14. MATERIAL ASSETS

Material Assets are defined as "resources that are valued and that are intrinsic to specific places" which can be of human or natural origin1. Material Assets are also defined as "built services and infrastructure"2. The majority of assets of natural origin are assessed elsewhere within this EIAR including biodiversity, land & soil, water quality, air quality and climate, and landscape. This chapter addresses, therefore, the likely significant effects of the Proposed Development on assets which are intrinsically of human origin:

- roads, traffic, transport, access,
- aviation,
- telecommunications, and
- utility infrastructure.
- Another material asset of human origin, archaeology and cultural heritage, is addressed in Chapter 13.

14.1 Roads, Traffic, Transport & Access

14.1.1 Introduction

14.1.1.1 Background and Objectives

Galetech Energy Services ('GES') has undertaken an assessment of the likely significant effects on transport and access resulting from the construction, operation and decommissioning of the Proposed Development. A full description of the Proposed Development is provided in Chapter 4.

This chapter provides an assessment of the likely significant effects on the local road network of the construction, operational and decommissioning traffic, including the likely turbine component haul route, and reviews the site access arrangements for construction, operational and decommissioning phases. The relevant sections of this chapter should be read in conjunction with the Route Access Survey attached at Appendix 14-1.

It considers and assesses the likely significant effects on roads, traffic, transport and access of the construction, operation of the Grid Connection component of the Proposed Development to the Athlone 110 kV electricity substation in the townland of Monksland.

14.1.1.2 Statement of Authority

GES is an Irish multi-disciplinary renewable energy consultancy that specialises in the project management of planning, environmental and technical engineering services of renewable energy developments from project feasibility through to delivery and operation. GES combines the expertise of leading experts in renewable energy design, planning and environmental assessment and has extensive experience in managing and coordinating EIAR projects for renewable energy and associated electricity grid and substation developments.

[1] *Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015)*
[2] *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA 2022)*

This section has been prepared by members of the GES Environment & Planning Team. This section of the chapter was prepared by Simon Carleton. Simon is a qualified planner (MSc BA MIPI) with wide ranging experience (6-years) in preparing EIARs and has prepared roads, traffic, transport, and access assessments for numerous renewable energy developments. This section of the chapter was reviewed by Gavin Daly. Gavin is a qualified planner (BA Dip MIPI) with over 20-years' experience and has advised on over 500MW of pre-consent and post-consent wind and solar energy developments, including associated grid infrastructure and amendments to approved projects.

14.1.2 Methodology

14.1.2.1 Assessment Methodology

This assessment used the following method, further details of which are provided in the following sections:-

- Legislation and guidance review (chapter prepared in accordance with relevant legislation & guidance, as provided at Chapter 1);
- Desk study, including review of available maps and published information;
- Windshield survey of turbine component haul route, Grid Connection route and likely aggregates haul routes; including a walkover survey of all noteworthy locations along the turbine component haul route, as identified at Appendix 14-1, and Grid Connection route;
- Evaluation of likely effects;
- Evaluation of the significance of these effects; and
- Identification of measures to avoid and mitigate any likely effects.

14.1.2.2 Planning Policy & Guidance

This assessment has been prepared and carried out in accordance with guidance, and relevant plans contained in the following published documents:

- European Commission (2017): Environmental Impact Assessment of Projects – *Guidance on the preparation of the Environmental Impact Assessment Report;*
- Department of Housing, Local Government & Heritage (August 2018): *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*
- Environmental Protection Agency (2022): *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;*
- The Roscommon County Development Plan 2022-2028 ('the CDP');
- The Design Manual for Urban Roads and Streets ('DMURS')[3];
- The Design Manual for Roads and Bridges ('DMRB') published by Transport Infrastructure Ireland ('TII'); and
- Traffic and Transport Assessment Guidelines[4].

An assessment of the relevant transport policies and objectives of the CDP are set out in Table 14-1 below.

[3] *https://www.gov.ie/en/publication/c808c-design-manual-for-urban-roads-and-streets-2019-low-res/*
[4] *https://www.tiipublications.ie/library/PE-PDV-02045-01.pdf*

Table 14-1 Roscommon County Development Plan 2022-2028 Road Transportation Policies and Objectives

Planning Policy/Objective	Assessed	Comment
Support and provide for improvements to the national road network, including reserving corridors for proposed routes, free of development, so as not to compromise future road scheme.	› Yes	While the Proposed Development does not provide for any improvements to the national road network, an assessment has been completed to determine whether it may impact upon any proposed improvements or road schemes.
Require all applications for significant development proposals to be accompanied by a Traffic and Transport Assessment (TTA) and Road Safety Audit (RSA), carried out by suitably competent persons, in accordance with the TII's Traffic and Transport Assessment Guidelines.	› Yes	This section comprises an assessment of the likely effects of the Proposed Development on roads, traffic, transport, and access. Given the characteristics of the Proposed Development and the appropriate design of its direct interactions with the road network, a Road Safety Audit is not assessed as being required.
New accesses onto Regional roads will not be permitted where access to a lower category road is available.	› Yes	The Proposed Development includes access points from regional and local routes. The availability of access points from the local road network was assessed at the design stage, and implemented where possible, with 2 no. access points remaining from the R363.

The CDP, at Table 7.3, sets out proposed upgrade works to non-national routes. As was the case in the Roscommon County Development Plan 2014-2020, the R362 (New Tuam Road) and the L2047 (Old Tuam Road) have once again been selected for upgrade works within the Monksland area.

14.1.2.3 Desk Study

A desk study of the Proposed Development including Wind Farm, Grid Connection route, turbine component haul route and the surrounding area was undertaken. The sources of information included documentary sources, outlined at Section 14.1.2.2, and an evaluation of aerial imagery

and visualisations (e.g. Google Maps and Streetview) to assess the nature and condition of the local road network.

14.1.2.4 Fieldwork

A site visit, including a windshield survey of the proposed turbine component haul route, likely construction material haul routes, and Grid Connection route, was undertaken on 19th May 2021. All noteworthy locations along the turbine component haul route, as identified at Appendix 14-1, and Grid Connection route were the subject of a walkover survey. The site visit was used to verify information obtained as part of the desk study and to visually assess site entrance locations and associated vehicle visibility splays.

14.1.3 Description of the Existing Environment

14.1.3.1 Site Location, Context and Construction Phase Haul Routes

The Proposed Development comprises 2 no. main elements; namely the Wind Farm component and Grid Connection component. The Proposed Development site is located in the townlands detailed in Chapter 1, Table 1-1. The Wind Farm site predominately comprises agricultural pasture and is located within two clusters both north and south of the R363. The proposed Grid Connection infrastructure will be located within private lands and within/adjacent to public roads (R363, R362, and L2047). A full description of the Proposed Development is detailed in Chapter 4.

The turbine transport haul route is illustrated at Appendix 14-2. While the selection of a precise port of entry can only be determined following appointment of the chosen turbine manufacturer (to be completed post-consent subject to a competitive procurement process), it is considered likely that the Port of Galway will be utilised in this case[5]. Consequently, it is proposed that the Planning Authority will be advised of the selected port of entry as part of a final Transport/Traffic Management Plan, and that any specific traffic control measures arising from the selected route will be agreed with the Planning Authority prior to the commencement of development.

Given that access from all potential port options (see Footnote No. 5 below) to the M6/R362 junction is readily achievable via the national road/motorway network, the ultimate selection of a port of entry has no bearing on the findings of the assessment undertaken in this chapter.

The turbine transport haul route to the Proposed Development site will, from the Port of Galway, be via the Lough Atalia Road, R339, R336, N6, M6, R362 and R363. From the R363, the Northern Cluster will be accessed by an Access Junction A (as detailed in Chapter 4) and a c. 2km access track located across private lands. This access track will intersect with the L7602 giving rise to the creation of an additional site entrance and the upgrade of an existing agricultural access point to the east and west of the L7602 road respectively. The Southern Cluster of proposed turbines will be accessed by an entrance from the L7535 (Access Junction B) and secondly, by an entrance from the R363 (Access Junction C). Access Junction B is an existing entrance which will require upgrade works. All access junctions are detailed further in Chapter 4 Section 4.4.

[5] *Turbine components may also be imported through other ports including Dublin Port, Port of Waterford or Foynes/Shannon/Limerick Port. Each of these ports are regularly used in the transportation of turbine components and are readily accessible without the need for significant road upgrade works between their location to the national road network.*

A detailed Route Access Survey (Appendix 14-1) of the above haul route has been undertaken to assess the suitability of the above route for the delivery of turbine components. The Route Access Survey describes the extent of works which will be required to facilitate the delivery of turbine components and found that extremely limited works will be required, with no hedgerow or roadside bank removal identified as being required.

Permanent carriageway widening of the L7535 for Access Junction B, will be completed to accommodate the delivery of turbine components and construction materials to the Proposed Development Site. The carriageway will be widened to an approximate width of 5m for a distance of c. 415m. Works will comprise the removal of an existing stone wall, widening of the carriageway (with construction materials and carriageways finishes to be agreed with the Planning Authority), and replacement of the stone wall at the proposed road edge.

Otherwise, all haul route upgrade works to be undertaken will be temporary in nature including the temporary removal of road signs, street lighting and other street furniture; and the temporary hardcoring of road margins/verges and roundabout islands. A description of works at a number of key locations is described at Table 14-2, below; however, the Route Access Survey, which details all necessary works, should also be read in conjunction with Chapter 4.

