	Trips with: 3 per Convoy	Trips with: 5 per Convoy
Nacelle	21	1	21	189	63	38
Blade	21	3	63			
Tower	21	5	105			
Transformer				2	1	

The potential impact associated with the traffic for the AIL advanced works and AIL haulage are discussed in Section 16.3.2.8.1, Table 16-8 and Table 16-9.

16.3.2.6 Grid Connection Cable Route

For construction of the grid connection, the cable will be laid within forestry and agricultural land and within the road carriageway. The cable route will require 3 no. local road crossings, 2 no. will be typical transverse trenches (i.e. L7451 and L8276). On the L8273, the crossing of the road and adjacent SAC will be by horizontal directional drilling to reduce the impact on the SAC. On the L3418, there will be 300m length of cable works constructed using a longitudinal trench in the carriageway. All trench reinstatement works will be in accordance with the Purple Book and the associated Municipal Districts will be consulted in advance of the programmed works.

The grid connection is a loop system requiring 2 no. trenches at each location. The trenches will be approximately 2m apart requiring 2 separate trenches. Due to the width of the local roads, a short-term road closure will be required to facilitate the trenching across the local roads on the L7451 and the L8276. It is envisaged that each road crossing will be undertaken as night works and each would be completed during a single night of works. During these construction works the potential impact on the traffic and existing roads will have a likely negative moderate brief effect. On completion of the reinstatement works, the potential impact will be neutral and reversible.

For the longitudinally trenched section within the L3418, a road closure will also be required. It is envisaged that these works will be completed over a 5 day period, with a temporary diversion put in place. During the construction works on the L3418, the potential impact will have a negative temporary (i.e. 1 week) significant effect. On completion of the reinstatement works, the potential impact will be neutral and reversible.

Trip Generation

The road crossing and longitudinal trenching works will require approximately 4-5 construction personnel (including TTM operatives) at each location and 2 HGV per work day. The hydraulic directional drilling will be located off road, requiring approximately 7-8 no. construction personnel at each pit location. A maximum of 1 HGV per day is envisaged over a 5 day period for removal of longitudinally excavated material as the pits for the hydraulic directional drilling will be reinstated with the removed soil.

The potential impacts associated with the traffic for the cabling works are discussed in Section 16.3.2.8.1, Table 16-6 and Table 16-9.

16.3.2.7 Construction Traffic Impact

Each of the aforementioned sections impacting on the traffic flow by construction phase vehicles have been amalgamated into this section to show the potential construction traffic impact. The trip generations have been developed in the previous sections for the following and are summarised in Section 16.3.2.7.1:

Wind Farm Site:

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

Wind Farm External Site Works:

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

16.3.2.7.1 The potential routes are discussed in Section 16.2.2 and Section 16.2.3 are the basis of the traffic distributions. Trip Generations

The trip generations for the proposed development are based on the estimated construction programme and material deliveries to the site as outlined in Section 16.3.2.4, 16.3.2.5 and 16.3.2.6.

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

Wind Farm Site

The Wind Farm assessment is based on the wind farm site works only, with 100 personnel on the Wind Farm site during peak construction activities with 2 personnel per light vehicle (LV), resulting in a total of 50 LV movements to and 50 LV from the site each day.

Figure 16-11 and Table 16-6 summarise the construction traffic for both the peak and average construction activities on a single day during the construction period.

The graph in Figure 16-11 indicates the daily volume of traffic arriving to the site on a day during the associated construction stage (i.e. civil works, turbine delivery, electrical, installation and commissioning). As previously mentioned, the AIL convoy movements are not accounted for in this graph as these traffic movements will be under traffic management, garda escort and be undertaken during the night-time, see Table 16-5.

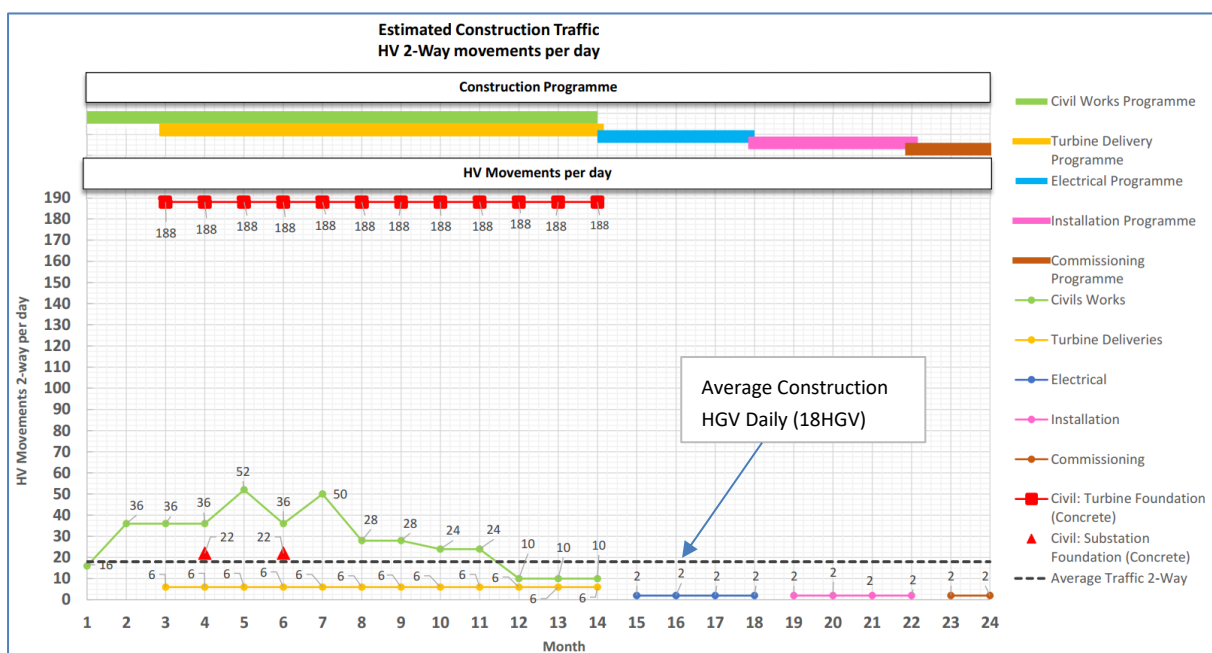


Figure 16-11: Graph of 2-Way Construction Traffic over Construction Programme

Table 16-6: Trip Generations Construction Traffic; Peak and Average Daily Volume

Trip Generation – Construction Traffic			
Works Zone	Classification	Peak Daily (2-way movement)	Average Daily (2-way movement)
Wind Farm	LV	100	60
	HGV	188	18
Advance Works AIL	LV	10	2
	HGV	32	20
Grid Connection	LV	6	2
	HGV	4	2

Note:

- (1) It is assumed that all construction staff arrive 2 per light vehicle to the site / works area.
- (2) The peak traffic is the worst-case scenarios at each works zone.
- (3) Wind Farm peak value is the maximum traffic occurring during the concrete pours for the turbine foundations. This will occur 21 times, i.e. on one day for each turbine foundation.

