# GARRANE GREEN ENERGY

# GARRANE GREEN ENERGY PROJECT

# COUNTY LIMERICK

## APPENDIX 17.2

## TRAFFIC MANAGEMENT PLAN

**August 2025**

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# ***DOCUMENT APPROVAL***

| | | |
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| **CLIENT / JOB NO** | Garrane Green Energy | 6839 |
| **DOCUMENT TITLE** | Traffic Management Plan (TMP) | |

| | **Prepared by** | **Reviewed/Approved by** |
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| Document<br>Final | Name<br>John Doogan | Name<br>David Kiely |
| Date<br>August 2025 | Signature | Signature |

6839/703/JD

# GARRANE GREEN ENERGY PROJECT

# TRAFFIC MANAGEMENT PLAN

## CONTENTS

# 1 INTRODUCTION

## 1.1 Brief

Jennings O'Donovan & Partners Limited has been appointed by Garrane Green Energy to prepare a Traffic Management Plan ("TMP") for the proposed Garrane Green Energy Project (The Project), Co. Limerick.

## 1.2 Statement of Authority

The Traffic Management Plan has been prepared by John Doogan of Jennings O'Donovan & Partners Limited, Finisklin, Sligo. Established in Sligo in 1950, Jennings O'Donovan & Partners Limited is a Clean Tech Company providing consulting engineering services in the areas of road design, renewable energy, civil and structural engineering, water supply, wastewater collection and treatment, environmental resource management and impact assessment and in the area of industrial and commercial development.

## 1.3 Site Location, Context and Proposed Development

The Project Site is located 22.9km south of Limerick City, 46.9km north of Cork City and 2.5km (closest turbine) north of Charleville, Co. Cork. The Project will consist of the following main components:

- Erection of 9 No. wind turbines with a tip height of 170m. The wind turbines will have a rotor diameter of 150m and a hub height of 95m.
- Upgrade of existing Access Tracks and construction of new permanent Access Tracks, permanent turbine hardstand areas and turbine foundations.
- Construction of two new bridge crossings on-site, one over the River Maigue and one over the Charleville Stream.
- Upgrade of existing site drainage network and installation of new site drainage.
- Wind Farm Internal Cabling connecting the wind turbines to the electrical substation.
- Construction of a permanent on-site AIS 110kV Substation, with a 'loop in' Grid Connection to the existing 110kV overhead line between Charleville and Killonan, including two single-storey control buildings with welfare facilities, all associated electrical plant and equipment, security fencing, gates, signage, all associated underground cabling, private well for water supply, wastewater holding tank, and all ancillary structures and works.
- Construction of a permanent double circuit 110kV underground cable and two steel cable interface masts to connect to the existing overhead line OHL.
- Erection of a permanent 60m Meteorological Mast for monitoring wind speeds.
- Construction of a Temporary Construction Compound for use during construction.
- Upgrade of the existing entrance on the N20 (Site Entrance 1) (to be used for abnormal loads and turbine component delivery) and upgrade of an existing site entrance on the L1537 (Site

Entrance 2) (to be used for all construction traffic except for abnormal loads and turbine component delivery).

- 6 No. temporary spoil storage areas and 1 No. permanent spoil storage area.
- Biodiversity enhancement and improvements associated with the Project.
- Landscaping, fencing and all associated ancillary works.

The Location and layout of the Project is shown on **Figure 1**.

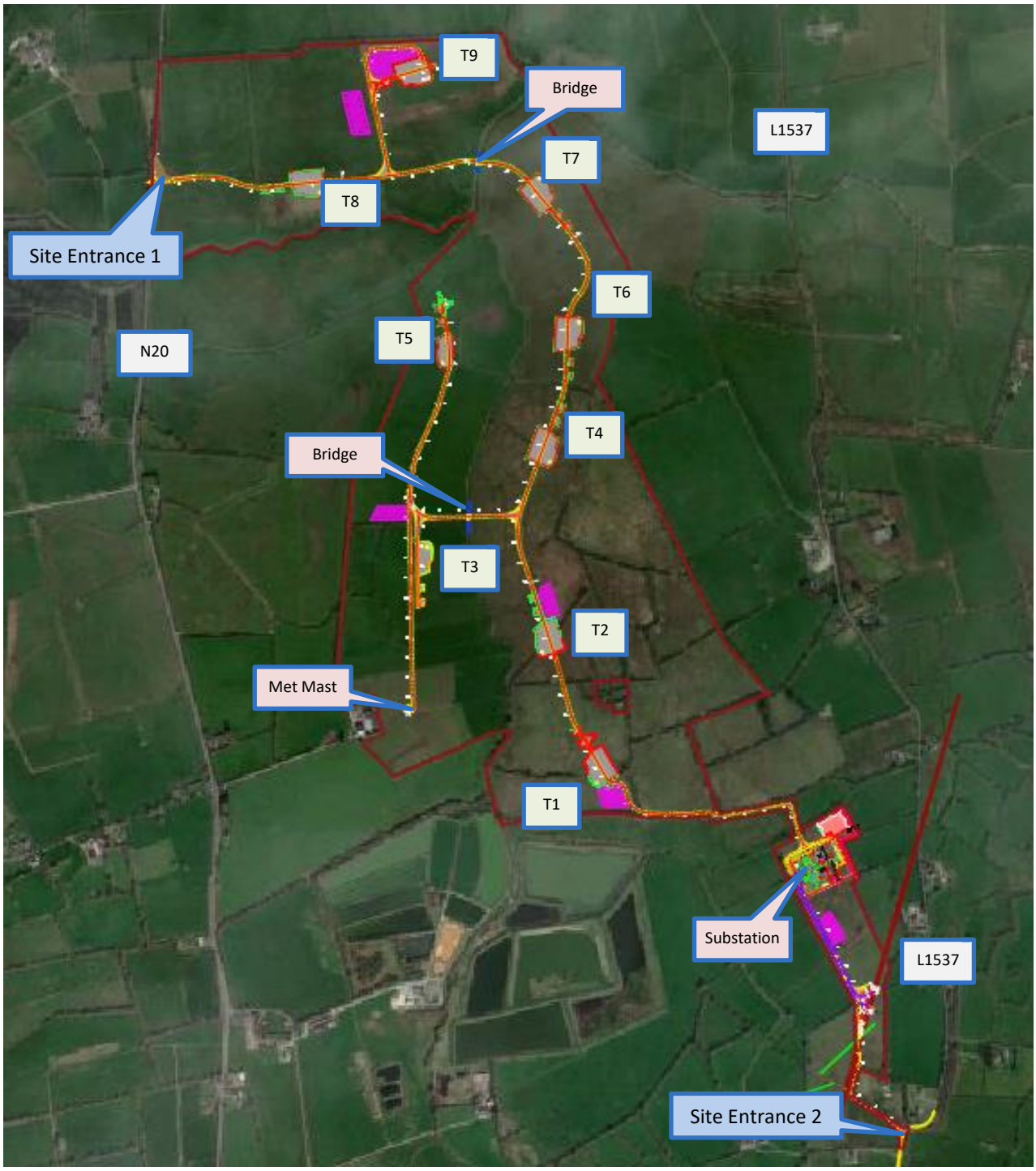



**Figure 1 – Site Layout**

# 2 EXISTING PUBLIC ROAD NETWORK

## 2.1 Existing Roads in the Vicinity of the Site

The location of the Site entrances to the Project is shown on **Figure 1**. Site Entrance 1 on the N20 is located at an existing farm entrance which will be upgraded as part of the Project. The N20 (**Plate 1**) is a 6.0m wide Type 3 single carriageway with hard strips and grass verges. The N20 runs between Limerick and Cork and has a 100km/h speed limit classification at the proposed site entrance. The proposed site entrance on the N20 will be used during turbine delivery using abnormal load vehicles.


**Plate 1 – N20 National Primary Road**

Site Entrance 2 on the L1537 is located at an existing farm entrance which will be upgraded as part of the Project. The L1537 local road (**Plate 2**) is a 3.0m wide single carriageway with grass verges and has an 60km/h speed limit classification. The L1537 runs between the R518 in the village of Bruree and the R515 to the east of Charleville. The L1537 will be used by wind farm construction, operations and decommissioning traffic to access the Project.

**Plate 2 – L1537 Local Road**

The R518 regional road (**Plate 3**) is a 6.0m wide single carriageway with grass verges and an 80km/h speed limit classification. The R518 runs between the N69 at Askeaton and Kilmallock. The R518 will be used by wind farm construction, operations and decommissioning traffic to access the Project.

**Plate 3 – R518 Regional Road**

The R515 regional road (**Plate 4**) is a 6.0m wide single carriageway with grass verges and an 80km/h speed limit classification. The R518 runs between the N24 at Tipperary to Charleville. The R518 will be used by wind farm construction, operations and decommissioning traffic to access the Project.

**Plate 4 – R515 Regional Road**

Site Entrance 1 to the Project is located on the N20 national primary road (**Plate 5**) at an existing field entrance. The existing entrance will be upgraded as part of the Project. Full details of the upgraded site entrance are given in **Section 17.3** of this report.


**Plate 5 – N20 Site Entrance 1**

Site Entrance 2 to the Project is located on the L1537 local road (**Plate 6**) at an existing field entrance. The existing field entrance will be upgraded as part of the Project. Full details of the upgraded site entrance are given in **Section 3** of this report.


**Plate 6 – L1537 Site Entrance 3**

The existing junction between the R518 and the L1537 (**Plate 7**) is a simple T-junction with priority for R518 traffic. The junction is located in Bruree village in a 50km/h speed limit zone. The junction is lit by public lighting. Observations during the traffic counts and traffic analysis carried out at the junction using the recorded traffic volumes show that there are no capacity problems at the junction under current traffic conditions. The junction is currently operating at free flow conditions with a level of service of A. Road network and junction capacity is measured in terms of level of service (LOS) thresholds which are based on the queuing delay on each arm of the junction. The transportation LOS system uses the letters A through F, with the following definitions: A = Free flow, B = Reasonably free flow, C = Stable flow, D = Approaching unstable flow, E = Unstable flow, F = Forced or breakdown flow. The results of the analysis are included in the TTA, **Appendix 17.1**.