Table 14-2 Description of Roadworks at Key Locations

Location	Description of Works
Junction of R339 & Unnamed Road	Temporary removal of street furniture (traffic light, lamp post and utility pole) to allow oversail of turbine blade. Temporary works to allow wheels to mount adjoining pedestrian footpath.
Junction of Unnamed Road & R336	Temporary removal of street furniture (lamp post) and temporary hardcoring of roadside verge.
Junction of R336 and N6	Temporary removal of street furniture (lamp post), pedestrian railings and traffic light.
Junction No. 13 on M6 motorway	Temporary hardcoring of roadside verge.
Roundabout at junction of M6 Slip-Road & R362	Temporary removal of street furniture (lamp posts, road signs and splitter island) to allow loads navigate the roundabout. Temporary works to roundabout island including hardcoring of grassed area to accommodate wheel-alignment of abnormal-sized loads.
Roundabout at junction of R362 & L2047	Temporary removal of street furniture (road signs) to allow loads to navigate the roundabout. Temporary works comprising hardcoring of grassed areas on roundabout island and adjoining pedestrian footpath to allow wheels to mount adjoining pedestrian footpath.
Left-hand Bend on R363 (Pollalaher & Brideswell townlands)	Third party land will be oversailed by blade tips but no works are required.

The undertaking of civil engineering works during the construction phase, including the construction of site entrances, access tracks, crane hardstands, turbine foundations and installation of grid connection infrastructure, will require the importation of aggregates and other general construction materials to the subject site. Due to the absence of significant volumes of usable construction material (rock) within the site, hardcore materials will largely be sourced from approved and licensed local quarries. Ready-mix concrete, for turbine foundation construction and substation foundations, will also be sourced from local licensed quarries.

The selection of material suppliers will be subject to a competitive tendering process prior to construction and, therefore, it is not possible to confirm the precise source of these materials at this stage. However, a number of candidate quarries have been identified and assessed as potential suppliers and are identified at Appendix 14-3. In addition, the likely haul routes from these suppliers to the main site entrance are also identified and assessed. While the likely haul routes do not always represent the most direct route to site, these routes have been selected to ensure that movements occur on national and regional roads and, insofar as possible, avoid local roads which may not be suitable to accommodate heavy goods vehicles (HGVs). The Planning Authority will be advised of the selected material suppliers as part of the Transport/Traffic Management Plan to be agreed prior to the commencement of development.

Other material deliveries will utilise standard HGVs and use the local, regional and national road network; however, it will be emphasised to all suppliers that the use of locally-classed roads is to be avoided where possible. As the majority of staff-associated vehicular movements will comprise light goods vehicles (LGVs) or cars, they will not be restricted to the use of specific roads.

The proposed Grid Connection infrastructure will be located within private lands and within/adjacent to public roads (R363, R362, and L2047). The Grid Connection infrastructure will commence, at the proposed on-site electrical substation, in a typical rural setting but the site context becomes noticeably urbanised as the proposed route approaches the town of Athlone. The proposed Grid Connection route passes adjacent to a number of residential housing estates along the R362 and L2047 before entering the existing Athlone 110kV substation. Works associated with the construction of the proposed Grid Connection will not require the movement of abnormally-sized vehicles and access to the Grid Connection route is not constrained by the existing environment.

14.1.3.2 Local Road Network

The road network in the vicinity of the Proposed Development Site generally comprises regional and local roads. In addition, the N63 National Secondary Road is located approximately 10km to the northwest of the Proposed Development site; while the N61 National Secondary Road is located approximately 10km to the west of the subject site. It should be noted that these routes do not form part of the core road network associated with the Proposed Development (i.e. forming part of the turbine component haul route or accommodating the Grid Connection route); however, it is possible that such routes will be utilised by general construction traffic or construction personnel travelling to the subject site.

The M6 motorway, along which turbine components are anticipated to be transported, is located to the south and southeast of the subject site; at a distance of c. 11km at its nearest point. This route is of a high standard and is regularly used in the delivery of wind turbine components.

The R362 regional road; which will be utilised in the delivery of turbine components, will accommodate the proposed Grid Connection and will likely be used in the delivery of construction materials; is located within suburban and rural areas. In suburban areas, on the outskirts of Athlone, the R362 has a speed limit of 60kph and is adjoined by pedestrian footpaths which are lit by street lighting. As the route progresses in the westerly direction into rural areas, past its junction with the L2025, the speed limit increases to 80kph and this also marks the

cessation of accompanying footpaths and street lighting. Road widths are typically 6m along the route and the road surface is considered to be of good quality; however, there is some evidence of localised surface-ravelling at a number of locations.

The R363 regional road, from which the site entrances will provide access to the site, will, as discussed above, be subject to minor temporary works to facilitate the delivery of abnormally-sized loads. The R363 is a regional road with an 80km/h speed limit and a general running width of approximately 6m. The road is generally in good condition with road markings. However, there is no pedestrian walkway or road lighting in rural areas.

The L7535 local road is a narrow single-vehicle carriageway bordered by stone walls and agricultural fencing. The carriageway is typically 3m in width and, generally, has a good quality running surface; however, there are no pedestrian footpaths or public lighting.

The L7602 local road is, again, a narrow single-vehicle carriageway bordered by stone walls and occasional hedgerows/vegetation. The carriageway is c. 3m in width but displays evidence of subsidence at its edges while potholes are also prevalent. The carriageway width narrows noticeably at the junction with the proposed access track and appears to be largely un-maintained.

14.1.3.3 Access to the Proposed Development Site

As described in brief above, access to the Proposed Development Site is, from the M6 motorway at Athlone, predominately provided for by the R362 and R363 local roads.

From the R363, the Northern Cluster will be accessed through the construction of a dedicated private access track, c. 2km in length. This access track will be accessed via a proposed site entrance (Access Junction A) which will provide for unimpeded sightlines (visibility splays) of 160m in each direction as stipulated at Section 12.24 of the Roscommon County Development Plan 2022-2028. This access track will intersect with the L7602 giving rise to the creation of an additional site entrance and the upgrade of an existing agricultural access point to the east and west of the L7602 road respectively. These entrances have been appropriately designed and will be constructed and upgraded accordingly to ensure compliance with relevant guidelines.

The Southern Cluster of proposed wind turbines will be accessed via 2 no. site entrances. The first entrance, Access Junction C, will accommodate access directly from the R363. This site entrance has, again, been designed and will be constructed in accordance with Section 12.24 of the Roscommon County Development Plan 2022-2028 and will provide for sightlines of 160m in each direction. A further access point (Access Junction B) will also be created from the L7535. An agricultural access point exists at this location and it is proposed to upgrade this entrance to accommodate construction traffic and abnormal-sized loads associated with the delivery of turbine components. Upgrade works, comprising the reprofiling of surrounding ground and temporary removal of an existing stone wall, will be required at the junction of the R363 and the L7535 to accommodate the swept area of abnormal loads; while, along the L7535, it is proposed to increase the running width of the carriageway from its existing width of c. 3m to c. 5m for a distance of c. 415m to accommodate construction traffic. The existing stone wall (to the east of the L7535) will be removed and, following the completion of carriageway widening works, will be reinstated at the carriageway edge to the satisfaction of the Planning Authority.

An autotrack assessment has been competed to determine all junction designs for the Proposed Development. These autotracks are included in Appendix 14-7.

Access to the proposed Grid Connection will be facilitated by each of the roads within which works are situated.

14.1.3.4 Delivery Vehicle Specification

The delivery of wind turbine components will be carried out by specialised HGVs. The largest vehicles to be used will facilitate the delivery of the wind turbine blades. Figure 14-1 and 14-2 illustrates the typical suite of transportation vehicles which will be used in the delivery of components, including a transportation vehicle used to transport the 81m blade component.