- (4) Wind Farm average traffic value does not account for concrete pours in the estimation of the average value. The average traffic volume for the Wind Farm is significantly lower as the concrete pours are isolated occurrences on 21 days.
- (5) Due to the confined works areas for the hardstanding for the AILs (i.e. typically within a roundabout), the HGV numbers is restricted. It is assumed that 2 HGVs will arrive per hour over 8 hours working day/ night.
The average AIL is based on pinch points no. 7-11, as the other pinch points are remote from the R704 and are discussed under Section 16.6.1.

Wind Farm External Site Works

For the advanced works for the AIL the traffic generations are outlined in Section 16.3.2.5 and summarised in Table 16-6. For the cabling route the traffic generations are outlined in Section 16.3.2.6 and summarised in Table 16-6.

16.3.2.8 Trip Distribution

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

Wind Farm Site:

- Typical construction traffic are outlined in Section 16.3.2.4 and

- Figure 16-3: C.
- AIL delivery route as outlined in Section 16.3.2.5 and : .

Wind Farm External Site Works:

- Advanced works for the AIL are outlined in Section 16.3.2.5 and :
- Cabling works are outlined in Section 16.3.2.6 and

• .

16.3.2.8.1 Link Capacity Assessment

An assessment of each road on the construction haul routes has been undertaken and is represented in Table 16-7, Table 16-8 and Table 16-9. The link capacity of each road is assessed against the two-way vehicle flows corresponding to Level of Service D.

Wind Farm Site - Typical Construction Traffic

The assessment in Table 16-7 is based on the total construction traffic envisaged at the Wind Farm during peak construction traffic activities (i.e. worst case) and during the average traffic situation. As evident in this table with the exception of the R704, the potential impact of the proposed Wind Farm construction traffic on the existing road network in the construction year 2025 is less than a 1% reduction on the national road link capacities. On these national roads the construction traffic for the Wind Farm will have a likely temporary / short-term slight negative effect.

The average percentage of HGVs on the national roads are very similar to the background traffic HGV volumes, resulting in a short-term not significant negative effect. The impact of the worst-case scenario at peak HGV movements is maximum of 2.0% higher than background traffic, with a temporary moderate negative effect.

The largest impact is as expected on the R704, which due to its character has a lower AADT link capacity than the national roads and lower HGV content. All the traffic to the development will travel on this road, either from the east or west. In the peak scenarios (i.e. concrete pours), the HGV volume increased significantly from 6.0% to 15.7%, with a reduction in spare link capacity from 70.6% to 64.9% (i.e. 5.8% difference). This indicates that with the additional peak construction traffic, there is significant spare capacity on the R704. These are 21 isolated peak HGV flows for the concrete pours and will be occurring on a single day, a maximum of three times a month over 12 months of the construction programme. The impact of this worst-case scenario on the R704 is a likely significant adverse brief effect.

The typical construction traffic impact on the R704 is more representative by the average construction traffic volumes. Although resulting in a higher impact than on the national road network, the increase in HGV percentage is less than 1% and, the difference between baseflow and construction traffic spare link capacity is a reduction in 1.6%. This will have a longer impact over the whole construction programme of 2 years but has a lower traffic volume impact, resulting in a likely slight negative short-term effect.

Wind Farm Site - Abnormal Indivisible Load Traffic

Table 16-8 outlines the link capacity assessment of the AIL haul route on the background traffic flows in the construction year of 2025. As previously outlined, there AILs will arrive in convoy, peak of 5 per convoy or average 3 per convoy. As these vehicles are AILs, an assumed vehicle impact or passenger car unit (PCU) of 10 has been attributed to these vehicles on their outward journey. As the extenders on the vehicles are retracted on the return journey and are typical of a standard HGV size on return, the vehicle impact is assumed to be 1 vehicle.

The HGV volume on the AIL haul routes, except for the R704, have a 0.1%-0.4% increase on baseflow traffic for the 3 components per convoy and 0.1%-0.6% for the 5 components per convoy. To transport a single turbine, 2 and 3 days would be required for 5 per convoy and 3 per convoy, respectively. As a maximum of 3 turbines are envisaged to be hauled per month, a maximum of 9 days and minimum of 6 days impact per month. The traffic impact of the AIL delivery on these national roads link capacity will have a not significant adverse brief / temporary effect.

The AIL traffic impact on the R704 is larger due to the nature of the road. The percentage HGV content increases from a baseflow of 6.0% to 8.0% and 9.3% for the average and peak convoy haulage. The difference in the link capacity is a reduction of 0.9% and 1.5% for average and peak, respectively. The impact of the AIL traffic volumes on the link capacity of the R704 are likely to be moderately negative for a brief / temporary effect period.

Table 16-7: Construction Traffic 2025 – Baseflow & Wind Farm Site Traffic

Route	AADT	AADT	%HGV	Spare Capacity	AADT	%HGV	Spare Capacity	% Diff.	AADT	%HGV	Spare Capacity	% Diff.
	TII Standard	Baseflow 2025			Peak				Average			
	Capacity				Construction Materials Haul Route No. 1							
R704	5,000	1,468	6.0%	70.6%	1,756	15.7%	64.9%	-5.8%	1,546	6.9%	69.1%	-1.6%
M9 South	52,000	12,805	9.2%	75.4%	13,093	10.4%	74.8%	-0.6%	12,883	9.3%	75.2%	-0.2%
M9 North	52,000	13,320	9.3%	74.4%	13,320	9.3%	74.4%	0.0%	13,320	9.3%	74.4%	0.0%
N24	42,000	7,939	8.8%	81.1%	8,227	10.7%	80.4%	-0.7%	8,017	8.9%	80.9%	-0.2%
N29	11,600	2,785	36.2%	76.0%	2,785	36.2%	76.0%	0.0%	2,785	36.2%	76.0%	0.0%
N25	42,000	13,389	9.3%	68.1%	13,389	9.3%	68.1%	0.0%	13,389	9.3%	68.1%	0.0%
Route	Capacity	Baseflow 2025			Construction Materials Haul Route No. 2							
R704	5,000	1,468	6.0%	70.6%	1,756	15.7%	64.9%	-5.8%	1,546	6.9%	69.1%	-1.6%
M9 South	52,000	12,805	9.2%	75.4%	12,805	9.2%	75.4%	0.0%	12,805	9.2%	75.4%	0.0%
M9 North	52,000	13,320	9.3%	74.4%	13,608	10.5%	73.8%	-0.6%	13,398	9.4%	74.2%	-0.1%
N24	42,000	7,939	8.8%	81.1%	7,939	8.8%	81.1%	0.0%	7,939	8.8%	81.1%	0.0%
N29	11,600	2,785	36.2%	76.0%	2,785	36.2%	76.0%	0.0%	2,785	36.2%	76.0%	0.0%
N25	42,000	13,389	9.3%	68.1%	13,389	9.3%	68.1%	0.0%	13,389	9.3%	68.1%	0.0%
Route	Capacity	Baseflow 2025			Construction Materials Haul Route No. 3, 4 & 5							
R704	5,000	1,468	6.0%	70.6%	1,756	15.7%	64.9%	-5.8%	1,546	6.9%	69.1%	-1.6%
M9 South	52,000	12,805	9.2%	75.4%	12,805	9.2%	75.4%	0.0%	12,805	9.2%	75.4%	0.0%
M9 North	52,000	13,320	9.3%	74.4%	13,320	9.3%	74.4%	0.0%	13,320	9.3%	74.4%	0.0%
N24	42,000	7,939	8.8%	81.1%	7,939	8.8%	81.1%	0.0%	7,939	8.8%	81.1%	0.0%
N29	11,600	2,785	36.2%	76.0%	2,785	36.2%	76.0%	0.0%	2,785	36.2%	76.0%	0.0%
N25	42,000	13,389	9.3%	68.1%	13,389	9.3%	68.1%	0.0%	13,389	9.3%	68.1%	0.0%