**Plate 7 – R518 / L1537 Priority Junction**

The existing junction between the R515 and the L1537 (**Plate 8**) is a simple T-junction with priority for R515 traffic. The junction is located to the east of Charleville in an 80km/h speed limit zone. The junction is lit by public lighting. Observations during the traffic counts and traffic analysis carried out at the junction using the recorded traffic volumes show that there are no capacity problems at the junction under current traffic conditions. The junction is currently operating at free flow conditions with a level of service of A. Road network and junction capacity is measured in terms of level of service (LOS) thresholds which are based on the queuing delay on each arm of the junction. The transportation LOS system uses the letters A through F, with the following definitions: A = Free flow, B = Reasonably

free flow, C = Stable flow, D = Approaching unstable flow, E = Unstable flow, F = Forced or breakdown flow. The results of the analysis are included in the TTA, **Appendix 17.1**.


**Plate 8 – R515 / L1537 Priority Junction**

The existing junction between the N20 and the R518 at ORourke's Cross (**Plate 9**) is a staggered T-junction with priority for N20 traffic. The junction is located in a 60km/h speed limit zone. The junction is lit by public lighting. Observations during the traffic counts show that there are no significant delays or capacity problems at the junction under current traffic conditions. Right turning traffic from the R518 experience delays of approximately 5 seconds during the morning peak hour.


**Plate 9 – N20 / R518 Priority Junction**

# 3 SITE ACCESS

## 3.1 Proposed Wind Farm Site Entrances

The location of the site entrances to the Project are shown on **Figure 1.** Site Entrance 1 will be constructed as a temporary entrance for abnormal loads to access the Project from the N20 national primary road. Site Entrance 1 will consist of a simple T-Junction located at an existing field entrance. The existing field entrance will be gated and will be isolated from the abnormal load entrance. The existing field entrance will remain operational for agricultural use and will not be available for construction, operation or decommissioning traffic. The field access will be upgraded as part of the Project, upgrades will include 215m visibility splays, 4m access track, bound surfacing at N20 intersection and field gate set back from the carriageway edge. Site Entrance 1 will only be used during delivery of abnormal loads such as turbine components, cranes and transformers and will not be used for general construction traffic. A temporary overrun area will be constructed at the junction to accommodate the swept path and wheel loading from abnormal load vehicles delivering turbine components during the turbine delivery phase of the project. When Site Entrance 1 is not in use for abnormal load deliveries, access to the junction will be restricted using temporary fencing erected along the existing N20 boundary. The temporary fencing will be used to restrict access and to prevent parking at the junction in the vicinity of the N20. The overrun area at the junction will be reinstated with topsoil and seeded with grass following the delivery of turbine components and the removal of cranes from the site. The layout of Site Entrance 1 during the construction phase of the Project is shown in **Figure 2.** During the operations phase of the project, Site entrance 1 will be closed and reinstated, operations traffic will access the development via Site Access 2 on the L1537. Site Entrance 1 will have a dwell area with a gradient of -2.5% at its intersection with the N20 with drainage falling towards the Project and away from the N20 carriageway. Visibility at Site Entrance 1 will be in accordance with TII standards and will have visibility splays of 215m measured from the carriageway edge at a 3.0m setback distance.

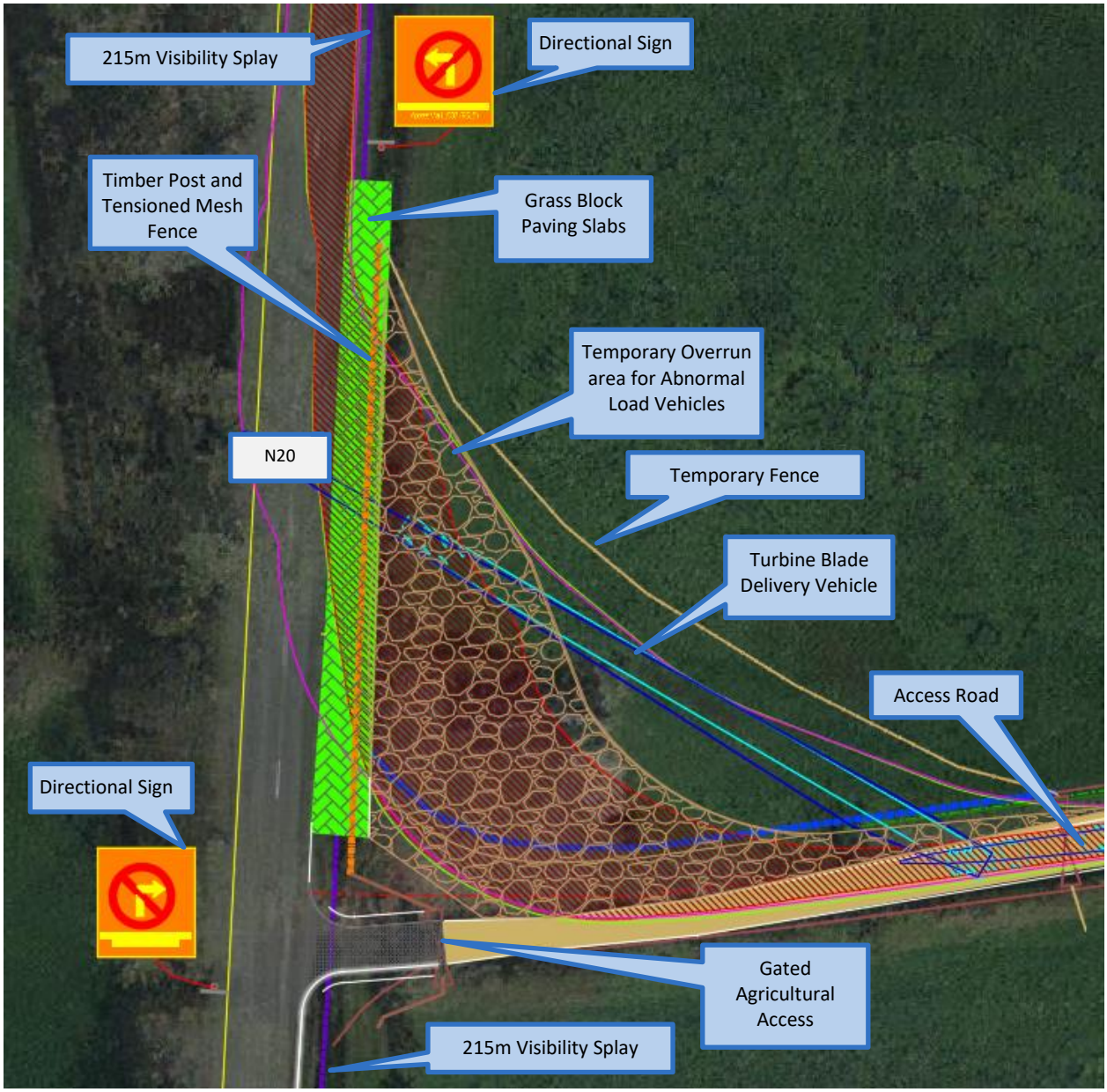



**Figure 2 – Site Entrance 1 on the N20**

Site Entrance 2 will be constructed on the L1537 local road at an existing farm entrance. Site Entrance 2 will consist of a simple T-Junction located at an existing field entrance which will be upgraded as part of the Project. Site Entrance 2 will be the primary access to the Project during the construction, operations and decommissioning phases of the Project. The layout of Site Entrance 2 is shown in **Figure 3.** Site Entrance 2 will have a dwell area with a gradient of -2.5% at its intersection with the L1537 with drainage falling towards the Project and away from the L1537 carriageway. Wheel cleaning facilities will be provided at the junction to prevent the spread of mud and debris onto the L1537 carriageway. Visibility at Site Entrance 2 will be available at a distance of 90m to the right and 70m to the left measured at a 3.0m setback from the L1537 carriageway edge. The visibility splays are in accordance

with vehicle speeds obtained from a traffic speed survey carried out over a seven-day period at the junction.