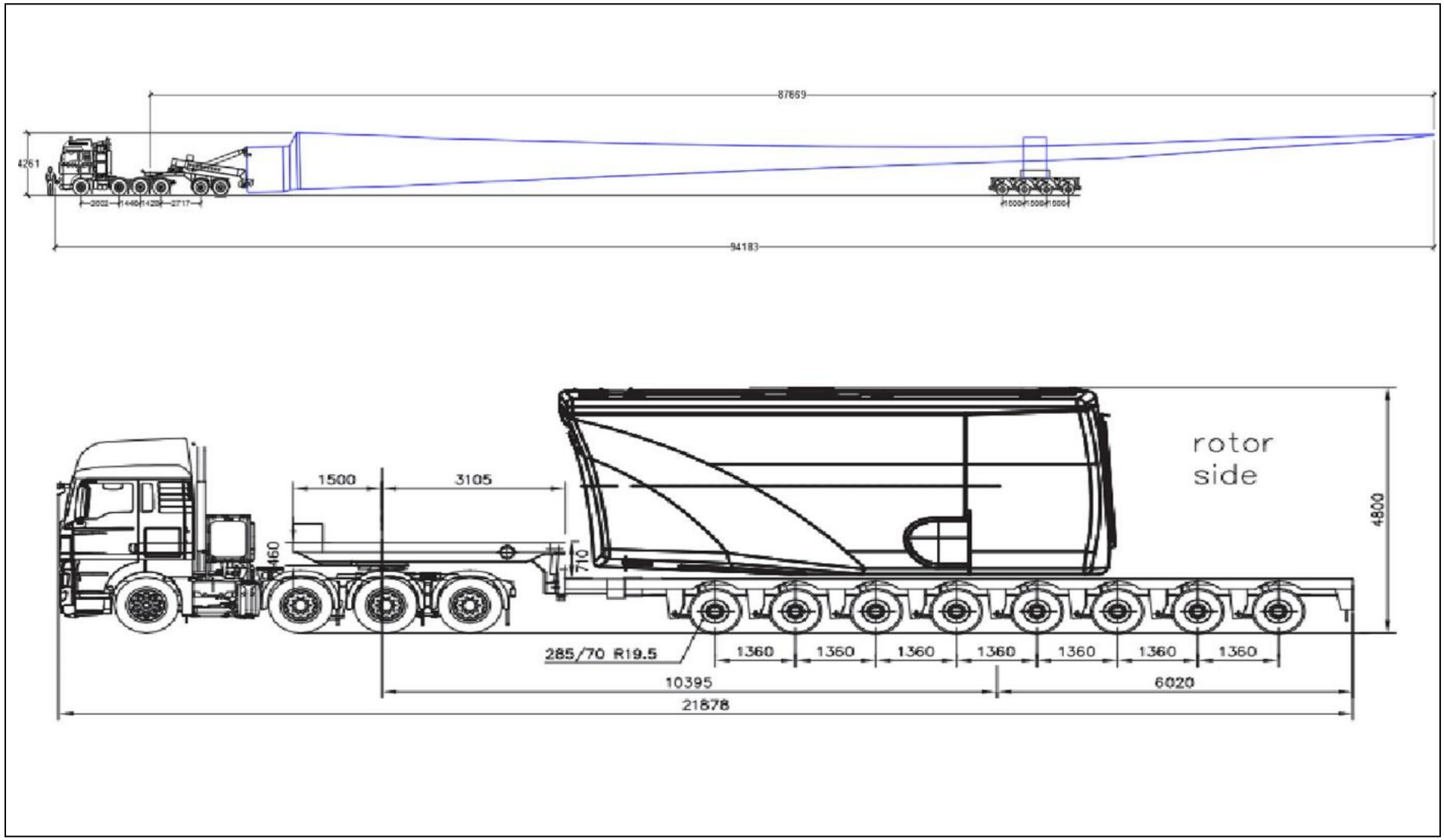

Figure 14-1 Typical Turbine Component Delivery Vehicles

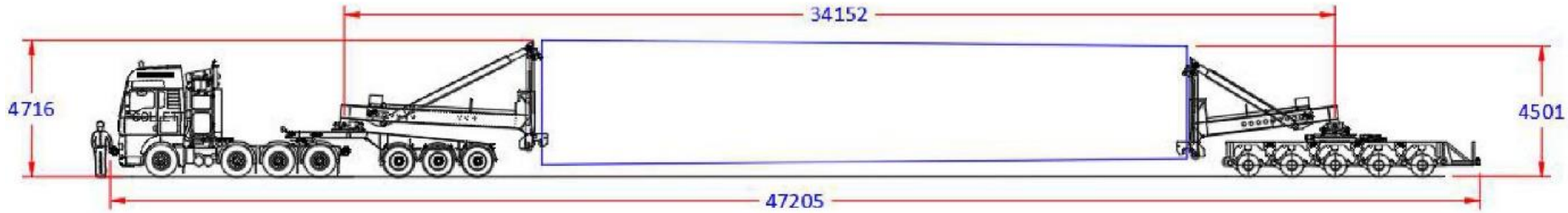

Figure 14-2 Typical Turbine Component Delivery Vehicles

The delivery of general construction materials and aggregates to site for the construction of the Proposed Development will be undertaken using standard HGVs, cement mixer trucks, and tipper trucks, the largest of which is anticipated to be a 16.5m articulated vehicle as shown in Figure 14-3 below. A typical tipper truck to be used in the delivery of aggregates for the construction of access tracks and hardstands (among others) is illustrated at Figure 14-4.

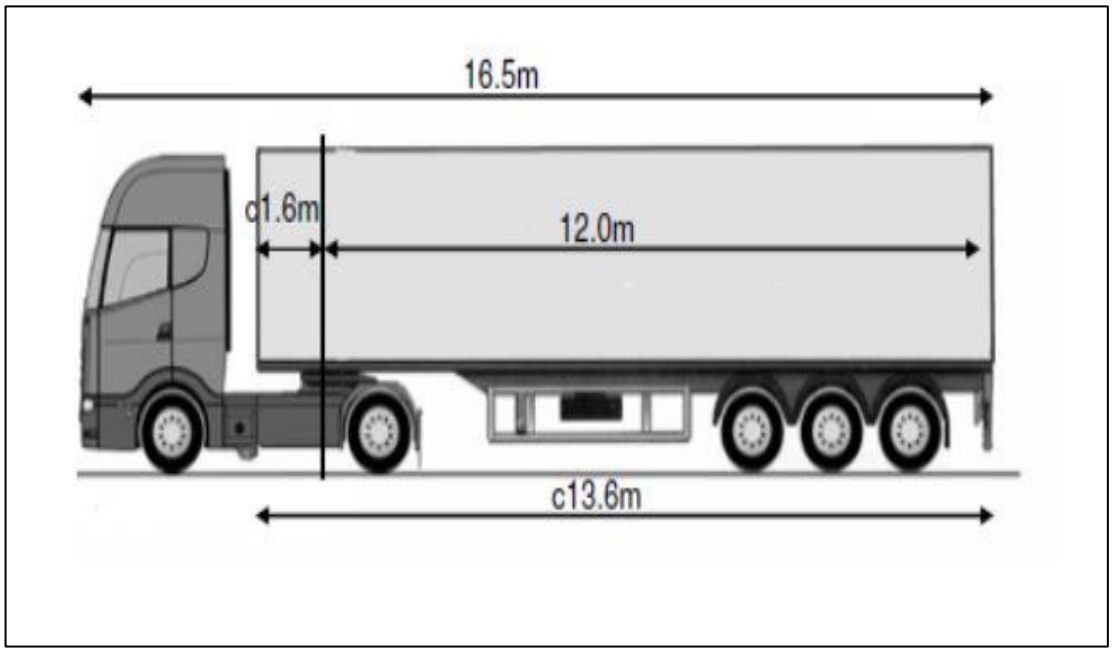

Figure 14-3 Standard HGV

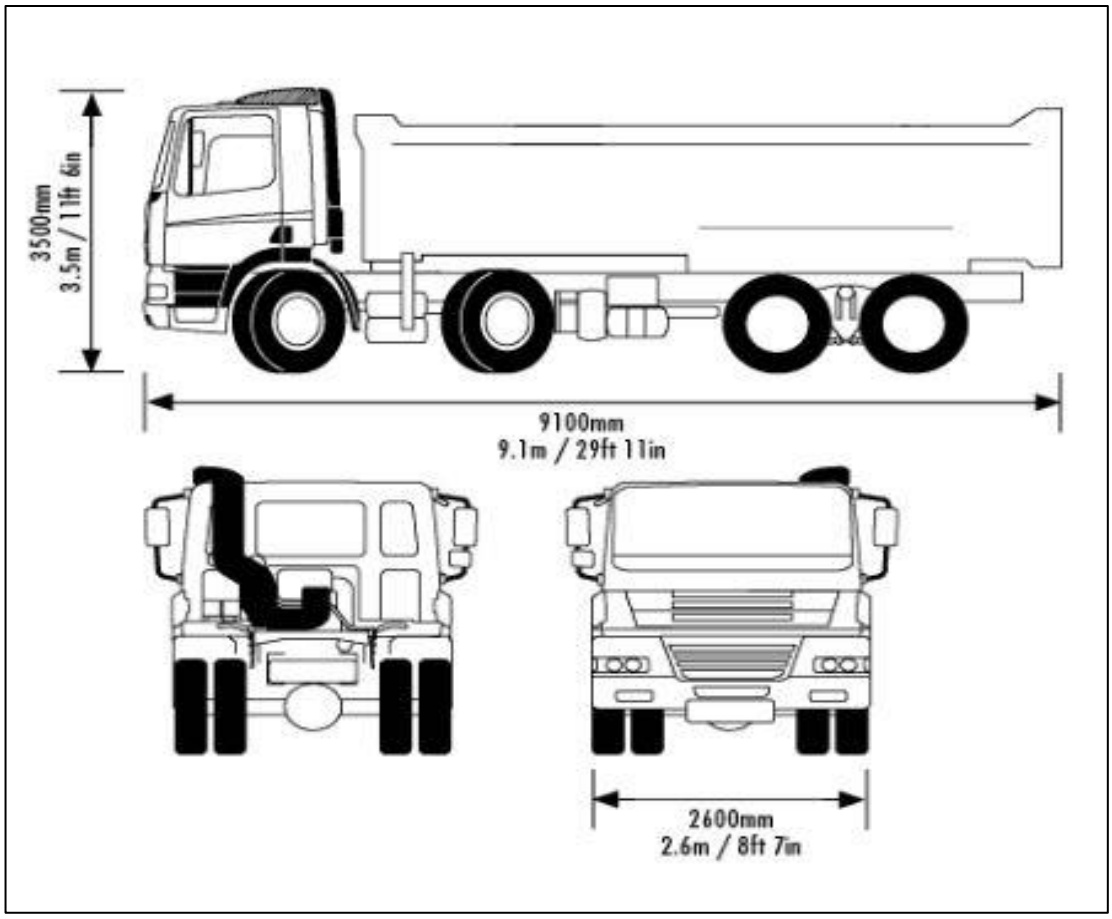

Figure 14-4 Standard Rigid Tipper Truck

14.1.4 Description of Likely Effects

14.1.4.1 'Do-Nothing' Scenario

In the 'Do-Nothing' scenario, the Proposed Development will not be constructed and there will be no alteration to existing land-uses, traffic generation and there will be no additional effects on the road network or on existing access arrangements.

14.1.4.2 Construction Phase

The construction period of the Proposed Development is estimated to take approximately 24-months, with the majority of traffic movements being associated with the construction of access tracks, hardstands and turbine foundations. During this period, there will be trips associated with the arrival and departure of construction staff and with the delivery of aggregates, reinforcing steel and ready-mix concrete. Staff trips will mainly be made using cars and vans, while deliveries of steel, concrete, and rock and other general construction materials will be made by HGV.