Note:

- (1) The capacity of each route is based on the road types and link capacities identified in TII DN-GEO-03031 (June 2017) and its Table 6.1.
- (2) N24 on the haul route is a Type 1 / 2 single carriageway, however at location of TII traffic counter location it is a Type 1 dual carriageway.
- (3) N29 has two road types: Type 1 single carriageway and Type 1 dual carriageway. At location of TII traffic counter the route is a Type 1 dual carriageway.
- (4) N25 on the haul route is a Type 1 dual carriageway, however at location of TII traffic counter location it is a Type 1 single carriageway as no TII data was available on the Waterford Bypass.



Table 16-8: Construction Traffic 2025 – Baseflow & AIL Delivery Route Traffic

Route	AADT	AADT	%HGV	Spare Capacity	AADT	%HGV	Spare Capacity	% Diff.	AADT	%HGV	Spare Capacity	% Diff.
	TII Standard	Baseflow 2025			Peak (5 per convoy)				Average (3 per convoy)			
	Capacity				Abnormal Indivisible Load Haul Route							
R704	5,000	1,468	6.0%	70.6%	1,543	9.3%	69.1%	-1.5%	1,513	8.0%	69.7%	-0.9%
M9 South	52,000	12,805	9.2%	75.4%	12,880	9.6%	75.2%	-0.1%	12,850	9.4%	75.3%	-0.1%
M9 North	52,000	13,320	9.3%	74.4%	13,320	9.3%	74.4%	0.0%	13,320	9.3%	74.4%	0.0%
N24	42,000	7,939	8.8%	81.1%	7,939	8.8%	81.1%	0.0%	7,939	8.8%	81.1%	0.0%
N29	11,600	2,785	36.2%	76.0%	2,860	37.1%	75.3%	-0.6%	2,830	36.7%	75.6%	-0.4%
N25	42,000	13,389	9.3%	68.1%	13,464	9.7%	67.9%	-0.2%	13,434	9.5%	68.0%	-0.1%

Note:

- (1) The Note as per Table 16-7 applies to this table.



Wind Farm External Site Works

The potential impact of construction traffic associated with the Wind Farm Site and the construction of the external site works are assessed in Table 16-9 and consider the following construction activities being undertaken at the same time:

1. Main site Wind Farm,
2. AIL Advanced Works and
3. Cable Laying works.

The combined impact of these construction activities on the national road network will have a slight adverse temporary effect (at the worst case) and temporary / short term not significant negative effect (on an average basis).

The combined impact of these construction activities at peak on the R704 is a follow:

- On a worst case basis there is a 11.3% increase in HGV content in comparison with the baseflow (6.0% and 17.3%). This traffic volume only occurs on the 21 no. of days when the concrete turbine foundations are being constructed.
- However, the AIL advanced works and cabling works only have a 1.6% increase in HGV content compared to the Wind Farm site only traffic activity (i.e. 17.3% versus 15.7%)
- There is a reduction in spare link capacity from baseflow in the year 2025 of 70.6% to 63.8% if these three construction activities occur concurrently (i.e. 6.8% reduction).
- The traffic impact on the R704 will have a significant adverse effect but will be brief / temporary in duration, as the AIL advance works and cable laying works will be short duration.

The average traffic situation is slightly improved to the worst case. The average HGV % is significantly lower at 8.1% when compared to the 17.3% peak and is more comparable with the 6.0% baseflow (i.e. there is only a 2% increase in HGV content above the baseflow). The link capacity of the R704 reduces by 2.1% on average for these combined traffic movements. The average potential traffic impact is likely to be a moderate negative brief effect of temporary duration.

Table 16-9: Construction Traffic 2025 – Baseflow & Construction Traffic for the Wind Farm Site, All Advanced Works & Cable Laying Works

Route	AADT	AADT	%HGV	Spare Capacity	AADT	%HGV	Spare Capacity	% Diff.	AADT	%HGV	Spare Capacity	% Diff.
	TII Standard	Baseflow 2025			Peak				Average			
	Capacity				Construction Materials Haul Route No. 1							
R704	5,000	1,468	6.0%	70.6%	1,808	17.3%	63.8%	-6.8%	1,572	8.1%	68.6%	-2.1%
M9 South	52,000	12,805	9.2%	75.4%	13,145	10.7%	74.7%	-0.7%	12,909	9.4%	75.2%	-0.2%
M9 North	52,000	13,320	9.3%	74.4%	13,320	9.3%	74.4%	0.0%	13,320	9.3%	74.4%	0.0%
N24	42,000	7,939	8.8%	81.1%	8,279	11.1%	80.3%	-0.8%	8,043	9.1%	80.9%	-0.2%
N29	11,600	2,785	36.2%	76.0%	2,785	36.2%	76.0%	0.0%	2,785	36.2%	76.0%	0.0%
N25	42,000	13,389	9.3%	68.1%	13,389	9.3%	68.1%	-2.5%	13,389	9.3%	68.1%	0.0%
Route	Capacity	Baseflow 2025			Construction Materials Haul Route No. 2							
R704	5,000	1,468	6.0%	70.6%	1,808	17.3%	63.8%	-6.8%	1,572	8.1%	68.6%	-2.1%
M9 South	52,000	12,805	9.2%	75.4%	13,145	10.7%	74.7%	-0.7%	12,909	9.4%	75.2%	-0.2%
M9 North	52,000	13,320	9.3%	74.4%	13,320	9.3%	74.4%	0.0%	13,320	9.3%	74.4%	0.0%
N24	42,000	7,939	8.8%	81.1%	7,939	8.8%	81.1%	0.0%	7,939	8.8%	81.1%	0.0%
N29	11,600	2,785	36.2%	76.0%	2,785	36.2%	76.0%	0.0%	2,785	36.2%	76.0%	0.0%
N25	42,000	13,389	9.3%	68.1%	13,389	9.3%	68.1%	0.0%	13,389	9.3%	68.1%	0.0%
Route	Capacity	Baseflow 2025			Construction Materials Haul Route No. 3, 4 & 5							
R704	5,000	1,468	6.0%	70.6%	1,808	17.3%	63.8%	-6.8%	1,572	8.1%	68.6%	-2.1%
M9 South	52,000	12,805	9.2%	75.4%	12,805	9.2%	75.4%	0.0%	12,805	9.2%	75.4%	0.0%
M9 North	52,000	13,320	9.3%	74.4%	13,320	9.3%	74.4%	0.0%	13,320	9.3%	74.4%	0.0%
N24	42,000	7,939	8.8%	81.1%	7,939	8.8%	81.1%	0.0%	7,939	8.8%	81.1%	0.0%
N29	11,600	2,785	36.2%	76.0%	2,785	36.2%	76.0%	0.0%	2,785	36.2%	76.0%	0.0%
N25	42,000	13,389	9.3%	68.1%	13,389	9.3%	68.1%	0.0%	13,389	9.3%	68.1%	0.0%