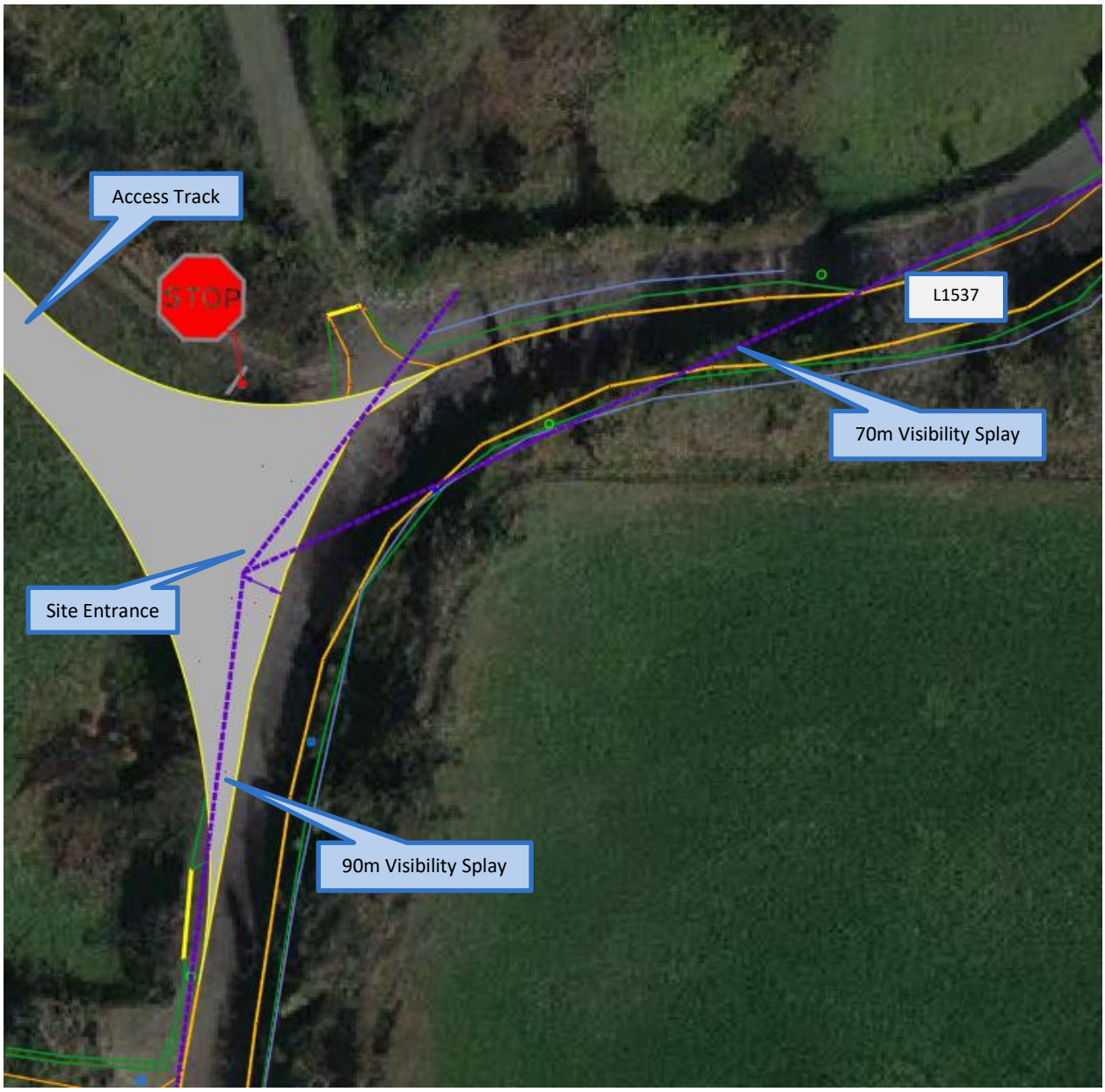



**Figure 3 – Site Entrance 2 on the L1537**

## 3.2 Junction Signage and Traffic Management

The Project site access junctions will be stop controlled junctions and will be signposted and marked in accordance with the Traffic Signs Manual during the operations phase of the wind farm. The junctions will be fitted with a RUS 027 stop sign and markings in accordance with TSM Figure 7.35.

During the construction of the wind farm the site entrance junctions will be signposted with advance warning signs in accordance with Chapter 8 of the Traffic Signs Manual. The layout of site entrance junction advance warning signage for Site Entrance 2 is shown on **Figure 4.**

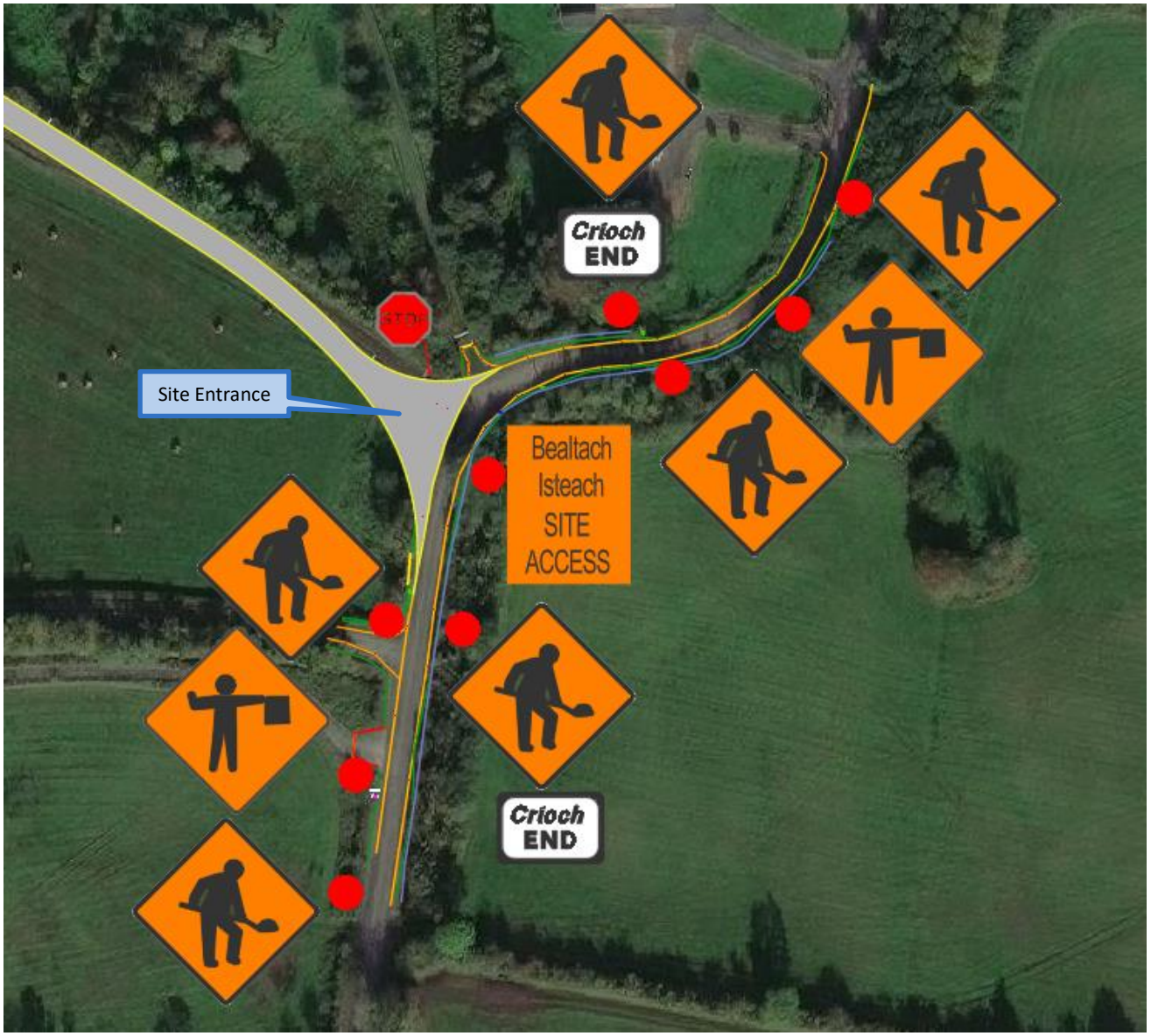
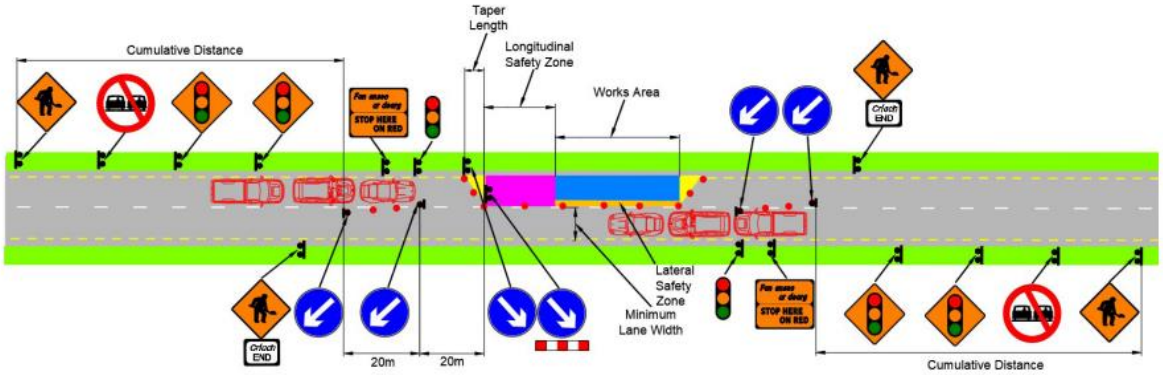