The construction phase of the development will likely comprise a six-day week with normal working hours from 07.00 to 19.00 Monday to Friday and 08.00 to 13.00 on Saturdays. It may be necessary to undertake works outside of these hours to avail of favourable weather conditions (e.g. during time of low wind speed to facilitate turbine erection etc.) or during extended concrete pours (e.g. turbine foundation pours must be completed within 24 hours etc.). Where the delivery of materials are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification.

14.1.4.2.1 Direct Effects

The direct effects assessed as likely to arise with respect to transport & access during the construction phase are listed below and described in the following sections:-

- Accommodation Works to Turbine Component Haul Route; and
- Grid Connection Installation Works.

Accommodation Works to Turbine Component Haul Route

While the proposed turbine transport haul route is assessed to be generally capable of accommodating abnormal loads, works will be required at a number of locations to facilitate turbine component deliveries. In general, the scope of works relates to temporary removal of street furniture (road signs and street lighting) and temporary hardcoring of roadside verges and roundabout islands and will not result in any long-term impact on the road network. All necessary works are described in full at Chapter 4 and Appendix 14-1; while the most notable requirements are discussed further at Table 14-2 above.

Based on the scope of the necessary works, the predicted effect on transport & access is assessed to be slight, negative, direct, likely but short term.

Grid Connection Installation Works

Direct effects on the local road network, transport and access are assessed as likely to arise in terms of effects on the road structure/surface due to excavations.

The proposed Grid Connection infrastructure will be installed in a trench of c. 1.2m deep by c. 0.6m wide; while joint bays (as described at Chapter 4); will be installed as required with the proposed trench to be located predominately within the carriageway of the R363, R362 and L2047. The precise location of the trench and joint bays within the public road (or verge) will be determined during the post-consent detailed design process but will, where possible, avoid the wheel bearing strip to allow backfilled aggregates to settle following trench reinstatement and avoid subsidence.

Following the installation of electrical ducting and associated infrastructure, the excavated trench will be backfilled according to the requisite specification and the road surface reinstated to the satisfaction of the Planning Authority. The Applicant has consulted with the Roads Department of Roscommon County Council and is fully aware of the reinstatement requirements. The predicted effect on transport & access is, therefore, assessed to be slight, negative, direct, short term and likely.

14.1.4.2.2 Indirect Effects

HGV Deliveries

The estimated timescale for the completion of the construction phase is approximately 24-months, inclusive of all works related to the construction of the Wind Farm, installation of Grid Connection infrastructure, haul route upgrade works and erection and commissioning of turbines. This allows approximately 18-months for civil construction and approximately 6-months for erection and commissioning of the turbines and the commissioning of electrical infrastructure.

It is estimated that during civil construction, approximately 20,829 no. loads of construction materials, stone, concrete, turbine components, electrical equipment, and plant and machinery will be delivered to the proposed Wind Farm site. Assuming an 18-month civil works construction

phase, this equates to approximately 1,157 no. loads per month or an average daily increase of 53 no. loads per day[6] excluding Sundays and public holidays. On the basis of a 10-hour working day; this equates to an additional 5.3 no. vehicles utilising the public road network per hour. Given the characteristics of the existing road network, as described at Section 14.1.3 above, this increase is assessed to be negligible.

The peak number of deliveries per day will occur during the concrete pour for turbine foundation construction. An estimated 70 no. cement mixer and other truck deliveries will be required per turbine foundation. Other materials are also likely to be delivered on such days, and therefore a realistic estimation of peak deliveries during the twenty days of foundation pours is approximately 110 to 120 no. deliveries per day. These pours will take place from 05:00 and typically take 16-hours to complete and involve approximately 15 no. trucks per hour.

The majority of civil construction material, such as aggregates and concrete, will be delivered to site using standard rigid tipper trucks, HGVs and ready-mix trucks. Due to the absence of significant volumes of suitable aggregate material at the site for use in the construction phase, the majority of rock/stone will be imported for use in the construction of hardstands, access tracks, site entrances, construction compound areas and substation compound.

It is estimated that a total of 159,350m^3 (17,706 no. loads) of rock will be imported to site. In addition, it is estimated that 5,400m^3 of rock will be encountered within the Proposed Development site which will be utilised in the construction phase.

Aggregates will also be required for the stoning out at a number of locations along the turbine delivery route. however, the necessary volumes will be negligible.

Turbine components will be delivered to site over a period of approximately 15-18 weeks and will commence at the latter end of the civil works phase. It is estimated that approximately 212 loads of turbine components and crane parts will be delivered during this period. Some of these loads (turbine tower sections, nacelles and blades) will be classified as oversized abnormal loads. Whilst every operation to transport abnormal loads is different and requires careful consideration and planning, escort vehicles, traffic management plans, drive tests, road marshals and convoy escorts from the Garda Traffic Corps are all measures that are regularly employed to get unusual loads from origin to destination.

Following completion of the construction works, it is estimated that approximately 70 loads will be needed to remove all temporary equipment, plant and machinery and materials used on site e.g. temporary construction compounds, fencing, cabins, storage containers etc. Table 14-3 details the estimated volume of deliveries to/from the proposed Wind Farm site; while the expected volume of deliveries associated with the proposed Grid Connection is provided at Table 14-4.

[6] *Calculated on the basis of 22 no. working days per month.*

Table 14-3 Estimated construction materials and no. of deliveries to proposed Wind Farm site (based on manufacturer's specification)

Material	Quantity	No. of HGV Deliveries (Trips)
Site Mobilisation (incl. plant & machinery)	-	45
Rock and aggregates	159,350 m^3	17,706
Concrete	17,275m^3	2,032
Miscellaneous Construction Materials (incl. concrete blocks, reinforcing steel, fencing, geotextile mats, ducting, and tools, etc.)	-	550
Electrical Equipment (incl. substation components, transformers, control panelling, and electrical cabling, etc.)	-	210
Meteorological Mast Materials	-	4
Wind Turbine Tower Sections	-	80
Nacelles	-	20
Rotor Blades	-	60
Ancillary Wind Turbine Components	-	42
Crane Deliveries (incl. ballast, and booms, etc.)	2 Cranes	10
Removal of all temporary on-site equipment and materials	-	70
Total	-	20,829

Table 14-4 Estimated construction materials and no. of deliveries to proposed Grid Connection route

Material	Quantity	No. of HGV Deliveries (Trips)
Site Mobilisation (incl. plant & machinery)	-	15
Excavated material to be removed	12,960 m^3	1,440

Material	Quantity	No. of HGV Deliveries (Trips)
(incl. excess spoil and road cuttings)		
Ducting and Electrical Cabling	-	15
Rock/Stone aggregates and concrete	12,350m^3	1,372
Miscellaneous Construction Materials (incl. tools, joint bays, jointing equipment, warning tape, etc.)	-	65
Total	-	2,907

The expected number of HGV deliveries is based on best estimates of trips generated by similar sized wind farms, previous experience in wind farm planning and civil construction, and based on the design of the project to date. Subject to planning permission being granted, these figures will be subject to refinement following the detailed design process, detailed pre-construction site investigations and consultation with the appointed contractor.

Based on the above estimated vehicular movements, the predicted effect on the road network as a result of the increase in HGV movements associated with the entire Proposed Development is moderate, negative, indirect, likely but short term. This assessment has been reached in consideration of the temporary duration of the proposed construction phase and the modest estimated average daily increase in vehicular movements on the surrounding road network.

Construction Personnel

The number of staff employed at the Proposed Development Site will vary according to the phase of works, peaking at up to approximately 100 no during the construction period. It is expected that the majority of workers will arrive on site in LGVs and crew vehicles. Vehicle sharing, subject to compliance with all relevant public health advice, will be actively encouraged to reduce vehicular movements. It is expected that c. 40 no. vehicles will visit the site on a daily basis during the peak construction period.

Parking for staff will be provided at the temporary construction compounds. No parking will be allowed for construction workers on the public road network. The additional vehicular movement associated with staff travelling to site are not assessed as likely to result in significant effects on transport and access. Effects are assessed to be imperceptible/slight, negative, short-term and likely.

Grid Connection Installation Works

During grid connection installation works within the public road network, minor disruption will be experienced by road users. Due to the characteristics of the roads involved, it is assessed that 'single-lane closures' combined with a 'Stop/Go' system can be appropriately implemented along the entire Grid Connection route which will allow for construction activities to progress in a safe manner while ensuring public safety and that existing traffic flows are maintained. Given the linear extent of the proposed Grid Connection route, it is likely that multiple crews will be working along the route at any given time and traffic management measures will be suitably implemented to avoid any significant cumulative effects. It is, therefore, assessed that effects arising from traffic disruption will be moderate-slight, negative, indirect, likely but of a short duration.

Overall Classification of Effects

The above sections have assessed the effects of the Proposed Development on roads, traffic transport and access which may arise as a result of the construction phase. Overall, as a consequence of:-

- The modest estimated daily increase in vehicular movements during the construction phase
- The methodologies to be implemented during the construction phase particularly relating to the completion of haul route upgrade works and grid connection installation works, and
- The appropriate implementation of traffic management measures

the predicted effects during the construction phase are not assessed to be significant and are concluded to be likely, moderate-slight, negative and of a short-term duration.