Note:

- (1) The capacity of each route is based on the road types and link capacities identified in TII DN-GEO-03031 (June 2017) and its Table 6.1.
- (2) N24 on the haul route is a Type 1 / 2 single carriageway, however at location of TII traffic counter location it is a Type 1 dual carriageway.
- (3) N29 has two road types: Type 1 single carriageway and Type 1 dual carriageway. At location of TII traffic counter the route is a Type 1 dual carriageway.
- (4) N25 on the haul route is a Type 1 dual carriageway, however at location of TII traffic counter location it is a Type 1 single carriageway as no TII data was available on the Waterford Bypass.



16.3.3 Operational Stage Potential Impact

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

The Wind Farm may be used during the operational stage for recreation use as outlined in Chapter 2 Section 2.1.

16.3.3.1 Site Entrance & Internal Access Tracks

For the operational stage, the site entrance will be on the L7451 at the new access, from the existing R704/L7451 priority junction. Smaller vehicles and occasional larger vehicles (i.e. maintenance HGVs) will utilise the L7451 and the new L7451 site access. On the rare occasion, if oversized/abnormal loads are required to attend site (e.g. to replace large turbine components), vehicles will utilise the upgraded junction on the R704, through the forestry access track to the new crossing point of the L7451 to the site. The L7451 will be used for access by all other vehicles during the operational period. The horizontal geometric design of the existing R704 site access and the new crossing point site accesses on the L7451 to accommodate the turning movement of the vehicles are described in this section. The swept paths of these vehicles are included in in Appendix 2-2.

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

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

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

16.3.3.2 Operational Traffic Impact

As previously mentioned, the construction activities for the proposed development has the potential to generate the largest traffic volumes in comparison to the operational and decommission stages of the development. For this reason, only the developments construction phase traffic has been assessed for link capacity on the road network as the operational traffic will have a lesser impact. The construction traffic link capacity indicates that there is suitable spare capacity under the heavier traffic impact during construction activities indicating that the operations traffic impact will have a not significant / slight adverse long-term effect over the 35 years of operation. Assessment of the operational traffic was discussed with the Local Authority during scoping and due to the lower traffic volumes was not required to be assessed.

The operational maintenance traffic associated with the maintenance works will be undertaken by a small team of 2-3 individuals commuting to the development by four-wheel vehicle or van



daily. The trips identified are a conservative assumption with occasional construction machinery to assist with maintenance of access tracks, drainage, etc. These vehicles will arrive to site from the new access on the L7451. The impact of these vehicles on the existing road network will have a likely imperceptible negative long-term effect.

Existing forestry and agricultural traffic volumes will be similar to the existing baseflow traffic. The Wind Farm during operation will not result in an increase in the forestry or agricultural traffic resulting in a neutral effect on the traffic on the existing road network.

The Wind Farm is proposed to be utilised as a recreation area for the public on completion of the construction phase. On site the existing southern construction compound will be utilised as a public car park. The permanent recreational facilities include marked walking and cycling trails along the site access roads, seating areas, picnic areas and associated recreation and amenity signage.

A summary of traffic data from a similar Wind Farm recreational facility is outlined in Figure 16-12. It is anticipated that use of the recreational facilities at the Wind Farm during the operational stage will generate similar traffic volumes. This traffic impact will have a likely not significant / slight negative long-term effect on the road network in the vicinity of the Wind Farm.

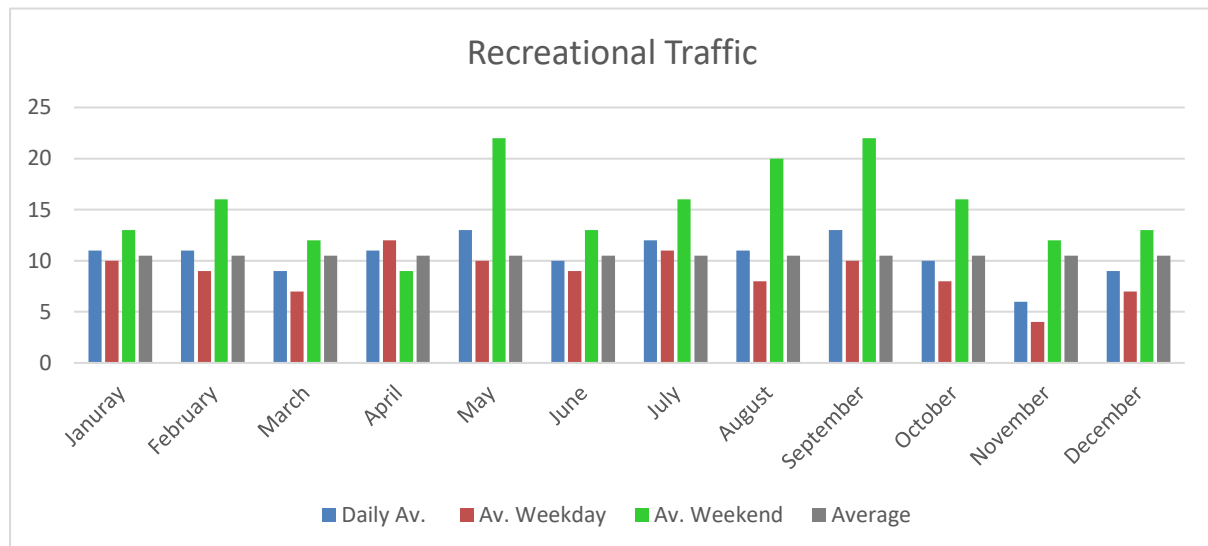


Figure 16-12: Graph of Recreation Traffic at an existing Wind Farm

16.3.4 Decommission Stage Potential Impact

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

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

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

16.3.4.1 Site Entrance & Internal Access Tracks

For movement of large volumes of HGVs and AILs, the crossing point of the L7451 through the forestry track to the R704 will be used. This will avoid interaction of large vehicles with residents on the L7451. This will reduce the negative impact on the community by reducing interaction between HGVs / AILs and residents to a singular location. This singular crossing point is located away from properties resulting in a temporary imperceptible adverse effect.