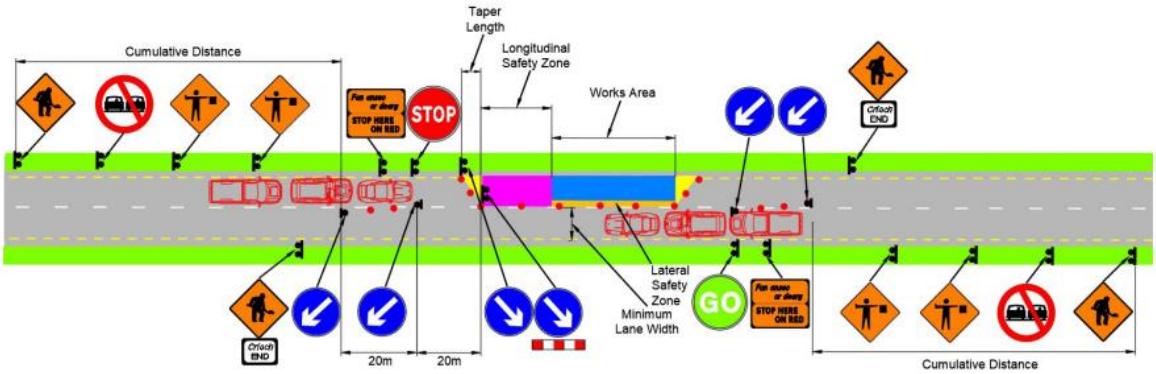

**Figure 4 – Site Entrance Signage**

Traffic management will be required during the construction of the site entrances on the N20 and L1537 to construct the site entrances to the Project. Traffic management will also be required during the delivery of turbine components at Site Entrance 1 on the N20. During the construction of the Project site access junctions, traffic management will be carried out in accordance with Chapter 8 of the Traffic Signs Manual using temporary traffic signals and flagmen. The construction of site entrance 1 on the N20 will be carried out over a period of approximately two to three weeks. The majority of the site entrance works, such as the construction of the temporary overrun area for abnormal load vehicles, will

be carried out from within the site and will not impact on the operation of the N20. Deliveries of materials for the construction of site entrance 1 will access via site entrance 2 on the L1537. Works at site entrance 1 involving alterations to fencing and the construction of the interface with the N20 carriageway will require temporary traffic management to be installed on the N20. Works at site entrance 1 which require temporary traffic management will be completed outside peak traffic hours on the N20 and the temporary traffic management will be removed at the end of each work shift to allow two-way traffic on the N20, subject to a safety assessment of the worksite. It is proposed to implement a cautionary speed limit of 75km/h at the approach to the works on the N20 when temporary traffic management is in place at site entrance 1. Site entrance 1 will not be used by general construction traffic. During the delivery of turbine components traffic management will be carried out using flagmen at Site Entrance 1, traffic management during turbine deliveries will be required for short periods of time during off peak hours on the public road network to allow abnormal load vehicles to access the site. During the delivery of turbine components, abnormal load vehicles will be accompanied by personnel who will carry out enabling works and traffic management. Details of traffic management systems for junction construction and turbine delivery is shown on **Figure 5.**




Temporary Traffic Signals – Site Entrance Construction




Stop & Go – Turbine Delivery

**Figure 5 – Traffic Management**

# 4 HAUL ROUTES FOR CONSTRUCTION, TURBINE DELIVERY & OPERATIONS TRAFFIC

## 4.1 Haul Route for Wind Farm Infrastructure Construction HGV Traffic

All HGV traffic associated with the construction of the Project will use the site entrances and road network shown on **Figure 6**. Workers employed on the Site will follow the road network shown in **Figure 6** to access the works. HGV access to site entrance 2 will operate using a one-way system. HGV traffic will approach the site from the R515 /L1537 junction to the east of Charleville and travel north to site entrance 2 on the L1537. HGV's exiting from the site will travel north on the L1537 to the R518 regional road in the village of Bruree. The haul route will be signposted with directional signs at all major junctions. The one-way system and indicative directional signage is shown in **Figure 7.**

Site Entrance 1 on the N20 will be used during the following phases of the wind farm construction, operation and decommissioning,

- Construction of Site Entrance 1. The construction of site entrance 1 will be carried out over a period of approximately two to three weeks. The majority of the works will be carried out from within the site and will not impact on the operation of the N20. Works at site entrance 1 which involve alterations to fencing and the construction of the interface with the N20 carriageway will require temporary traffic management to be installed on the N20. Works at site entrance 1 which require temporary traffic management will be completed outside peak traffic hours on the N20, details of traffic management systems and speed reduction proposals are given in **Section 3.2** of this report. The layout of site entrance 1 is shown in **Figure 2.**
- Delivery of abnormal loads such as turbine components, cranes and transformers. Site entrance 1 will not be used by general construction traffic or site personnel. Site entrance 1 will remain closed when not in use for abnormal load deliveries.
- Removal of turbine components from site using abnormal load vehicles during the decommissioning period.

Site Entrance 2 on the L1537 will be used during the following phases of the wind farm construction, operation and decommissioning, Construction of the access road infrastructure leading to the River Maigue bridge.

- Construction of the river Maigue bridge.
- Construction of the Charleville stream bridge and unnamed stream bridge.
- Construction of turbine hardstands and foundations
- Access during the operation of the Project.
- Removal of material from site using during the decommissioning period.

- Field access to agricultural land.
- Construction of the Onsite Substation.
- Construction of the Grid Connection.

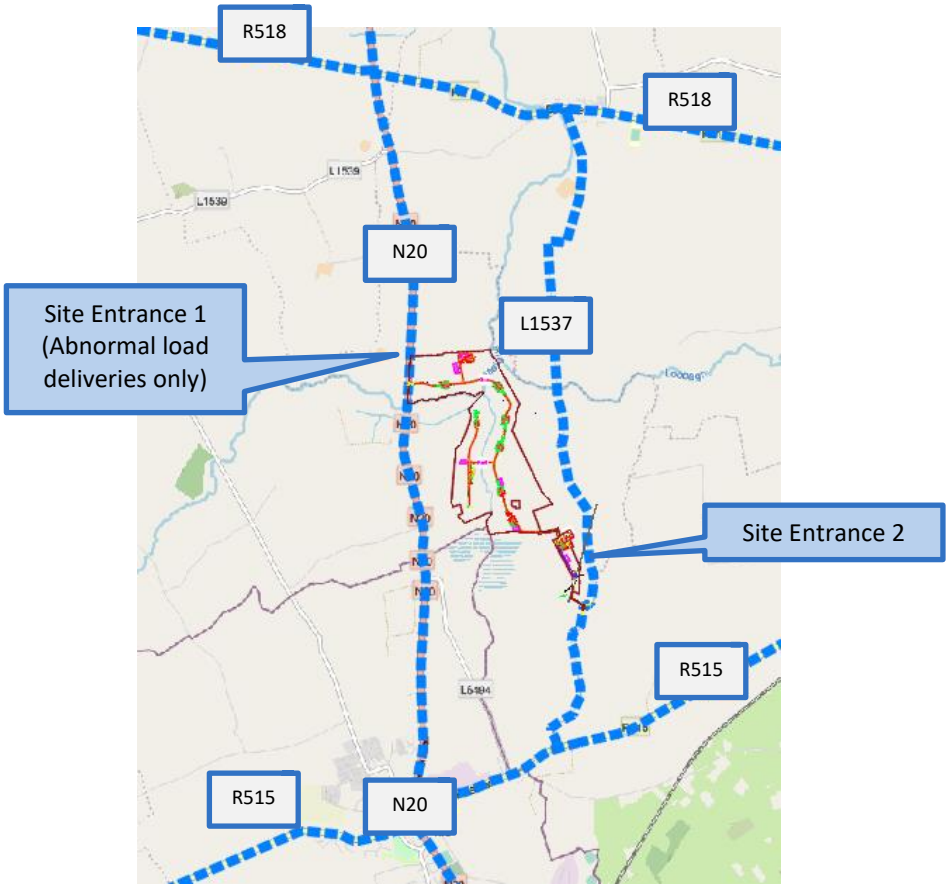



**Figure 6 – Construction Haul Routes**

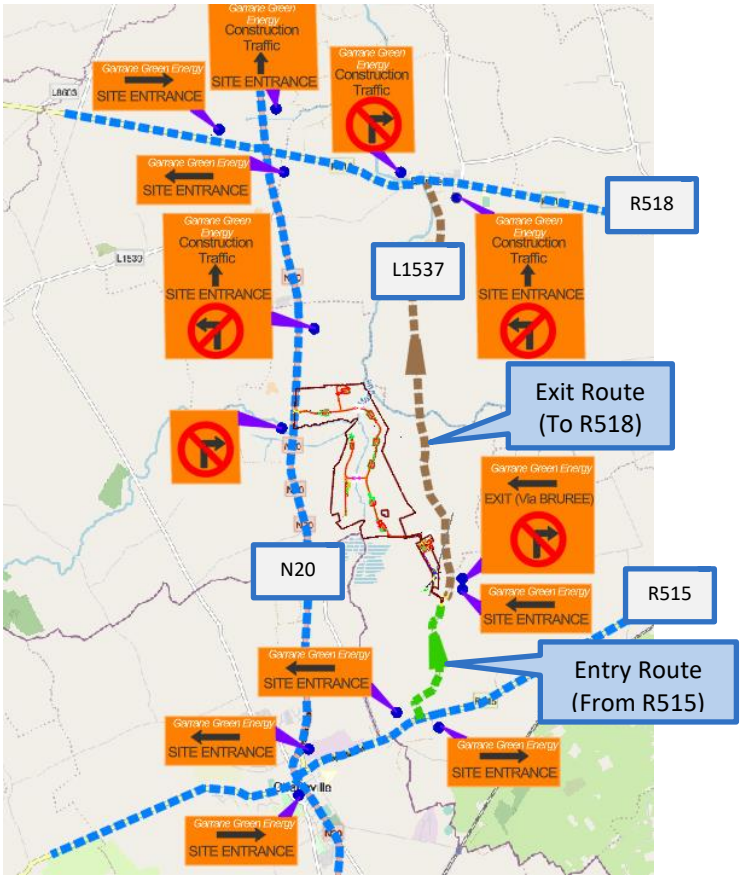



**Figure 7 – Directional Signage**

## 4.2 Material Supplies

The construction of the Project will require specific grades of granular material to be delivered to the Site for the structural layers of wind farm access roads, fill under turbine foundations and turbine hardstands / crane platforms. The construction of turbine foundations will require imported ready mix concrete and reinforcing steel. The construction of the Onsite Substation will require delivery of general building materials such as concrete blocks. Precast concrete products and plastic ducting will be required for onsite grid connections. The construction of the grid connection will require selected granular materials to backfill trenches and asphalt surfacing materials. The materials will be sourced from local quarries in the area such as the following which are show on **Figure 8**: Material suppliers will follow the construction haul routes shown in **Figure 7** to access the site.