14.1.4.3 Operational Phase

During the operational phase, the Proposed Development will generally be unmanned. Operational and remote monitoring activities will be carried out on an ongoing basis. However, regular visits to the site will be undertaken for routine inspections and maintenance of the proposed wind turbines, meteorological mast and electricity substation. Under normal circumstances, the operation of the Wind Farm would require 1-2 no. visits to the site per week by maintenance personnel. Maintenance staff will be instructed not to park on any public road and parking will be available at turbine hardstands and the on-site substation. In the case of a major fault; for example, breakdown of a turbine component; larger machinery may require access to the site; however, it is assessed that extensive works would not be required in order to accommodate same.

Occasional inspections of the grid connection infrastructure (including joint and communication bays) will also be completed, on average, twice per year. Maintenance operations will entail a visual inspection of the bays by personnel, travelling in a light goods vehicle (LGV), and will not necessitate large machinery.

Overall, the volume of traffic predicted to be generated during the operational phase is very low; with estimated traffic volumes of 1-2 light goods vehicles per week; and will not noticeably alter exiting traffic volumes, affect local access or impact on the road network. On occasion, it may be necessary for HGVs to access the Wind Farm to undertake larger maintenance works (e.g.. maintenance of access tracks, turbine component maintenance, etc.); however, the volume of vehicular movements will be extremely low and are not assessed as likely to adversely affect roads, traffic, transport or access. Therefore, the effects associated with the operation of the Proposed Development on the existing public road network, and on access, will be negligible and is not assessed as likely to be significant.

14.1.4.4 Decommissioning Phase

During the decommissioning phase of the Proposed Development, the total volume of HGV traffic will be significantly reduced compared to the construction period.

The wind turbines proposed as part of the Development are expected to have a lifespan of approximately 30 years and ongoing research shows that this is likely to increase with improvements in turbine technology, site design and maintenance measures. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to fulfilment of planning requirements at that time, or the Proposed Development may be decommissioned

fully. The onsite electrical substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the electricity grid.

Upon decommissioning of the Proposed Development, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that would be used for their erection. The turbine will most likely be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in environment emissions such as noise, dust and/or vibration.

Site roadways will be left in situ, as appropriate. If it were to be confirmed that the roads were not required in the future for any other useful purpose, they could be removed where required. Underground cables will be removed, and the ducting left in place. Overall, the impact of the decommissioning phase is assessed to be slight and negative of short-term duration and high probability.

14.1.4.5 Cumulative and In Combination Effects

The above assessment has assessed the likely in-combination effects of the construction, operation and decommissioning of the Proposed Development as a whole (i.e. Wind Farm and Grid Connection infrastructure) and concluded that effects would be generally be moderate-slight, negative, short-term and high probability. In addition, it is necessary to assess the likelihood of the Proposed Development giving rise to cumulative effects with other existing, permitted or Proposed Developments for which planning application have been made, including other wind farms.

Given the magnitude of effects assessed as likely from the Proposed Development, cumulative effects are assessed as only likely to occur during the construction and decommissioning phases of the Proposed Development. Cumulative effects are unlikely to occur during the operational phase as wind farms do not generate a significant amount of traffic during operation as outlined in Section 14.1.4.3.

Other developments which have been included within the cumulative assessment are listed at Chapter 2. The majority of existing, permitted and Proposed Developments in the vicinity of the Proposed Development comprise residential dwellings, associated ancillary developments (e.g. extensions) or agricultural developments. However, such developments are not predicted to generate a perceptible, in EIA terms, level of traffic such that a cumulative effect on transport and access is likely to arise.

In relation to other wind farm developments, the nearest such project is the operational Skrine Wind Farm, Co. Roscommon located c. 8.5km to the north of the Proposed Development. Additional wind energy developments located within 20km of the Proposed Development include the proposed Kilcash Wind Turbine, located c. 10km north of the Proposed Development, and the permitted Derrane Wind Farm located c. 19.5km north of the Proposed Development.

The operational Skrine Wind Farm is not, due to its small scale, assessed as likely to generate significant levels of vehicular traffic during its operational phase such that likely significant effects on transport and access could occur. Similarly, due to the small-scale of the proposed Kilcash Wind Turbine (1 no. turbine) and Derrane Wind Farm (2 no. turbines) and the corresponding low volume of traffic generation and the substantial intervening separation distances, significant effects on roads, traffic, transport and access are not assessed as likely to arise.

It is noted that there are ongoing quarrying and extraction activities at the adjacent Roadstone Quarry at Cam, Co. Roscommon. Day-to-day activities at this quarry generate notable volumes of traffic; however, the quarry is directly accessed by the regional road network (R363). During the construction phase of the Proposed Development, construction materials (rock and concrete) will, be imported from a local supplier(s). While the supplier and, therefore, associated haul route cannot be confirmed at this point, it is likely that, due to proximity, material will be sourced from the quarry at Cam.

Consequently, a significant proportion of vehicular movements associated with quarrying activities would, therefore, be associated with the Proposed Development thereby substantially reducing any likelihood of significant cumulative effects.

In the event that an alternative supplier is selected; due to the quality of the surrounding road network, significant cumulative effects are not assessed as likely. While an increased volume of traffic on the local road network would be experienced by local residents and road users, the predicted increase is not assessed to be significant having regard to the overall average-predicted daily trip generation of 53-trips.

In summary, therefore, due to low levels of vehicular movements during the operational and decommissioning phases, it is only during the construction phase that cumulative effects are assessed as likely. However, due to a combination of project characteristics (e.g. small scale of other developments) and/or separation distances; the Proposed Development is not assessed as likely to give rise to likely significant cumulative effects with existing, permitted or Proposed Developments. Moreover, due to the temporary nature of construction activities, any cumulative effects are assessed to be short-term.

14.1.5 Mitigation & Monitoring Measures

14.1.5.1 Mitigation

The likely effects of the Proposed Development have been identified as being slight to moderate and temporary in nature and associated with short-term construction and decommissioning activities. Likely effects during the operational phase have been assessed as being negligible and hence specific mitigation measures are not deemed to be necessary during this phase of development.

While the likelihood of effects are not assessed to be significant, even in the absence of mitigation, a suite of measures will be implemented which will further reduce any likely effects during the construction phase. The following mitigation measures will be implemented:

- The timing of peak delivery of construction materials to the proposed wind farm site (i.e. during turbine foundation pours and turbine component deliveries) will be carefully scheduled to minimise traffic disruption; particularly along the R363 and R362 which will be utilised for the delivery of materials and components and will accommodate the proposed Grid Connection infrastructure;
- Traffic movements will be limited to 07.00 to 19.00 Monday to Friday and 08.00 to 13.00 on Saturdays with no movements on Sundays or public holidays. It may be occasionally necessary to undertake works outside of these hours to avail of favourable weather conditions, during extended concrete pours, or in the event of an emergency. Where construction activities are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification;
- Wheel cleaning equipment will be used, as necessary, to prevent any debris being transferred from site to the adjacent public roads. All drivers will be required to ensure that their vehicle is free from dirt and stones prior to departure from the construction site.

Where conditions exist for dust to become friable, techniques such as damping down of the affected areas will be employed and vehicles/loads will be covered to reduce dust emissions;

- A comprehensive final Traffic/Transport Management Plan (TMP) shall be agreed, as part of the final Construction Environmental Management Plan (CEMP), with the Planning Authority prior to the commencement of development. The TMP shall include *inter alia* confirmed details of construction material haul routes; confirmed details of vehicle specifications; a materials delivery programme; traffic management measures including details of 'Stop/Go' systems, signage, road closures and diversionary routes (unlikely to be required); and road reinstatement details;
- All works to the public road shall be undertaken in consultation with, and agreed in advance with, the Planning Authority and in accordance with road opening licences;
- All reasonable steps shall be taken to ensure that national and regional routes are used to transport construction materials to the site, in so far as is practicable;
- Prior to and post construction, pavement and bridge condition surveys will be undertaken along all local and regionally classed roads along the turbine component haul route and selected construction material haul route;
- Adequate signage shall be provided at entrances providing access, safety and warning information;
- Speed limit compliance will be emphasised to all staff and contractors prior to the commencement of construction during site induction, and will be strictly enforced throughout the construction phase;
- Sufficient car parking spaces will be available at the contractor's temporary compounds during the construction phase. No parking of cars by persons associated with the Proposed Development will be permitted on any part of the public road that is not closed to traffic. All staff will be instructed to ensure that private entrances remain unobscured (particularly along the Grid Connection route);
- Road sweeping, particularly along the proposed Grid Connection route, will be carried out as appropriate to ensure construction traffic does not adversely affect road conditions;
- Traffic restrictions shall be kept to minimum duration and extent;
- Appropriate traffic management; including maintenance of local access and pedestrian access (where safe to do so); shall be implemented to facilitate continued public use of roads where temporary traffic restrictions have to be put in place;
- The delivery schedule for oversized loads shall be agreed with the relevant local authorities and An Garda Síochána, and all relevant licenses and permits shall be obtained;
- Maximum axle loadings for oversized loads shall be strictly enforced in accordance with the Road Traffic (Construction and Use of Vehicles) Regulations 2003 (S.I. No. 5 of 2003) as amended;
- A designated contact point and coordinator will be put in place to manage all access arrangements and to interface with the public and the Planning Authority; and
- The site shall be closed to the public during the construction phase.

14.1.5.2 Monitoring

The proposed turbine delivery and construction material haul routes will be monitored during the construction phase to identify any damage which may have been caused by construction traffic. Where any damage has been caused by traffic associated with the Proposed Development, it shall be repaired by the appointed contractor as soon as possible.

- A post-construction pavement and bridge condition survey will be undertaken to determine if any deterioration has occurred as a result of construction related vehicles. If deterioration is identified as a direct cause of the Proposed Development, repair work shall be undertaken to the satisfaction of the Planning Authority.