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

16.3.4.2 Decommission Traffic Impact

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

On completion of the decommissioning works, the site will still facilitate forestry, agricultural and recreational use. The forestry and agricultural uses will have an imperceptible impact on the road network as they are existing operations occurring in the absence of the Wind Farm. The recreational activities will generate additional traffic, this volume of traffic is low (i.e. average of 11 daily). As in the operational stage, this traffic for recreational use of the Wind Farm will have a likely not significant / slight negative long-term effect on the road network in the vicinity of the Wind Farm.

16.4 MITIGATION MEASURES

16.4.1 Mitigation Measures – Construction Stage

16.4.1.1 Site Entrances

Existing forestry accesses are available on the local road network around the Wind Farm. The selection of the site access location on the L7451, was based on minimising the impact of the proposed development on the local residents. The proposed new crossing point on the L7451 was selected over a site access further south with existing infrastructure, to increase the separation distance of residents to the construction traffic crossing point on the L7451.

Use of the R704 access into the forestry instead of along the L7451 at the R704 junction, will also remove the construction traffic off the local road (L7451) and passing of larger vehicles in proximity to the local community.

16.4.1.1.1 Junction Visibility

Adequate visibility is available from the site accesses onto the Local Road, L7451, of 2.4m 'x-distance' by 'y-distance' of 160m in accordance with the TII DN-GEO-03060. Maintenance of the hedgerows within the visibility splays shall be undertaken to maintain the required visibility splays and mitigate the potential for overgrown vegetation which may result in inadequate visibility at the accesses during the construction activities, see Appendix 2-2 Drawing No. 10730-2051.

At the R704, the existing visibility is not in accordance with the current standards and was highlighted as a Problem in the Road Safety Audit (RSA) undertaken by the independent RSA Team. A hidden dip is located within the current vertical road profile, obstructing the visibility to approaching vehicles from the west at the R704 site access. To improve safety at this access ensuring adequate visibility, it is proposed to widen the existing site access, realign the existing access road and modify the vertical geometry of the existing road to remove the hidden dip and improve the visibility.

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

16.4.1.1.2 Junction Swept Paths

In accordance with the TII DN-GEO-03060 and as agreed during scoping with Kilkenny County Council, swept path analysis has been undertaken at the site access for a worst-case typical construction vehicle (i.e. articulated truck (16.5m long)), in addition to those undertaken for the AIL as outlined in Table 16-4. The swept path of the maximum legal articulated vehicle accessing / departing the site are available in Appendix 2-2 on Drawings No. 10730-2052 and 70730-2053.

As previously discussed in Section 16.3.2.5, the swept path analysis of the longest AIL, the turbine blade, were undertaken following identification of potential pinch points in the route assessment report in Appendix 2-2.

The proposed site access design has been developed to take cognisance of the swept path of all vehicles arriving to and departing from the site. On the R704, an overrun area is proposed where infrequent larger movements are required. The gate has been positioned to allow for a large



vehicle to wait clear of passing traffic on both the R704 and L7451, to avoid potential collision between a passing vehicle and one stopped to open the gates at the site access. At the approach to the site accesses, the internal access tracks are proposed at a widened width of 7.0m, to accommodate safe clearance width between two large construction vehicles passing and acting as passing bays.

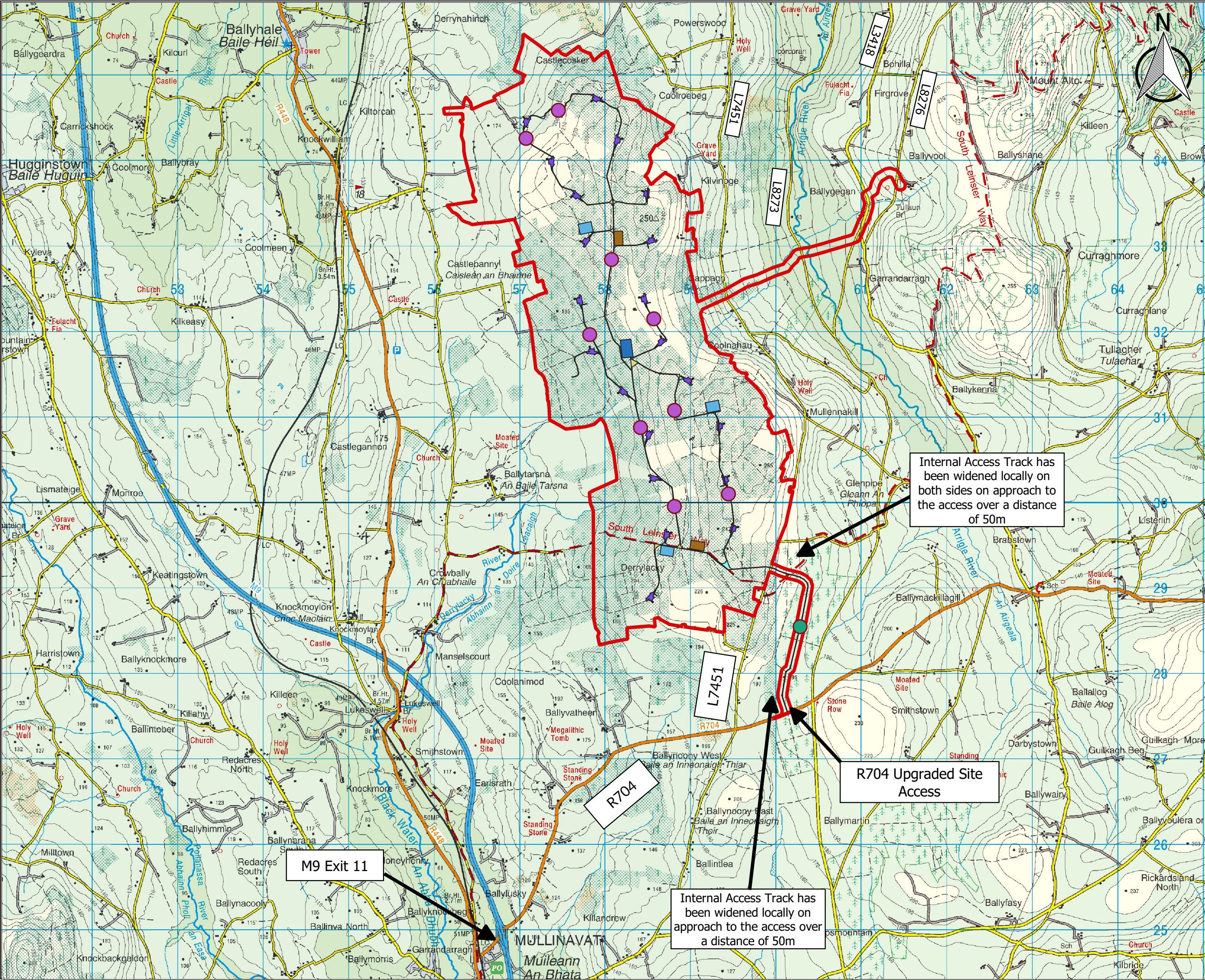
16.4.1.2 Internal Access Tracks & Passing Bays

Along the access track from the R704 to the L7451 site access crossroad, the road width is approximately 5m (5.5m including shoulders) widening locally on approach to the site accesses to 7.0m over a distance of 50m. In addition to these facilities for passing of vehicles, a long passing bay will be constructed within this forestry area to facilitate queuing of vehicles away from the public road network. This passing bay is 5.0m x 70m long which can accommodate 7 no. concrete trucks.