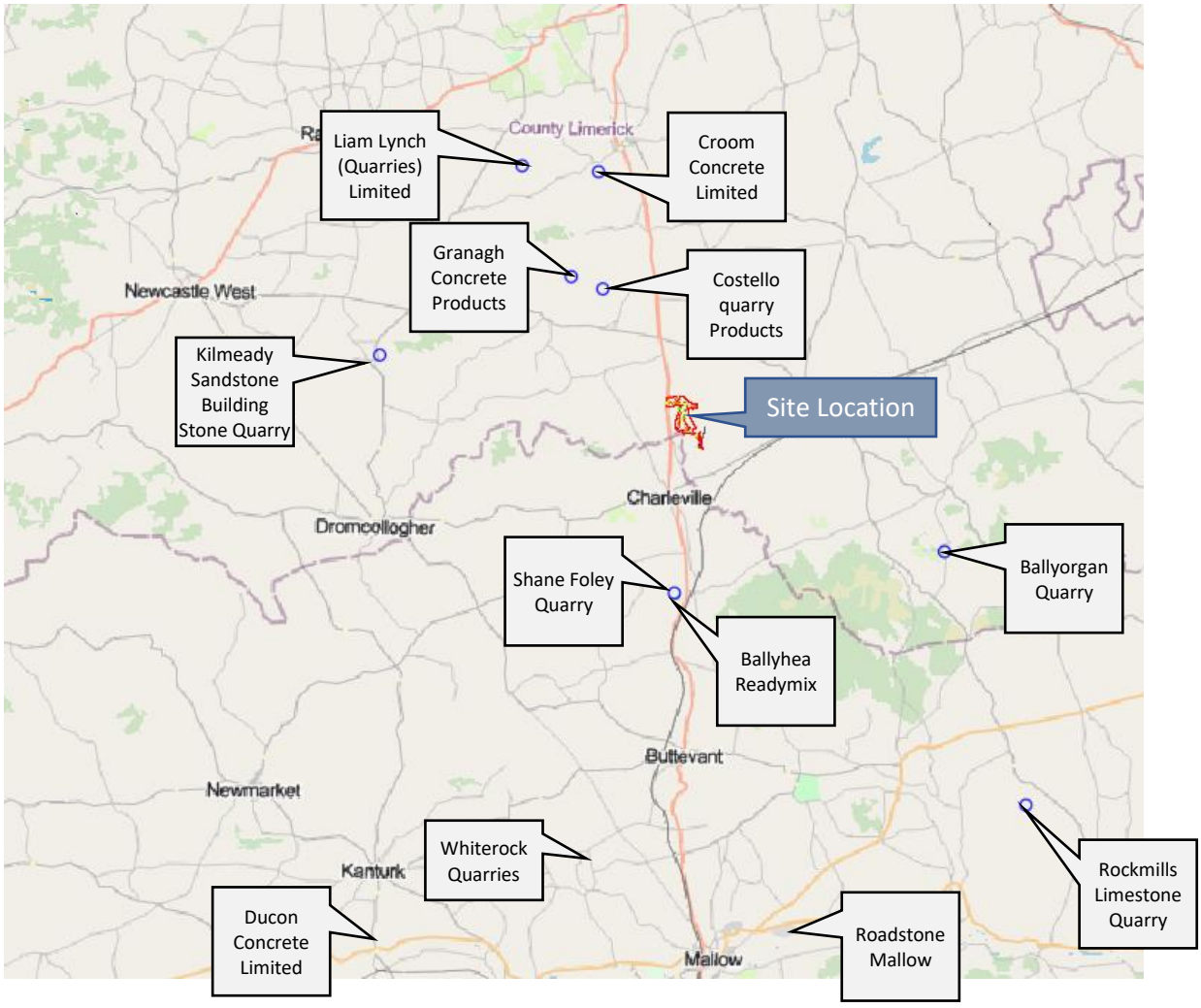



**Figure 8 – Concrete and Aggregate Suppliers**

## 4.3 Haul Route for Wind Farm Grid Connection Traffic

All HGV traffic associated with the construction of Grid Connection will use Site Entrance 2 to access the works. All grid connection works will take place within the boundary of the Project, no grid connection works will take place on the public road network.

## 4.4 Haul Routes for the Removal of Material from Site

Topsoil and unsuitable subsoil material resulting from Site clearance will be processed / graded on Site and incorporated into non-structural elements of the design and used for site landscaping, suitable subsoil material resulting from site excavations will be incorporated into structural elements of the works. Surplus topsoil and subsoil will be deposited at spoil depositary locations throughout the site. Volumes of excavated material are detailed in the Project CEMP Spoil Management Plan. The construction of enabling works for turbine delivery on the public road network will result in waste granular and asphalt material which will be transported for recycling / disposal at a licenced waste facility.

## 4.5 Haul Route for Turbine Delivery Traffic

The turbine components for the Project will be shipped to Shannon Foynes Port or to the Port of Galway. The turbine components will be transported on the public road network using abnormal load vehicles between the landing port and site Entrance 1 on the N20. The proposed Turbine Delivery Routes are shown on **Figure 9** for Shannon Foynes Port and **Figure 10** for the Port of Galway. Delivery vehicles will use the following road network to access the Site,

Via. Shannon Foynes Port:

- N69 - Limerick County Council / Transport Infrastructure Ireland
- N18 - Limerick County Council / Transport Infrastructure Ireland
- M20 - Limerick County Council / Transport Infrastructure Ireland
- N20 - Limerick County Council / Transport Infrastructure Ireland

Via the Port of Galway

- M6 - Galway County Council / Transport Infrastructure Ireland
- Exit from Port of Galway onto Dock Street – Galway City Council
- Lough Atalia Road – Galway City Council
- R339 – Galway City Council
- R336 – Galway City Council
- N6 national primary road – Galway City Council / Galway County Council / Transport Infrastructure Ireland
- M6 motorway – Galway County Council / Transport Infrastructure Ireland
- M18 - Galway County Council / Transport Infrastructure Ireland
- M18 - Clare County Council / Transport Infrastructure Ireland
- M18 - Limerick County Council / Transport Infrastructure Ireland
- N18 - Limerick County Council / Transport Infrastructure Ireland / PPP operator
- M20 - Limerick County Council / Transport Infrastructure Ireland
- N20 - Limerick County Council / Transport Infrastructure Ireland


**Figure 9 – Turbine Delivery Route- Shannon Foynes Port**

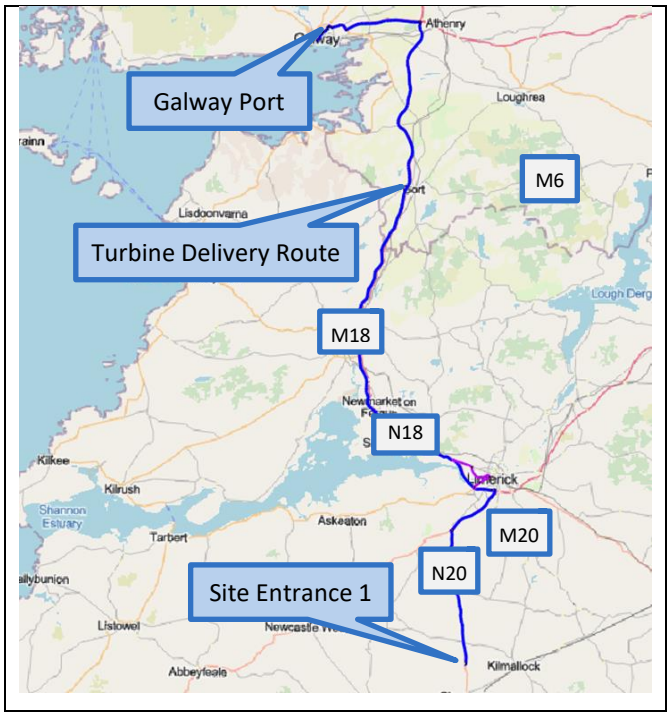



**Figure 10 – Turbine Delivery Route- Port of Galway**

## 4.6 Transportation of Abnormal Load Turbine Components on the Public Road Network

The transportation of turbine components consisting of abnormal loads will be subject to abnormal load permits obtained by the haulage company who will submit details of the transport vehicle, load to be transported and transport route to An Garda Siochana and to the local authority through which the load will pass. As is best industry practice, delivery vehicles will use a combination of trailers and axle configurations based on the weight and dimensions of the load in order to ensure that the maximum axle weight transmitted to the road surface does not exceed the limits set out in the Road traffic Regulations, 2003.

Prior to the transportation of turbine components between the port and the Project, a trial run will be carried out by a delivery vehicle using a retractable load gauge in order to determine that fully loaded vehicles can access the Site. The trial run will be carried out using appropriate permits in consultation with An Garda Siochana, local authority and all relevant road stakeholders.

Transport Infrastructure Ireland and PPP operators shall be included in all correspondence relating to the transportation of turbine components.