14.1.6 Residual Effects

14.1.6.1 Construction Phase

There are no significant residual effects, positive or negative, assessed as likely to occur during the construction phase. Mitigation measures have been proposed to offset any likely effects and any residual effects are assessed to be slight, negative and short-term. The residual negative effects are likely to arise as a result of upgrade works along the turbine component haul routes, increases in traffic volumes on regional roads in the vicinity of the Proposed Development site and temporary traffic disruption along the proposed Grid Connection route; however, significant effects are not assessed as likely.

14.1.6.2 Operational Phase

There will be no residual effects during the operational phase as only occasional light vehicles are envisaged to visit the site during operation for routine checking and maintenance. On occasion, larger HGVs may be required to visit the site; however, vehicular numbers are likely to be low. There will also be a likely positive, long-term residual effect experienced by local road users arising from permanent upgrades to the L7535 local road.

14.1.6.3 Decommissioning Phase

Decommissioning phase effects are assessed to be similar to those of the construction phase but of a reduced scale and magnitude. Consequently, it is assessed that the decommissioning phase will not give rise to any likely significant effects.

14.1.7 Summary

This section has assessed the likelihood of significant effects arising from the Proposed Development on roads, traffic, transport and access. The Proposed Development has generally been assessed as being likely to result in likely, negative, slight/moderate and short-term effects. After mitigation, the likely residual effects have been assessed as imperceptible/slight, negative and short-term in nature. In addition, there will also be a likely positive, long-term residual effect experienced by local road users arising from permanent upgrades to the L7535 local road.

Likely cumulative effects, with the attendant Grid Connection and other developments in the vicinity, have been assessed as being imperceptible to moderate negative, short term and likely.

Overall, this assessment has identified no likelihood of significant effects on roads, traffic, transport and access which could arise as a result of the construction, operation or decommissioning of the Proposed Development either individually or in combination with other existing, permitted or Proposed Developments. A suite of mitigation measures have also been proposed which will serve to further prevent any likelihood of significant effects.

14.2 Aviation

14.2.1 Introduction

This section assesses the likely significant effects on aviation as a result of the construction, operation or decommissioning of the Proposed Development. The requirement for an assessment of the likely effects on aviation is set in the *Wind Energy Development Guidelines for Planning Authorities 2006* (and Draft Revised Wind Energy Guidelines 2019) which state:

> *'The siting of wind turbines may have implications for the operations of communications, navigation and surveillance systems used for Air Traffic Control for the separation and safety of aircraft. Wind turbine siting may also have implications for the flight paths of aircraft.'*

14.2.1.1 Statement of Authority

This section has been prepared by members of the GES Environment & Planning Team. This section of the chapter was prepared by Simon Carleton. Simon is a qualified planner (MSc BA MIPI) with wide ranging experience (6-years) in preparing EIARs and has prepared aviation assessments for numerous renewable energy developments. This section of the chapter was reviewed by Gavin Daly. Gavin is a qualified planner (BA Dip MIPI) with over 20-years' experience and has advised on over 500MW of pre-consent and post-consent wind and solar energy developments, including associated grid infrastructure and amendments to approved projects.

14.2.2 Methodology

The assessment involved consultation with various stakeholders including the Irish Aviation Authority (IAA) and Department of Defence. In addition, publications issued by the IAA and the Department of Defence were reviewed to determine if the Proposed Development site was assessed as being of significance or if significant effects were likely.

The Draft Revised Wind Energy Guidelines 2019 state that wind turbines can cause interference with the safe operation of an airport if located within 20km of an airport. Accordingly, a desktop study was also undertaken to determine the presence of airports, aerodromes or airstrips within 20km of the subject site.

This assessment was also prepared in accordance with the *Draft Air Corps Wind Farm/Tall Structures Position Paper* (August 2014) (Appendix 14-4) which sets out the Air Corps position to the appropriate siting and management of wind farms and tall structures. This assessment includes a detailed review of this position paper and a comparison of the Proposed Development site with identified 'Danger Areas', 'Restricted Areas' and 'Low Level Flying Areas'.

14.2.3 Consultation

Consultation was undertaken with the IAA and Department of Defence to establish if any effects on aviation were likely. A consultation letter was issued to both stakeholders in January 2020 which included a general description of the Proposed Development and site location drawings.

Correspondence was received from the IAA (see Appendix 2-1), with no likely significant effects on aviation having been identified. The IAA has requested the imposition of a condition of consent requiring specific details to be agreed with the IAA including advance notification of the

commencement of crane operations, the specification of obstacle warning lighting to be installed on the wind turbines, and the provision of as-constructed project details to the IAA.

At the time of writing, no response has been received from the Department of Defence.

14.2.4 Description of Existing Environment

There are no major airports within 20km of the Proposed Development and the site is therefore assessed as being unconstrained. The proposed wind turbines are located c. 52km east of Galway Airport and c. 62km southeast of Ireland West (Knock) Airport.

According to the IAA, there are no aerodromes or airstrips in the immediate vicinity of the Proposed Development or indeed within County Roscommon. The nearest aerodrome in the Republic of Ireland is at Abbeyshrule in County Longford at an approximate distance of 36km.

The Proposed Development site is not located within any 'Danger', 'Restricted' or 'Military Operating' area as identified at Annex A, B or C of the Air Corp Position Paper. Similarly, the subject site is not located within 3 no. nautical miles of any critical low-level route identified at para. 2(2)(c) and illustrated at Annex D of the Paper.

Air traffic control radar is of two types. Primary Surveillance Radar (PSR) equipment sends out pulses of electromagnetic energy which will reflect off objects in their path. The radar's receiver antenna detects the returning 'echoes' and these are displayed on the radar screen. The time taken for the pulse to travel out to the target and back gives an indication of the range of the object from the radar

Secondary Surveillance Radar (SSR) is the second type of radar equipment used for air traffic control. Like primary radar, SSR relies on an antenna rotating continuously through 360°. However, the radar does not transmit raw pulses of energy; it transmits an interrogation signal. The signal is received at the SSR antenna, decoded, and the height and location of nearby aircraft are presented on the radar screen. This enables controllers to positively identify radar returns on their screens and (after verbal confirmation from the pilot) to confirm the aircraft's height.

Rotating wind turbine blades within radar range can impart a Doppler shift to any radar energy reflecting off the blades. The radar's processor could detect this as a non-static target and therefore display the turbines as objects on the radar screen; however, given that the Proposed Development is located beyond 20km of an airport, no effects are assessed as likely.

14.2.5 Description of Likely Effects

14.2.5.1 'Do-Nothing' Scenario

In the 'Do-Nothing' scenario, the Proposed Development will not be constructed, and no tall structures will be present at the site. Accordingly, there will be no interaction whatsoever with aviation.

14.2.5.2 Construction Phase

The only potential impact on aviation associated with the Proposed Development during the construction phase is during the erection of wind turbines on site. However, due to the relatively low-altitude of structures and given that cranes will be fitted with appropriate aviation warning lighting to alert pilots to the presence of tall structures, no adverse effects are anticipated.

Due to the sub-surface nature of the proposed Grid Connection infrastructure, there will be no effects on aviation.

14.2.5.3 Operational Phase

Due to the presence of tall structures, it is possible that the Proposed Development could interact with aviation operations. However, due to the incorporation of aviation warning lighting within the design of the proposed wind turbines (see Section 14.2.7.2), effects are assessed to be likely, negligible and permanent (for the duration of the operational phase)

The Proposed Development Site is not located within any low flying areas, restricted areas, danger areas, military operating areas or low level routes identified within the Air Corps Wind Farm/Tall Structures Position Paper. It is concluded, therefore, that the operation of the proposed wind turbines and meteorological mast will not result in any likely significant effect on the Air Corps or associated activities.

Due to the sub-surface nature of the proposed Grid Connection infrastructure, there will be no effects on aviation.

14.2.5.4 Decommissioning Phase

The likely effects during the decommissioning phase are assessed to be similar to those during the construction phase with no significant effects assessed as likely to occur.

14.2.6 Mitigation & Monitoring Measures

14.2.6.1 Construction Phase

Due to the absence of likely impacts, there are no specific mitigation measures proposed. As is best practice, warning lights are to be fitted to cranes during the installation of the proposed wind turbines.

Prior to the commencement of construction, and as requested by the IAA in their consultation response, a scheme of aeronautical warning lighting for the Proposed Development will be agreed with the Authority. The 'to be constructed' turbine coordinates, ground and tip height elevations will also be provided to the IAA a minimum of thirty days prior to commencement of development.

Due to the sub-surface nature of the proposed Grid Connection infrastructure, no mitigation measures are required.

14.2.6.2 Operational Phase

The proposed wind turbines will be fitted with aviation warning lighting in accordance with the specification to be agreed with the IAA. The precise lighting specification will also be agreed with the Planning Authority prior to the commencement of development.

The developer will continue to liaise with the IAA during the operation phase to ensure that any necessary mitigation measures are being implemented. At a maximum of thirty days following the installation of the proposed turbines, 'as-constructed details' will be provided to the IAA to allow for the updating of mapping charts, including:

- The number of wind turbines;

- WGS-84 coordinates of each turbine;
- Ground elevation of each turbine (Malin Head OD);
- Blade tip elevation of each turbine (Malin Head OD);
- Height of Turbine;
- Contour maps at the requisite scale; and
- A note of which turbines have been fitted with obstacle warning lights.

In the event that the obstacle warning lights fail or if there are plans to withdraw them from use for a period of time, the IAA will be contacted, via AISOPs@iaa.ie, as a matter of urgency, to request that a NOTAM (Notice to Airmen) is issued concerning the absence of obstacle lights. The following information will be provided to the IAA:-

- Obstacle ID;
- Obstacle type;
- Obstacle Position;
- Elevation; and
- Colour of Light.