Each passing bay within the Wind Farm site is approximately 50m long by 4.5m wide, accommodating up to 5 no. of 10m standard rigid trucks. The passing bays will facilitate continuous movements to the works areas with limited disruptions. For passing bays refer to

and Drawing No. 10730-2005 in Appendix 2-2.

The internal road layout has been designed to accommodate the swept paths of the vehicles anticipated onsite. The internal access track layout has been created with two loops. These loops may be used by vehicles onsite to queue on approach to the works areas and allow for continuation from the works area in a forward manner to depart the site.



Legend

Study Area

Passing Bay Locations

- 50m Passing Bay
- 70m Passing Bay

Site Layout

- Borrow Pits
- Compound
- Improved Forest Roads
- Proposed Roads
- Turbine hardstand
- Substation

Passing bay dimensions are 5.0m wide by 50m long

Internal Access Track has been widened locally on both sides on approach to the access over a distance of 50m


R704 Upgraded Site Access

Internal Access Track has been widened locally on approach to the access over a distance of 50m

M9 Exit 11

Notes:

- All coordinates relate to Irish Transverse Mercator (ITM)
- All levels shown relate to ordnance survey datum at Malin head.
- Drawings are for Planning Purposes only

Client: 

Project: Castlebanny Wind Farm

Title: Internal Access - Passing Bay

Scale: 1:40000 @A3

Prepared by: NOC	Checked: JS	Date: Nov 2020
Project Director: Damien Grehan		
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Drawing 10730 - 16.13

Issue: A

To supplement the internal access track loops and pending their full construction as the works progress, there are to be 2 no. compounds, 9 no. passing bays and a widened internal access track location at the junction of the access track to T2 and T3 within located within the Wind Farm site, refer to Drawing No. 10730-2010.

16.4.1.3 Drainage

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

16.4.1.4 Haul Routes

Mitigation measures on the haul roads and cable route includes:

- The crossing point of the L7451 was moved to create additional distance to residents to minimise construction traffic noise impact.
- Selection of a viable route with the lowest impact on the road network.
- Avoidance of sensitive receptors and urban settings
 - The construction route to the site is from the regional road R704 via forestry lands to the site via a new crossroad access located on the L7451. This proposal removes multiple interaction locations with residents along this local road and has one fixed location for interaction.
 - The site access route encourages the use of the strategic infrastructure in the area while avoiding the local road and potential sensitive receptors.
 - Turbine delivery route along national and regional roads with largest capacity to accommodate the vehicles.
 - The typical construction traffic haul roads are principally along the national and regional road network, avoiding the local primary and secondary roads.
 - Restricting HGV movements during peak sensitive times on the road networks (i.e. at school times)
 - The grid connection route will be laid primarily in forestry and agricultural lands, minimising works within the public road with the exception of road crossings and a short section (approximately 300m) along the L3418.
 - There will be no effect on the L8273 during cabling works as the cable will be laid by drilling underneath it, resulting in no impact on use.
- To mitigate traffic on the national road network, a number of possible routes have been investigated as possible sources of material for delivery in Section 16.3.2.4.
- To mitigate the impact of the AIL delivery on the road network, the advanced works are to be undertaken (i.e. hardstanding, making signs demountable, utility diversions etc). The hardstanding works areas will be temporary in nature and removed once the final turbine is delivered to site.
- The Local Authority identified drainage as a key consideration with regards to the site development of the wind farm itself and also the temporary works required for the AIL haulage. Proposals for drainage within the site have been identified in Chapter 2 and Chapter 9.

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

16.4.1.5 Traffic Impact

To mitigate the impact of the construction traffic, the Wind Farm will utilise all available resources within the existing site to reduce the requirement for importation of materials to site. Excavation of stone material from 3 no. borrow pits within the Wind Farm site to provide capping material will reduce the HGV volumes.

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

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

16.4.1.6 Trench Reinstatement

To mitigate the impact of the cable laid within the public road the reinstatement works will be backfilled and reinstated as soon as practicable. The reinstatement works will be undertaken in accordance with the “Purple Book” best guidance and practices as required by Kilkenny County Council. The proposed reinstatement and construction details and phasing will be agreed with associated Local Authorities Municipal District Office in advance of the works. The Contractor will be responsible for arranging for the required road opening licenses.

16.4.1.7 Pre- and Post-Construction Pavement Surveys

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

16.4.1.8 Traffic Management Plan (TMP)

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

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

The following mitigation has been incorporated into the TMP:

- Haul route selection to avoid sensitive receptors.
- Widened approaches to the site accesses within the development to facilitate queuing of construction vehicles off the public road.

- Traffic Management Operatives (TMOs) will be provided by the principle contractor in accordance with their Traffic Management Plan at the site accesses during peak construction traffic activities, refer to the TMP.
- A wheel wash will be provided within the site.
- Passing bays on the internal access track and a loop layout within the Wind Farm site to facilitate safe passing of vehicles within the site, vehicles travelling in a forward direction (reducing higher risk reversing manoeuvres).
- For the longitudinal cabling works on the L3418, to reduce the potential impact by the traffic management road closure, a suitable diversion route will be agreed with the Local Authority in advance of the works.

16.4.1.9 Project Delays

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

16.4.2 Mitigation Measures – Operational Stage

As outlined in Section 16.3.3.2, due to the relatively low operational traffic, it is envisaged that the operational impacts of the proposed development will be not significant / slight effect when compared to the existing background traffic. As such, no mitigation measures are proposed for the operation and maintenance of the Wind Farm and associated generated recreational traffic.

16.4.3 Mitigation Measures – Decommission Stage

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

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

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

16.5 RESIDUAL IMPACTS

16.5.1 Construction Stage

During the 24 month construction stage of the Castlebanny Wind Farm development, it is forecast that the additional typical construction traffic that will appear on the delivery routes Table 16-8 will have a variable effect and duration on the existing road network. The traffic volumes to the Wind Farm site shown in Figure 16-11 and Table 16-7 already account for the general mitigation by design as outlined in Section 16.4.1.5 (i.e. use of onsite borrow pits and use of existing forestry track infrastructure where feasible).