## 4.7 Enabling Works for Turbine Delivery on the Public Road Network

The haul routes for the transportation of turbine components between Shannon Foynes Port / Port of Galway and the Project has been assessed by Jennings O'Donovan & Partners Limited using AutoTRACK software to determine the swept path of abnormal load vehicles delivering turbine components. The assessment has shown that enabling works such as road widening, alterations to junctions, removal and trimming of vegetation, alterations to signs, lighting, traffic signals and street furniture will be required along the haul route between the Shannon Foynes Port / Port of Galway and the Project. A summary of the assessment is listed in **Table 1** for the haul route from Shannon Foynes Port and in **Table 2** for the haul route from the Port of Galway. Full details of the works locations on the turbine delivery route between a Shannon Foynes Port are shown in **Appendix 17.3 of the EIA**. Full details of the works locations on the turbine delivery route between the Port of Galway are shown in **Appendix 17.4 of the EIA**.

| Location | Enabling Works |
|---|---|
| N69 / L6188 Junction at Foynes Port | Existing boundary to be set back.<br>Verge strengthening to withstand wheel loading on inside of bend.<br>Tree trimming for blade oversail<br>Temporary removal / relocation of signs, street furniture and lighting columns at junction |
| N69 Ferrybridge | Vertical alignment of bridge to be checked to prevent grounding of vehicles. |

| Location | Enabling Works |
|---|---|
| N69 Roundabout at Clarina | Over-run to be constructed through roundabout central island to withstand wheel loading from abnormal load vehicles. |
| N69 / N18 / R510 Dock Road West Roundabout | Over-run to be constructed through roundabout central island to withstand wheel loading from abnormal load vehicles.<br>Tree trimming for blade oversail<br>Temporary removal / relocation of signs, street furniture and lighting columns at junction |
| N69 / N18 /R510 Dock Road East Roundabout | Temporary removal / relocation of signs, street furniture and lighting columns at junction.<br>Modifications to roundabout central island for blade oversail<br>Tree trimming for blade oversail |
| N18 Junction 1 – M20 Slip Road | Temporary removal / relocation of signs, street furniture and lighting columns for blade oversail.<br>Tree trimming for blade oversail. |
| M20 Junction 5 – N20 Exit | Temporary removal / relocation of signs and street furniture for blade oversail.<br>Tree trimming for blade oversail. |
| N20 Site Entrance | New site entrance constructed to accommodate the swept path of abnormal vehicles.<br>Removal of vegetation from N20 verges.<br>Tree trimming for blade oversail. |

**Table 1 – Turbine Delivery Route Enabling Works – Shannon Foynes Port**

| Location | Enabling Works |
|---|---|
| Galway Docks | Parking restrictions in Galway Port Car Park, alterations to existing fencing, loadbearing surface to be provided |
| Lough Atalia Road / R339 College Rd Junction | Existing signs and traffic lights to be temporarily removed during abnormal load deliveries.<br>Contraflow to avoid traffic island. |
| R338 / R339 Junction | Contraflow at junction to avoid traffic island and traffic lights on central island. |
| R339 / L5034 Junction | Location of traffic lights and street furniture to be checked prior to transportation.<br>Existing hedge to be trimmed. |
| L5034 / R336 Junction | Lighting column on inside of bend to be moved during transportation.<br>Vegetation to be trimmed for load oversail |
| N6 / N83 / R336 Junction | Vehicles to contraflow slip lane at junction to avoid traffic islands<br>Pedestrian railing to be removed at inside of bend during transportation<br>Traffic light to be removed at inside of bend during transportation<br>Directional sign to be relocated during transportation |
| N6 / N67 Roundabout Segregated Left Turn Lane | Lighting column to be removed during transportation<br>Road sign to be removed during transportation<br>Road sign on splitter island to be removed during transportation |
| N6 / M18 Junction – Entry Slip Road | Signs at entry to be removed during transportation<br>Signs at entry to be removed during transportation |

| Location | Enabling Works |
|---|---|
| N6 / M18 Junction – Exit Slip Road | Lighting Column at exit to be relocated during transportation<br>Barrier to be set back during transportation<br>Sign at exit to be relocated during transportation |
| M20 / M18 Junction – Exit Slip Road | Vegetation to be removed from inside of slip lane |
| L2025 M20 / N20 Junction – Exit Slip Road | Sign in verge relocated during transportation<br>Signs on splitter island to be removed during transportation |
| N20 Site Entrance | New site entrance constructed to accommodate the swept path of abnormal vehicles.<br>Removal of vegetation from N20 verges.<br>Tree trimming for blade oversail. |

**Table 2 – Turbine Delivery Route Enabling Works – Port of Galway**

## 4.8 Enabling Works for Turbine Delivery – Materials, Specification and Reinstatement

The enabling works for transportation of turbines and reinstatement of road infrastructure on the public road network will be carried out in consultation with the relevant road stakeholders using an approved road opening licence and agreed traffic management plan which shall be in accordance with Chapter 8 of the Traffic Signs Manual. Transport Infrastructure Ireland shall be included in all correspondence relating to proposed enabling works and transportation of turbine components on the public road network.

Specification of materials and workmanship shall be in accordance with TII publications and agreed with the relevant road stakeholders prior to any works being carried out on site.

All damage to the national road network shall be repaired using materials and workmanship in accordance with TII specifications and shall be agreed prior to any works commencing on site. A pre-construction condition survey of the road network shall be carried out in order to establish an agreed baseline prior to any works commencing on site. A post construction road condition survey shall be carried out following the completion of construction to determine if deterioration has occurred on the road network.

# 5 PRE-CONSTRUCTION WORKS REQUIREMENTS

## 5.1 Location and Diversion of Existing Services

A desk-based study will be carried out to locate existing services at all works locations before work commences on Site. Prior to the commencement of works, the location of existing services shall be confirmed by ground penetrating radar. All service diversions and works to protect existing services

which are necessary for the construction of the wind farm shall be agreed with the relevant service provider prior to works commencing on Site.

## 5.2 Permits to Work on the Public Road Network

Prior to the commencement of works, the contractor shall obtain all necessary road opening licenses and road closure permits to work on the public road network. The contractor shall inform the public in advance of any road closures and provide alternative means of access to properties, businesses and farms.

## 5.3 Traffic Management Plan

All works carried out on the public road network shall be carried out using a traffic management system in accordance with the requirements of Chapter 8 of the Traffic Signs Manual. The appointed contractor shall compile a detailed Traffic Management Plan for the works which will specify the precise traffic management measures for each works section and submit to relevant authority for approval. The contractor will appoint a competent traffic management coordinator who will be the main point of contact for all traffic management matters during the course of the works. The agreed traffic management systems shall be installed and maintained by operatives with the appropriate training to carry out works on traffic management systems. The TMP shall be submitted to the owners engineer and Developer for review 1 month before scheduled works.

## 5.4 Site Access Roads

All construction traffic shall access the site from the L1537. Construction HGV traffic shall be prohibited from using local roads which are not directly affected by the works. The location of site access points shall be signposted and assigned a site access number for the duration of the works. Haul Routes for construction and delivery traffic shall be signposted from the national and regional road network.

## 5.5 Road Condition Survey

A pre-construction road condition survey shall be carried out prior to any works commencing on site. A post-construction condition survey shall be carried out following the completion of the works in consultation with the relevant authority. Reinstatement of defects on the public road network resulting from construction traffic shall be made good to a specification agreed with the relevant local authority / TII. The scope of the road condition survey shall be agreed relevant local authority / TII.

## 5.6 Public Information and Access

The appointed Contractor shall inform local residents, businesses and emergency services of proposed works and road closures in advance of any works taking place on Site. Access shall be maintained to

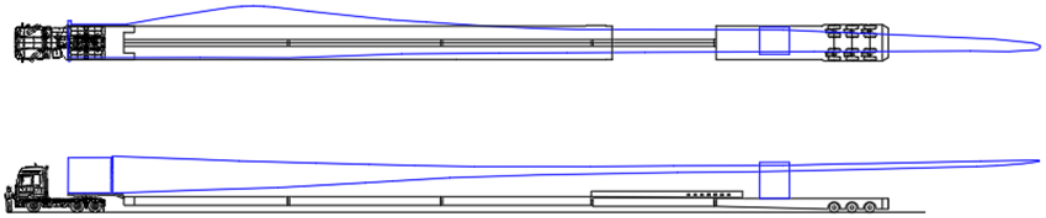
properties at all times during the course of the works. The Contractor will appoint a project coordinator who will be the main point of contact for matters relating to traffic which will affect the general public, local businesses and emergency services. An out of hours contact number shall also be provided.

## 5.7 Emergency Access Routes

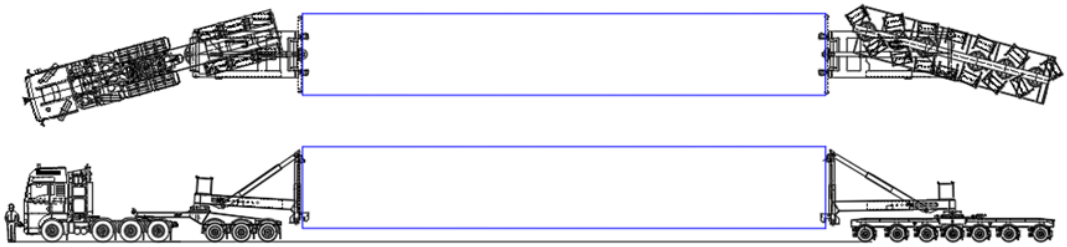
Emergency access routes shall be provided at all times for emergency service vehicles to access the Site or to bypass the works in the event of an emergency.