It should be noted, however, that the proposed wind turbines will be fitted with an uninterruptable power supply (UPS) to ensure that the aviation warning lights remain operational even in the event of a power outage. This UPS is sufficient for a period of twelve hours; after which, the warning lights can be powered by a small generator should the power outage continue.

Due to the sub-surface nature of the proposed Grid Connection infrastructure, no mitigation measures are required.

14.2.6.3 Decommissioning Phase

Mitigation measures proposed during the construction phase will also be implemented during the decommissioning phase. Due to the sub-surface nature of the proposed Grid Connection infrastructure, no mitigation measures are required.

14.2.7 Residual Effects

Taking into account the predicted impacts and proposed mitigation measures, no likely significant residual effects are assessed as likely to occur on aviation during the construction, operation or decommissioning phase of the Proposed Development.

14.2.8 Cumulative Effects

Due to the absence of other tall structures in the wider vicinity of the Proposed Development site and given that the nearest wind farm development is in excess of 8km from the subject site, it is assessed that there is no likelihood for the Proposed Development to have any significant effects on aviation, in combination with other existing, permitted or Proposed Developments.

14.2.9 Summary

This assessment concludes that the Proposed Development, is unlikely to result in any significant effect on aviation. The Proposed Development site is not located within an area identified as being of particular sensitivity or importance in the Air Corps Position Paper on military aviation or located close to any civilian aerodrome, airfield or airport. Accordingly, with the installation of appropriate aviation warning lighting, no significant effects are assessed as likely to occur. As a result, it is assessed that significant effects on aviation are unlikely to occur as a result of the

Proposed Development, either individually or in combination with other existing, permitted or Proposed Developments.

14.3 Telecommunications

14.3.1 Introduction

As noted in the *Wind Energy Development Guidelines for Planning Authorities 2006*, wind turbines, like all electrical equipment, produce electromagnetic radiation, and this can interfere with broadcast communications. This section considers the likely significant effects of the Proposed Development upon a range of communications infrastructure, including telecommunications networks, broadcast radio and television, and fixed infrastructure such as telecommunication masts. In theory, interference could affect all electromagnetic communications including:-

- Satellite Communications;
- Cellular Radio Communications; and
- Television Broadcasting Signalling.

14.3.1.1 Statement of Authority

This section has been prepared by members of the GES Environment & Planning Team. This section of the chapter was prepared by Simon Carleton. Simon is a qualified planner (MSc BA MIPI) with wide ranging experience (6-years) in preparing EIARs and has prepared telecommunications assessments for numerous renewable energy developments. This section of the chapter was reviewed by Gavin Daly. Gavin is a qualified planner (BA Dip MIPI) with over 20-years' experience and has advised on over 500MW of pre-consent and post-consent wind and solar energy developments, including associated grid infrastructure and amendments to approved projects.

14.3.2 Methodology

The methodology employed in assessing the likelihood of significant effects on telecommunication networks consisted of desk-based research and consultation with various telecommunication service providers and relevant authorities. Desk based research was undertaken to identify:

- Locations of known telecommunications facilities;
- Known telecommunication fixed links; and
- Known television broadcast and re-broadcast facilities;

14.3.2.1 Scoping & Consultation

As part of the scoping and consultation exercise, MKO contacted the relevant national and regional broadcasters, fixed and mobile telephone operators. Consultation was also carried out with ComReg, in February 2020, in order identify any other additional licensed operators in the vicinity of the site to be contacted, who may not have been on the list of main operators. All telecommunications consultees are presented below in Table 14.5.

Table 14-5 Estimated construction materials and no. of deliveries to proposed Grid Connection route

No.	Consultee	Date of response	Likelihood of Effects identified by Service Provider
1	Airspeed Communications	18th February 2020	No.

No.	Consultee	Date of response	Likelihood of Effects identified by Service Provider
2	BT Communications Ireland	12th February 2020	No
3	ESB Telecoms	17th February 2020	No.
4	Eir	24th February 2020	Transmission link identified but no effects likely subject to maintenance of 100m buffer to wind turbines.
5	Imagine Group	12th February 2020	Transmission link identified but no effects likely subject to maintenance of 50m buffer to wind turbines.
6	Ripplecom	15th July 2020	Transmission link identified but no effects likely subject to maintenance of 121m buffer to wind turbines.
7	2rn (RTE Transmission Network)	12th February 2020	Transmission link identified but no effects likely subject to maintenance of 100m buffer to wind turbines.
8	Tetra Ireland Communications Ltd.	18th February 2020	No.
9	Three Ireland	12th February 2020	Transmission link identified but no effects likely subject to maintenance of 100m buffer to wind turbines.
10	Towercom	12th February 2020	No.
11	Virgin Media	12th February 2020	No.
12	Vodafone Ireland	13th February 2020	Transmission link identified but no effects likely subject to maintenance of 81m buffer to wind turbines.
13	ComReg	20th February 2020	No.

No.	Consultee	Date of response	Likelihood of Effects identified by Service Provider
14	Viatel Ireland Ltd	No Response	N/A
15	EMR	12th February 2020	No.
16	Ajisko	13th February 2020	No.
17	Arden Broadband Limited	No response	N/A
18	Eircom Ltd	24th February 2020	No.
19	Enet Telecommunications Networks	18th February 2020	No.
20	Lighthouse Networks Limited/Lightnet	15th July 2020	Two links identified in the area surrounding the site, no impact from the Proposed Development identified.
21	Westmeath Council	No response	N/A

The responses received can be viewed at Appendix 2-1

Consultation responses received from service providers generally confirmed that there would be no significant impact on the telecommunications network in the area of the Proposed Development. The matters raised by a number of service providers are described further below.

Eir identified the presence of a transmission link in the vicinity of the Proposed Development site. It was recommended that a 100m separation distance be adhered to between the proposed wind turbines and the transmission link. This separation distance/buffer zone was applied, and the layout of the Proposed Development adjusted accordingly.

Imagine Group identified the presence of 2 no. microwave links which were likely to result in adverse effects on the provision of services. It was advised that a buffer of 50m, from the link to the wind turbines, be applied to avoid adverse effects. The layout of the Proposed Development was adjusted accordingly.

Ripplecom advised that 2 no. existing links were likely to be affected by the Proposed Development. Following the identification of the routing of the links, a buffer zone of 121m (to the turbine tower) was applied to the links.

2rn identified the presence of a link which was likely to result in adverse effects on the provision of services. A buffer of 100m, from the link to the wind turbines, was applied to avoid adverse effects. The layout of the Proposed Development was adjusted accordingly.

Three Ireland identified the presence of a fixed link in the vicinity of the Proposed Development; however, it was assessed that significant effects were not likely to occur.

Vodafone identified the presence of a transmission link in the vicinity of the Proposed Development site. Following consultation, an 81m buffer between the proposed wind turbines and the transmission link was applied and the layout of the Proposed Development adjusted accordingly.

Lighthouse Networks Limited/Lightnet advised of 2 no. fixed links in the vicinity of the Proposed Development; however, it was assessed that significant effects were not likely to occur.

14.3.3 Description of Existing Environment

The Proposed Development site is traversed by a number of communications links associated mobile phone networks, wireless broadband and digital television (as described above); however, the Proposed Development site is not considered to be a significant or critical location for telecommunications (i.e. no regionally or nationally important masts are present within or in the environs of the site). The alignments of all links traversing the site were mapped and are well known to the Applicant.

14.3.4 Description of Likely Effects

14.3.6.1 'Do-Nothing' Scenario

In the 'Do-Nothing' scenario, the Proposed Development will not be constructed and no tall structures will be present at the site. Accordingly, there will be no interaction whatsoever with existing or future telecommunications infrastructure.

14.3.6.2 Construction Phase

It is assessed that no electromagnetic interference or interaction with telecommunication services will occur during construction.

Due to the sub-surface nature of the proposed Grid Connection infrastructure, there will be no effects on telecommunications.

14.3.6.3 Operational Phase

Due to the sub-surface nature of the proposed Grid Connection infrastructure, there will be no effects on telecommunications during the operational phase.

14.3.4.1.1 *Potential Interference of Wind turbines with Electromagnetic Transmissions*

The operation of wind turbines can potentially affect electromagnetic transmissions in two ways: by blocking or deflecting line of sight radio or microwave links or by 'scattering' transmission signals.

Analogue and Digital Television Signals

The United Kingdom's Office of Communications (OFCOM) document *"Tall structures and their impact on broadcast and other wireless services"*[7] provides an overview for developers and planning authorities on how tall structures such as wind turbines may affect reception of wireless services.

There are two potential problems that can occur due to interference from tall structures: (1) signal blocking, and (2) reflection. Signal blocking can occur when a tall structure is situated between the transmitter and receiver. This causes a shadow behind the structure that can reduce signal levels. The severity of the reduced signal can vary depending on a number of factors such as the height of the structure.

Signal reflection can occur when wireless signals are reflected from the sides of structures. In the case of wind turbines, because the blades are rotating, the reflections can fluctuate and be quite complex. Reflections from turbines can also vary depending on the speed at which the blades are rotating and the angles of the blades. According to OFCOM, digital television signals are much better at coping with signal reflections, and pictures do no experience ghosting.

As analogue television has been phased out in Ireland, problems with ghosting and signal reflection due to interference from turbines will be reduced. The digital television signal is much better at coping with signal reflection. Since the digital switchover, the power of transmitters emitting the digital signal has been increased to deal with the demand. This higher output is likely to overcome any signal interference and is not likely to effect the reception received on televisions.