It is estimated that the 3 no. borrow pits will supply approximately two-thirds of the internal access road foundation material. The use of the borrow pits reduces the haulage of materials for the internal access track construction to a third of its total requirement. As stated in Chapter 2 and Section 16.1.5, a total of approximately 22.5km of internal access tracks are required for this development. Upgrade of the 11.4km of existing forestry access track will significantly reduce the aggregate required to be imported to site. As the second highest contributor to traffic volume (i.e. internal access track construction) for this development, the combined mitigation by design has result in a significant reduction in the potential impact.

The residual average construction traffic impact will remain as per the potential impact, with a short-term slight negative effect on the national road network and slight negative short-term effect on the R704. The worst-case scenario residual construction traffic impact is the same as the peak potential impact on the R704, with an expected moderate brief adverse effect corresponding to the 21 no. days associated with the turbine foundation concrete pours. On the AIL delivery route there will be a not significant residual effect following the temporary advanced works to accommodate the delivery of the turbine components (i.e. all street furniture demounted will be re-erected). At the locations requiring hardstanding, the areas will be reinstated to existing conditions, resulting in a not significant effect. During the construction works themselves, appropriate temporary traffic management will be employed at all works areas within the road. This will result in an impact on existing traffic on the road network and will have a moderate negative brief to temporary effect (depending on the location).

The cabling works will have a moderate negative brief effect on the local road network. The majority of the cable route is within forestry and agricultural lands and not laid within the road carriageway with the section directionally drilled under the L8273 with no impact on the road use. The impact of the cable laying will be on local roads only, while the regional and national roads will not be impacted. Works will be for two crossing points and a 300m on-road longitudinal trench section. Temporary closures will be required but works will be undertaken off-peak and will be very short duration (i.e. less than a day at crossings).

To facilitate the longitudinal cable within the carriageway of the L3418, a suitable diversion route is available to accommodate the diverted traffic during the cable laying in the L3418. Due to the short length of the diversion route, it will have a not significant temporary effect on the local road users. Local access to properties will be maintained as per standard temporary traffic management practices where possible. On reinstatement of the road in accordance with the "Purple Book", there will be no residual impacts caused by the cable laying.

16.5.2 Operational Stage

As the traffic impact of Castlebanny Wind Farm will be imperceptible, long-term, negative during the operational stage, there will be no significant residual effects during this stage of the development.

16.5.3 Decommissioning Stage

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

16.6 CUMULATIVE IMPACTS

16.6.1 Construction Stage

Chapter 4 Policy Planning and Development outlines all the relevant planning applications within the vicinity of the site to be considered as part of this cumulative assessment. These planning applications are considered cumulative impacts if they have a current planning application and have not been constructed. All refused, retained and continuation of operations planning applications are accounted for within the baseline traffic.

As previously mentioned in Section 4.3, there are two commissioned wind farms to the south and south east of the site namely; Ballymartin Wind Farm and Rahora Wind Farm, respectively. Both of these Wind Farms have been constructed. They are not considered cumulative impacts as the operational traffic generations will be very low.

The following is a list of cumulative impacts identified in Chapter 4:

PI. Ref. 16/445 – Highfield Solar Limited application for a 10-year permission for the construction of a Solar PV Energy development at Derrynahinch, Knocktopher. The site is located 18.5km from the access to our development on the R704. The construction period is envisaged to be 16 week and no details on traffic volumes were identified in the planning information. The haul route is from the national road network (i.e. via M9 Exit 10 Knocktopher) to the R448 to the site on local roads. The cabling works are proposed within local roads outside the scope of this EIAR. The traffic volumes are anticipated to be medium to low and cross the part of the Wind Farm haul route on the national road which has sufficient space capacity or over a short section of the R448. Maintenance traffic of 1-2 visits per month for service personnel was mentioned in their planning application. The cumulative impact of this development for construction with the Wind Farm will not result in a significant increase in effect and would be temporary in nature. The low volume of traffic for operation is very low and have an imperceptible effect.

PI Ref: 16/778 - ART Generation Ltd application for a solar farm at Tullaroan, Callan is located approximately 26-28km from the R704 site access to the Castlebanny Wind Farm. The access to this planned solar farm is approximately 9.5km west of the M9 Exit 10. It is envisaged that there will be limited additional traffic on the R704 generated by this development and that the national road network has sufficient capacity to accommodate both developments.

PI Ref: 16/592- Solar Sense SPV3 Limited applied for permission for a solar photovoltaic installation, new entrance onto public road, underground cable and ducts along the public road to the entrance of the existing Ballyhale substation within the townland of Kiltorcan, Co. Kilkenny. The site is located on the R448 which is on both the Typical Construction Haul Route 2A and Haul Route 4. The main haul route to this site is via the M9 Exit 10 and R699 to the R448 as outlined in the Planning Report Section 9.2. The highest volume of traffic is associated with the construction stage with peak of 62 traffic movements and average of 32 traffic movements daily over the construction period of 12 weeks. The R448 has a similar road character to the R704 (Type 3 single carriageway) with an AADT capacity of 5,000. The peak of 62 vehicles would be a 1.24% increase in traffic and in conjunction with a peak of 288 vehicles for Castlebanny Wind Farm (i.e. increase of 5.76%) totalling 7%. It is anticipated that the R448 will have sufficient spare capacity and the cumulative impact will raise slightly.

PI Ref: 19/538 – Solar Sense SPV 3 Ltd applied for permission for the provision of 4 no battery storage container required by the previously granted solar farm (Reg Ref: 16/592). As outlined



under the PI Ref: 16/592, the impact of the solar farm in the previous application will have a slight impact over the 12-week construction programme. The materials for the civil works and trucks required to transport the battery containers (i.e. articulated trucks) will only result in minimal increase to the traffic volumes outlined in its original planning. The cumulative effect of this solar farm being constructed in conjunction with Castlebanny Wind Farm will result in a slight temporary effect.

PI Ref: 18/573 – EirGrid plc application for proposed uprate works on the existing 110kV line between Great Island substation, Co. Wexford and Kilkenny substation, Co. Kilkenny, This application will impact on a number of regional and national roads. However, these impacts are limited as outlined in their Planning Environmental Considerations report:

“direct access to the structures will be via the local road network with limited accesses from the regional roads and only two accesses from the national road (N25). Some temporary inconvenience during the construction period to other road users will arise as a result of the need to open temporary accesses to structures and to offload construction equipment and materials. However, the relatively low level of current use of the local roads in the area surrounding the line means that only a limited number of existing road users will be impacted. Any such impacts will be managed safely and outlined in the Construction Stage Traffic Management Plan.”

A peak of 8 deliveries over a period of 1 or 2 days at each location was identified which will have an imperceptible brief effect. This additional traffic will have an imperceptible effect on the road network in conjunction with the Castlebanny Wind Farm traffic.

In addition to the aforementioned cumulative impacts, the non-renewable energy planning applications in Appendix 4-2, are typically isolated one-off housing, minor farm works and retentions. It is envisaged that the additional traffic associated with these developments will be accounted for in the central growth factor applied to the baseflow traffic.