# 6 DELIVERY VEHICLE SPECIFICATION

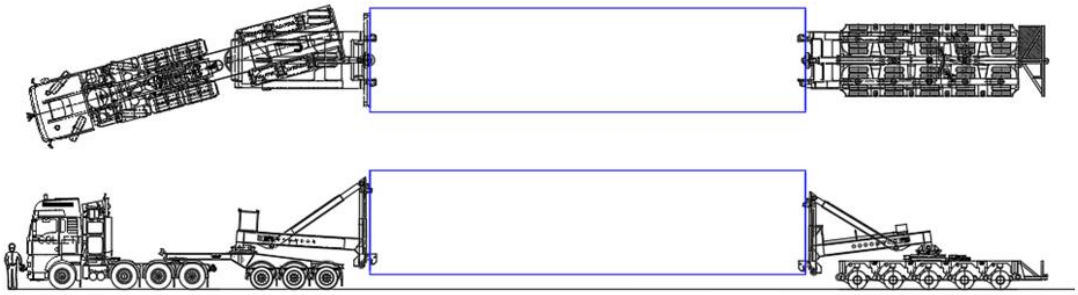
Delivery of road construction materials, concrete for Turbine Foundations, building materials, drainage, ducting and cables will be carried out using standard heavy goods vehicles (HGV). Delivery of turbine components will be carried out using specialist abnormal load vehicles. Turbine blades will be delivered on an extendable semi-trailer, one per trailer. The turbine blades will be 73.9m long, approximately 14m of the blade will overhang the rear of the trailer. Following delivery to the Site, the trailer will be retracted for the return trip. Each turbine tower will be delivered to site in sections on extendable semi-trailers, the tower sections range in length from 33.0m to 17.5m with a maximum width of 4.45m. All material deliveries will have a maximum axle load of 12 tonnes per axle, and a maximum gross vehicle weight of 166.7 tonnes. The main crane for turbine erection will have a maximum axle loading of 12 tonnes per axle and a maximum total weight of 100 tonnes. Vehicles delivering counterweights for the crane will have a maximum axle loading of up to 12 tonnes per axle. Vehicle weights do not exceed 180 tonnes and structures on the haul route with spans not exceeding 50m are not subject to a Category 3 structural assessment as defined in Section 1.3 of DN-STR-03001 published by TII for exceptional abnormal loads. Abnormal load vehicles used for the transportation of turbine components are shown below. The transport vehicles used for transportation of components may differ from those shown below depending on the haulage contractor's preferences.



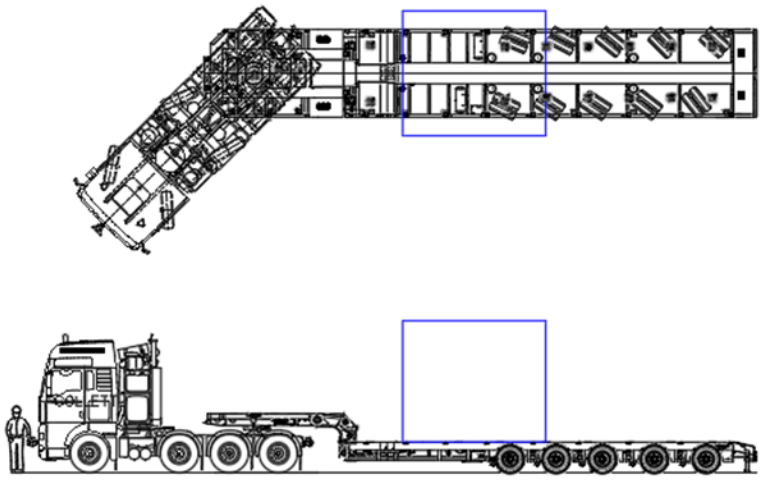
**Typical Turbine Blade Transport Vehicle**



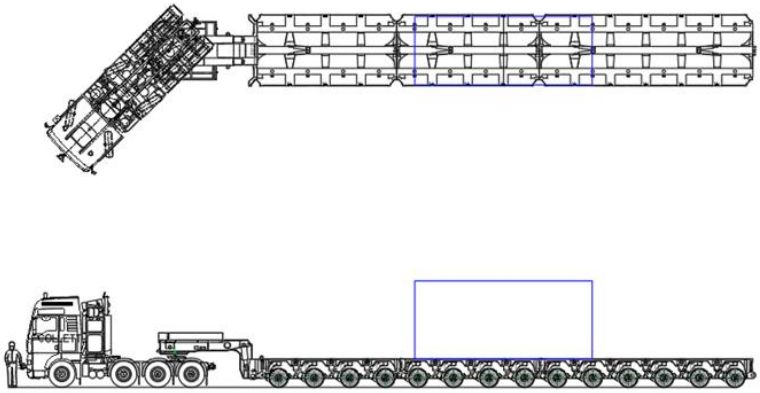
**Typical Turbine Tower Transport Vehicle**



**Typical Nacelle Transport Vehicle**



**Typical Hub Transport Vehicle**



**Typical Generator Transport Vehicle**

# 7 CONSTRUCTION, OPERATION & DECOMMISSIONING TRAFFIC VOLUMES

## 7.1 Construction Period

The construction period of the Project is anticipated to take approximately 18 months with the majority of HGV deliveries to site concluding in month 10. The project timeframe is summarised in **Table 3** below. It is expected that construction hours will be between 07:00 and 19:00 Monday to Friday and 08:00 and 13:00 on Saturday. There may be periods outside normal site working hours when long duration and weather dependent specialist works such turbine foundation construction and turbine installation may be carried. All construction activities outside normal site working hours will be agreed with Limerick City and County Council.

| Proposed Works | Timetable (Week No.) |
|---|---|
| Site Establishment (Plant, Offices, welfare facilities) | 1 |
| Site entrance construction (2 No.) | 1 |
| Fencing | 1 |
| Temporary Construction Compound | 1 |
| Construction of Internal Access Road | 2-5 |
| Bridges | 2-5 |
| Site Drainage | 2-5 |
| Substation Buildings | 4-9 |
| Substation Compound Construction | 4 |

| Proposed Works | Timetable (Week No.) |
|---|---|
| Substation Electrical Works | 10-14 |
| Substation Commissioning | 15-16 |
| Construction of Turbine Hardstands | 2-10 |
| Construction of Turbine Foundations (950m3 Per Base) | 2-10 |
| Wind Farm Internal Cabling Installation | 10-12 |
| Turbine Delivery and Erection (crane) | 11-16 |
| Grid Connection | 12-16 |
| Energisation | 16 |
| Turbine Commissioning | 16-18 |
| Site Restoration | 16-18 |

**Table 3 Project Timeframe**

## 7.2 Construction Period – Trip Generation HGV's

The estimated HGV deliveries to the Site during the construction period are shown in **Table 4**. The trips generated by the construction of the Project are based on AutoCAD Civil 3D site layout design drawings, site investigation results and turbine supplier's specifications. The calculated volumes of materials are based on the following design criteria,

- All granular materials for road and hardstand structural layers will be imported from local quarries.
- All concrete for turbine foundations will be imported from local ready-mix facilities.
- Topsoil and subsoil material resulting from site clearance will be incorporated into the design and will not be removed from site. Details of spoil management for the Project are given in the spoil management section of the Project CEMP.
- All material excavated during enabling works for turbine deliveries will be removed from site and replaced with imported material.
- Material used for the construction of temporary compounds and junction widening will be incorporated into the site road construction at the end of the contract and will not be removed from site.

| Materials | Quantity | No. Of Deliveries | Timeframe (Month) | Maximum Loads / Day | Vehicle Type |
|---|---|---|---|---|---|
| Site Establishment (Plant, Offices, welfare facilities) | | 10 | 1 | 5 | OGV2 |
| Site entrance construction (2 No.) | 1,700m3 | 170 | 1 | 10 | OGV2 |
| Fencing | 200m | 10 | 1 | 5 | OGV2 |
| Temporary Construction Compound | 600m3 | 60 | 1 | 10 | OGV2 |
| Construction of Internal Access Track | 12,750m3 | 1,275 | 2-5 | 10 | OGV2 |
| Bridges | 3 No. | 60 | 2-5 | 5 | OGV2 |
| Site Drainage | - | 20 | 2-5 | 5 | OGV2 |
| Substation Buildings | - | 50 | 4-9 | 5 | OGV2 |
| Substation Compound Construction | 210m3 | 20 | 4 | 10 | OGV2 |
| Substation Electrical Works | - | 20 | 10-14 | 5 | OGV2 |
| Substation Commissioning | - | 5 | 15-16 | 1 | |
| Construction of Turbine Hardstands | 50,600m3 | 5,060 | 2-10 | 10 | OGV2 |
| Construction of Turbine Foundations (950m3 Per Base) | 8,550m3 | 960 | 2-10 | 120 | OGV2 |
| Wind Farm Internal Cabling Installation | 4,700m | 50 | 10-12 | 5 | |
| Turbine Delivery and Erection (crane) | 9 Turbines | 140 | 11-16 | 3 | OGV2 |
| Grid Connection | - | 30 | 12-16 | 5 | OGV2 |
| Energisation | - | 5 | 16 | 2 | OGV1 |
| Turbine Commissioning | - | 5 | 16-18 | 2 | OGV1 |
| Site Restoration | - | 15 | 16-18 | 5 | OGV1 / OGV2 |
| Total | | 7,965 | | | |

**Table 4 HGV and Abnormal Load Deliveries to Site During Construction**

It is estimated that during the wind farm construction, an approximate total of 7,965 loads of material and building supplies will be delivered and removed from the Site. The majority of HGV movements to and from Site will occur during the first ten months of the construction period and will be associated with site Access Track construction, turbine hardstand construction and turbine foundation construction.

A schedule of maximum predicted daily traffic movements to site which may occur due to combined site activities over a 18-month construction period is shown in **Table 5.**

| Activity | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Establishment (Plant, Offices, welfare facilities) | 5 | | | | | | | | | | | | | | | | | |
| Site entrance construction (2 No.) | 10 | | | | | | | | | | | | | | | | | |
| Fencing | 5 | | | | | | | | | | | | | | | | | |
| Temporary Construction Compound | 10 | | | | | | | | | | | | | | | | | |
| Construction of Internal Access Road | | 10 | 10 | 10 | 10 | | | | | | | | | | | | | |
| Bridges | | 5 | 5 | 5 | 5 | | | | | | | | | | | | | |
| Site Drainage | | 5 | 5 | 5 | 5 | | | | | | | | | | | | | |
| Substation Buildings | | | | 5 | 5 | 5 | 5 | 5 | 5 | | | | | | | | | |
| Substation Compound Construction | | | | 10 | | | | | | | | | | | | | | |
| Substation Electrical Works | | | | | | | | | | 5 | 5 | 5 | 5 | 5 | | | | |
| Substation Commissioning | | | | | | | | | | | | | | | 1 | 1 | | |
| Construction of Turbine Hardstands | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | | | | | | |
| Construction of Turbine Foundations (950m$^3$ Per Base) | | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | | | | | | | | |
| Wind Farm Internal Cabling Installation | | | | | | | | | | 5 | 5 | 5 | | | | | | |
| Turbine Delivery and Erection (crane) | | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | | |
| Grid Connection | | | | | | | | | | | | 5 | 5 | 5 | 5 | 5 | | |
| Energisation | | | | | | | | | | | | | | | | **2** | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Turbine Commissioning | | | | | | | | | | | | | | | | | **2** | **2** |
| Site Restoration | | | | | | | | | | | | | | | | | **5** | **5** |
| **Total** | **30** | **150** | **150** | **165** | **155** | **135** | **135** | **135** | **135** | **140** | **13** | **18** | **13** | **13** | **9** | **11** | **7** | **7** |

**Table 5 - HGV and Abnormal Load Deliveries to Site During Construction**

The first month of the wind farm construction period will involve deliveries of materials for site access works, Temporary Construction Compound, site offices and site security. This period will include deliveries of fencing materials for site boundaries and compounds, temporary fencing to protect trees, hedges and ecological buffer zones, road construction materials for Temporary Construction Compound and site entrance, and delivery of temporary site office units. It is anticipated that a maximum of 30 HGV vehicles (60 HGV movements) will visit the Site on a daily basis during the first month of the contract.

Months 2 to 10 will involve deliveries of materials for Turbine Hardstands, Turbine Foundations, site access tracks, Onsite Substation and Control Building and Wind Farm Internal Cabling, this period will include deliveries of road construction materials for access tracks and Turbine Hardstands, ready mix concrete and steel reinforcement for Turbine Foundations. It is anticipated that a maximum of 165 HGV vehicles (330 HGV movements) will visit the Site on a daily basis during the period. The peak traffic will occur on 9 days during the 9 month period between months 2 to 10 when Turbine Foundations are poured. Concrete pours for individual Turbine Foundations will generate 120 HGV arrivals (240 HGV movements).

Months 10 to 18 will involve HGV movements for works associated with turbine delivery, turbine erection, turbine commissioning, electrical works, Grid Connection works, road reinstatement, road surfacing, site landscaping and the removal of temporary works materials such as offices and fencing from site. It is anticipated that a maximum of 18 HGV vehicles (36 HGV movements) will visit the site on a daily basis during this period.

Based on the indicative timetable outlined above the peak times for HGV deliveries to Site will be during months 2 to 10 (45 daily HGV deliveries + 120 additional deliveries during concrete pours which will take place on nine separate days during this period). Project traffic will be distributed throughout the day with morning, afternoon and evening peaks. The distribution of Project traffic is shown in Table 6 during the construction of Turbine Foundations.

| Time | Arrivals | | Departures | |
|---|---|---|---|---|
| | HGV | LGV | HGV | LGV |
| 06.00 – 07.00 | | 35 | | |
| 07.00 – 08.00 | 20 | 20 | 20 | |
| 08.00 – 09.00 | 15 | 5 | 15 | 2 |
| 09.00 – 10.00 | 15 | | 15 | |
| 10.00 – 11.00 | 15 | | 15 | |
| 11.00 – 12.00 | 20 | | 20 | |
| 12.00 – 13.00 | 15 | | 15 | |
| 13.00 – 14.00 | 10 | 5 | 10 | 5 |
| 14.00 – 15.00 | 15 | | 15 | |
| 15.00 – 16.00 | 15 | | 15 | |
| 16.00 – 17.00 | 10 | | 10 | |
| 17.00 – 18.00 | 10 | 2 | 10 | 5 |
| 18.00 – 19.00 | 5 | | 5 | 20 |
| 19.00 – 20.00 | | | | 35 |

**Table 6 - Development Traffic Profile**

## 7.3 Construction Period – Light Vehicles\Vans and Construction Personnel

The number of staff on site will vary according to the phase of the construction, peaking at approximately 40 at the height of the construction period. It is expected that the majority of workers will arrive on site in mini-buses and crew vehicles which are used to transport teams of workers from different construction disciplines. Labour vehicle sharing will be actively encouraged to reduce vehicular movements.

It is estimated that 35-40 vehicles will visit the site on a daily basis during the peak construction period. Parking for staff will be provided within the Temporary Construction Compound and no parking will be allowed for construction workers on the public road network in the vicinity of the Site. A number of additional unscheduled visits may be required throughout the construction period for site inspections and unforeseen circumstances.

## 7.4 Operational Period – Traffic

The vehicle movements associated with the operational period of the Project will be very low. Trips during the operational period would normally be made by vans associated with site monitoring, servicing, cleaning and maintenance operations. During the operational period, parking will be provided within the site and security gates will be set back from the public road to allow operatives to access the site without obstructing the public road network.

### Scheduled Site Visits

Weekly maintenance, estimated two visits by two service personnel – 208 trips per year.
Six-month service, estimated of two visits by two service personnel – 4 trips.
Annual service, two visits by two service personnel – 4 trips.
Monthly visit by Developer or agents to check over the site, grass cutting, ecological monitoring etc. – 12 trips.

### Unscheduled Site Visits

Visits which may arise as a result of malfunction, damage or vandalism. – 5 trips

The frequency of vehicle trips associated with servicing, monitoring and upkeep of the Site are expected to be in the region of 230 trips per year.

## 7.5 Decommissioning Period – Traffic

The vehicle movements associated with the Decommissioning period of the Project are estimated to be similar to the construction period. The Decommissioning period will take approximately 4 to 6 Months, during which time infrastructure will be removed from Site.

# 8 PROPOSED MITIGATION MEASURES

The impact of the traffic volumes generated by the Project have been identified as being temporary and associated with an 18 month construction and a 4 to 6 month decommissioning period. The development will generate low volumes of traffic during the operation of the wind farm.

In order to minimise the impact of development traffic on the local community and public road users, the following mitigation measures have been considered:

- HGV movements will generally be limited to 07:00 - 19:00 Monday to Friday and 08:00 - 13:00 on Saturday. Deliveries will be scheduled to avoid peak times around the morning and evening peak hours. This will avoid HGV traffic arriving during the morning peak hour creating conflict

with local residents on their commute/school run. Construction personnel will be encouraged to car-pool, or to travel to site in minibuses.

- Wheel cleaning equipment will be used on site to prevent mud and stones being transferred from the Development to the public road network. All drivers will be required to check that their vehicle is free from dirt and stones prior to departure from the construction Site. In addition, any dust generating activities will be minimised where practical during windy conditions, and drivers will adopt driving practices to minimise dust creation. Finally, loads will be covered into and out of the site where required to ensure that the spillage or deposit of clay, rubble or other debris on the public road network is prevented.
- Construction works on the public road network will be carried out under a road opening licence with an agreed Traffic Management Plan in accordance with Chapter 8 of the Traffic Signs Manual.
- During the construction phase, clear construction warning signs will be placed on the N20 and L1532 advising the general public as to the presence of the construction Site. The site entry points will also be appropriately signed. Access to the construction site will be controlled by on site personnel and all visitors will be asked to sign in and out of the site by security / site personnel. Security gates will be sufficiently set back from the road, so that vehicles entering the Site will stop well clear of the public road, thus obviating the queuing of construction traffic on the public road network. Site visitors will all receive a suitable Health and Safety site induction, and Personal Protective Equipment ("PPE") will be worn.
- Longitudinal trench excavations in the public road shall be straight and parallel to the centre of the road/footway where practicable. Transverse road or footway crossings shall be at right angles to the kerb or property line. Bituminous and concrete road surfaces and footways be cut using a road saw, concrete saw or equivalent mechanical means to the full depth of the bituminous or concrete material prior to any excavation work. The edges of the road shall be trimmed to provide an overlap for permanent road reinstatement in accordance with chapter 7 of the Managing Openings in Public Roads Specification.
- All excavations in the public road network are to be reinstated at the end of the work shift, A temporary reinstatement shall be carried out in the event that the works are not completed at the end of the work shift.
- Once construction of the Project is completed, all portacabins, machinery and equipment will be removed and temporary hardstanding's excavated and reinstated. The area will be re-graded with the topsoil to a natural profile and allowed to regenerate from the seed bank within the topsoil.

# 9 SUMMARY

This TMP has been undertaken to outline the management of traffic movements during the construction, operation and decommissioning phases of the Garrane Green Energy Project.

Increased volumes of traffic will be generated by the Project during the construction and decommissioning periods. Traffic analysis carried out in the Traffic and Transport Assessment (TTA) report in **Appendix 17.1** for the project shows that traffic generated by the Projectt during the construction, operation and decommissioning phases of the Garrane Green Energy Project can be accommodated on the existing public road network.

During the operational phase of the Project, the Site will be accessed by light vehicles for an estimated 230 times per year for routine monitoring, servicing and site maintenance.

Priority at junctions for existing public road users will remain unchanged during the construction, operation and decommissioning phases of the Project.

All traffic accessing and leaving the Site will use the designated Haul Route for construction and decommissioning traffic.

Mitigation measures have been proposed to minimise impacts of construction traffic on the public road network and local road users. Security gates will be provided at the Site access. Gates will be set back from the public road carriageway edge to accommodate articulated vehicles. Wheel cleaning facilities will be provided at the site entrance and at works locations on the public road network to prevent mud and dust spreading to the public road.

Temporary Construction Compounds will be provided on Site and will remain for the duration of the construction period. The compound will be used to store construction materials for the Project and as a parking and turning facility for construction and delivery traffic.

Components for each turbine will be delivered to site in three separate abnormal load convoys over the period of one week. The convoys will travel at times agreed with An Garda Síochána. The haulage contractor will obtain all necessary permits for the transportation of abnormal loads from An Garda Síochána and the relevant County Council through which the load will travel.