Off-Site Forestry Replanting

Due to the felling of trees within the site to facilitate the development, replanting of trees will be undertaken to balance the tree removal. Replanting will occur mostly offsite, at a site located at a significant distance from this site. It will have no significant impact on the road network in the location of the replanting, and there will be no potential for cumulative impacts with the proposed wind farm-related works, due to the remote distance between the sites.

16.6.2 Operational Stage

The cumulative impact on road and traffic will be the use of the infrastructure for existing agricultural activities, the proposed operational activities, and the recreational activities at the Wind Farm. As outlined in Section 16.3.3.2, the traffic volumes associated with these activities will be low and will have a likely slight negative long-term effect on the road network in the vicinity of the Wind Farm.

16.6.3 Decommissioning Stage

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

16.7 CONCLUSION

This chapter assesses the potential impact of the proposed project on the surrounding road network and its capacity. Regional access to the site area is typically via national roads (e.g., M9) with local access into the proposed site from the R704 and a new crossing point on the L7451 local road.

For the project stages access to the site will be via different routes to reduce the impact on the existing environment. Details are shown in Figure 16-2: , with construction and decommissioning using the same access from the R704, via forestry lands (avoiding the L7451) to a new crossing point on the L7451 to the Wind Farm site. The operational access will be from the R704 via the R704/ L7451 priority junction and along the L7451 to the new crossroad access. Due to works required for a new and upgraded access a Road Safety Audit was required and is included in Appendix 16-1. The key problem identified in the audit was the inadequate visibility available on the R704 from the site access to the west. In response to this an upgraded site access is proposed with vertical realignment works on the R704 to the west to remove the hidden dip obscuring the visibility. The approach was agreed with the RSA Team and all other minor problems were addressed in the issue of the final RSA.

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

The construction activity with the largest impact on the traffic volumes is the pouring of the turbine foundations and the second largest is the haul of material to the site for the internal access track construction. A number of haul routes were identified for the supply of these materials as shown on

Figure 16-3: C. These routes were selected based on proximity to site and suitable road infrastructure. Mitigation measures on the haul route include selection of site access points to locate HGVs away from properties, remove HGVs from the less substantial local road network, improved visibility at the site accesses increasing safety. No preferred construction material haul route has been selected but each has been assessed against available link capacity and change in HGV content.

Mitigation by design has an impact on the potential impacts of the proposed project. The potential traffic generations associated with the internal access track construction has been reduced by the use of the borrow pits identified onsite (i.e. a two-third reduction) and utilisation of the existing forestry access tracks onsite where suitable, resulting in only 11km of new internal access track construction and 11km of upgrade of existing. The impact of the mitigation by design reduces the volume of traffic required at the site. As this mitigation is by design and is incorporated into the potential effects, the residual impact of the construction traffic remains the same. A short-term slight negative effect on the national road network and slight negative short-term effect on the R704 is predicted during average operations at the Wind Farm site. The worst-case scenario residual construction traffic impact will be experienced on the R704 with an expected moderate brief adverse effect, corresponding to the isolated 21 no. days of the 2-year construction programme, associated with the turbine foundation concrete pours.

This EIAR investigated and assessed the proposed AIL delivery route / Turbine Delivery Route (TDR). A preliminary report was undertaken and is included in Appendix 2-3. This assessment used the longest abnormal load (i.e. turbine blade) to identify pinch points. The preliminary assessment was undertaken with a 75m length blade and revised swept paths have been undertaken with a blade of up to 77.5m long. As outlined in Table 16-5, 12 pinch points were identified with two alternative means of leaving the N25 Waterford Bypass and travelling onto the M9 northbound to site. Advanced TDR works will be required at these pinch point locations.

A combined traffic assessment of these advanced works in conjunction with the main Wind Farm site and the cabling works was assessed. The worst impact was identified on the R704, with the link capacity reducing by 2.1% on average and 6.8% at peak. The average potential traffic impact is likely to be a moderate negative brief effect of temporary duration. The peak effect will be brief occurring on 21 no. isolated days. The impact on the national road network will be slight and brief for peak and not significant and short-term / temporary for the average residual impact.

The cabling construction works will occur at the same time as the main Wind Farm works and have been included in the previous paragraphs traffic impacts. The cabling works will have low traffic volumes when the two trench crossings are constructed, with the largest volume of traffic required at the longitudinal trench over a 5-day period. The other cabling works are either off road or by hydraulic directionally drilling removing the impact on the road. A road closure will be required on the L3418 for the longitudinal trench works and a diversion route will be put in place as outlined in the Traffic Management Plan (TMP).

To minimise the impact of the proposed development during the construction stage a Traffic Management Plan (TMP) has been prepared and is included in the Construction and Environmental Management Plan (CEMP). The site layout incorporates passing bays, widened approaches to the site accesses, internal access track loops and compounds to assist with the traffic management and delivery on the site by providing adequate locations clear of the public road for vehicles to queue, facilitating larger HGVs onsite to pass each other safely and also allows for reducing the high-risk reversing manoeuvres on site. The overall traffic impact will be



on average slight over the 2 year construction programme with isolated peaks of brief but significant impact (i.e. 21 days over 2 years). The operational stage of the development will result in low traffic volumes for operation and maintenance works at the Wind Farm. Existing traffic operations at the Wind Farm site for forestry and agriculture uses are accounted for in the baseflow traffic and will have a neutral impact as pre-existing. A benefit of the Wind Farm when constructed is its use as a recreational amenity (for walking and cycling). Traffic information from similar sites indicates that the recreation amenity will result in an increase of 11 movements to the development per day. Due to the low volume of traffic, no mitigation measures were applied to the operational stage impacts. Overall the operational stage traffic impact is likely to have a slight negative long-term effect on the road network in the vicinity of the Wind Farm.

As outlined above the decommissioning stage will have a similar but reduced impact in comparison to the construction stage traffic. In the construction stage the largest traffic volume impacts were associated with the haul of the material for the road construction and the turbine foundation pours. As the proposal is to leave these in place, this significantly reduces the decommissioning stage traffic volumes. Mitigation measures are proposed during the decommissioning works for the public's safety and access to the Wind Farm will be restricted to those in a construction capacity during the decommissioning works (i.e. access will be restricted to those using the site for agriculture, forestry and for recreational purposes). These restrictions will only have a minor reduction in traffic but are in the interest of public safety. During the decommissioning works, the access used for the construction stage will be used again, to remove the impact of HGVs from the local road and the residents on the L7451.

During decommissioning if the turbines are to be removed off site, the AIL haul route will be reused. The advantage to the use of this route is all the permeant infrastructure works (i.e. making signs demountable) will be installed and readily taken down in advance of the traffic management. Works will be required for swept paths similar to that in the construction stage at the pinch points. The decommissioning will be over 35 years away and a new TMP will be undertaken specifically for the decommissioning phase to mitigate the impact. Potential future road infrastructure improvements may also benefit the decommissioning stage. The predicted residual impact for the decommissioning stage is slight and temporary.