Overall, it is assessed that there is no likelihood of significant effects arising and that any effects which are experienced are likely to be slight.

14.3.4.1.2 *Mobile Phone & Broadband Signals*

Notwithstanding the presence of a number of telecommunication (mobile phone & broadband) masts in the wider area, the consultation process has not identified the likelihood of significant interference occurring and no service provider has raised any concerns. Therefore, it is assessed that any effects arising will be imperceptible and, therefore, significant effects are assessed as not likely.

14.3.6.4 Decommissioning Phase

During the decommissioning phase, all tall structures will be removed and no significant effects are assessed as likely.

14.3.5 Cumulative Effects

Due to the absence of other wind farm developments and tall structures in the vicinity of the Proposed Development site which may affect telecommunication links, it is assessed that there is no likelihood for the Proposed Development to have any significant effects on telecommunications, in combination with other existing, permitted or Proposed Developments.

[7] OFCOM: Tall structures and their impact on broadcast and other wireless services, August 2009, http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf

In addition to the above, the applicant was made aware that Cellnex have submitted a planning application for a mast within proximity of the Southern Cluster, approximately 620m east of turbine no. 12. The applicant has had correspondence with Cellnex and the turbines will not have any significant effect on the mast and any of its associated links.

14.3.6 Mitigation & Monitoring Measures

Given that no significant effects are assessed as likely to occur from the construction, operation or decommissioning of the proposed Grid Connection, no mitigation measures are proposed or required.

14.3.6.5 Construction Phase

As no likely significant effects are assessed as likely to occur during the construction phase, no specific mitigation measures are proposed.

14.3.6.6 Operational Phase

Following the completion of an extensive consultation process with telecommunication service providers, the layout and design of the proposed Wind Farm was revised in accordance with the identification of telecommunications links which traversed the site. The layout was carefully amended to ensure that no telecommunications link was affected and that all necessary fresnel zones were respected. As a result, significant effects are not assessed as likely to occur and mitigation measures

Notwithstanding that, as a result of the above, the Proposed Development is assessed as unlikely to interfere with any telecommunications links, all operators will be kept informed of any changes to the layout should these occur to ensure that compliance with telecommunications constraints is maintained.

The operation of the proposed wind turbines may result in some localised interference to television signals in the area. As is standard practice for wind energy developments, the Applicant has entered into a protocol agreement with 2rn to ensure that any complaints received from the local public concerned are appropriately remediated. This is the standard protocol for such development proposals and is enclosed at Appendix 14-5.

If, despite the 'mitigation-by-design' precautions undertaken to date, significant television signal interference in any form is identified and is attributed to the Proposed Development, appropriate remedial measures will immediately be undertaken. A range of technical measures are available to mitigate any instances of interference including signal amplifiers, active deflectors and relay transmitters, repeater stations, booster units, realignment of domestic aerials, installation of higher quality aerials and the installation of suppression equipment.

Significant signal interference in relation to mobile phone signal, broadband and other telecommunications are not assessed as likely; however, should any interference occur which is directly attributable to the operation of the Proposed Development, remedial works will be promptly undertaken to ensure uninterrupted service provision.

14.3.6.7 Decommissioning Phase

As no likely significant effects are assessed as likely to occur during the decommissioning phase and no specific mitigation measures are proposed or required.

14.3.7 Residual Effects

No likely significant residual effects are assessed as likely to occur.

14.3.8 Summary

It can be concluded that, on the basis of a desktop assessment and extensive consultation with stakeholders, the Proposed Development will not result in likely significant effects on the telecommunications network. The implementation of mitigation-by-design measures, and any remedial measures which may be required during the operational phase, will ensure that any likely significant effects on telecommunication signals (including television, radio and broadband) are appropriately managed and mitigated in accordance with an agreed protocol. As a result, it is assessed that significant effects on telecommunications are unlikely to occur as a result of the Proposed Development, either individually or in combination with other existing, permitted or Proposed Developments.

14.4 Resources & Utility Infrastructure

14.4.1 Introduction

This section provides details of the likelihood of significant effects on or interactions with existing renewable and non-renewable resources and existing utility infrastructure. Within the wider environs of the Proposed Development site there is evidence of the extraction and use of resources; particularly in relation to the milling of peat from peatlands to the west of the Proposed Development site with numerous quarries located in Co. Roscommon.

There is also the presence of utility infrastructure, with overhead electricity lines connecting to the majority of dwellings, medium and high voltage electricity lines traversing the landscape to the north and south of the Proposed Development, telecommunication lines located adjacent to the majority of local roads, and underground water and wastewater infrastructure (particularly along the Grid Connection route near Athlone).

14.4.2 Statement of Authority

This section has been prepared by members of the GES Environment & Planning Team. This section of the chapter was prepared by Simon Carleton. Simon is a qualified planner (MSc BA MIPI) with wide ranging experience (6-years) in preparing EIARs and has prepared resource and utility infrastructure assessments for numerous renewable energy developments. This section of the chapter was reviewed by Gavin Daly. Gavin is a qualified planner (BA Dip MIPI) with over 20-years experience and has advised on over 500MW of pre-consent and post-consent wind and solar energy developments, including associated grid infrastructure and amendments to approved projects.

14.4.3 Description of Existing Environment

14.4.3.1 Renewable Resources

There are 8 no. existing wind farm developments located within County Roscommon. These developments are as follows:-

- Skrine Wind Farm comprising 2 no. wind turbines located c. 7km south of Roscommon town;
- Sliabh Bawn Wind Farm comprising 20 no. turbines located c. 11km northeast of Roscommon town;
- RooskyWind Farm comprising 2 no. wind turbines located c. 2.5km south of Ballaghderreen;
- Largan Hill Wind Farm comprising 9 no. wind turbines located c. 5km north of Ballaghderreen;
- Kilronan Wind Farm comprising 10 no. wind turbines located c. 2km west of Arigna;
- Seltenaveeny Wind Farm comprising 2 no. wind turbines located c. 3km north of Arigna;
- Tullynahaw Wind Farm comprising 11 no. wind turbines located c. 3km north of Arigna; and
- Altagowlan Wind Farm comprising 9 no. wind turbines located c. 4km northwest of Arigna.
- In addition to the above, there are a number of wind energy micro-generation sites located throughout the county.

14.4.3.2 Non-Renewable Resources

There are a number of extant and former quarrying and mining activities within County Roscommon. There are no quarries located within the Proposed Development site; however, the Roadstone quarry at Cam is located along the R363, immediately adjacent to the Proposed Development site. Due to the general absence of usable rock material within the site, the majority of aggregates for the construction phase will be imported from authorised quarries in the vicinity. Further details on the importation of such materials are provided at Section 14.1.

14.4.3.3 Utilities Infrastructure

The existing electricity transmission network in south County Roscommon predominately comprises 38 kV and 110 kV electricity transmission lines, with 1 no. 220 kV line traversing the northern part of the county. Appendix 14-6 illustrates the existing electricity transmission network in the wider region of the Proposed Development site. EirGrid is the Transmission System Operator (TSO) responsible for both the planning and operation of Ireland's high voltage national grid (≥110 kV) while ESB Networks are responsible for the development of medium and low voltage distribution lines. Given the overall electrical output of the Proposed Development, a connection to the transmission network, at 110 kV, is considered the most appropriate connection method.

In addition, there is an extensive physical telecommunications network in the wider environs of the Proposed Development site with poles and wires running along the majority of local and regional roads; while local services such as water schemes and local authority roadside drainage infrastructure is also present along local roads.

14.4.4 Description of Likely Effects

14.4.4.1 'Do-Nothing' Scenario

In the 'Do-Nothing' scenario, the Proposed Development will not be constructed. Accordingly, there would be no increased renewable energy generation and, similarly, no resources would be required to construct, operate or decommission the Proposed Development.

14.4.4.2 Construction Phase

The construction phase of the Proposed Development is not likely to have any significant impacts on existing renewable or non-renewable resources, or utilities infrastructure. The construction phase will not inhibit the export of renewable energy generated from other sources, inhibit the development of other renewable energy projects, nor will it impact upon existing utility services. While there is a potential for interaction with utility services (e.g. accidental collision with overhead wires during the construction phase), this will be mitigated through good construction practices.

During the process of connecting the Proposed Development to the national grid, some minor, temporary disruption to electricity supply, at a local level, may occur. However, during this process, EirGrid will balance the loading on the network to ensure that no significant disruption occurs and significant effects do not arise.

The construction phase will result in the extraction of non-renewable resources in the form of aggregates for the construction of access tracks and areas of hardstanding and concrete for turbine foundations and substation construction. However, aggregates will only be sourced from quarries with the necessary consents, and therefore the effects of this extraction have already been fully

assessed. As a result, it is assessed that significant effects on the environment are unlikely to occur as a result of the Proposed Development, either individually or in combination with other existing, permitted or Proposed Developments.

14.4.4.3 Operational Phase

The operational phase of the Proposed Development will not result in any likely effect on existing utility infrastructure or renewable or non-renewable resources.

It may be necessary to occasionally import aggregates to the site during operations to maintain access for service vehicles; however, materials will again be sourced from authorised quarries with the necessary consents and no likely significant effects will occur.

The Proposed Development will have no likely operational phase effects on existing renewable resources. It is assessed that the Proposed Development will have a likely overall positive effect in terms of carbon reduction and climate change (see Chapter 10). It is assessed, therefore, that significant effects on the environment are unlikely to occur in respect of resources and utility infrastructure during the operational phase as a result of the Proposed Development, either individually or in combination with other existing, permitted or Proposed Developments.

14.4.4.4 Decommissioning Phase

No likely significant effects are assessed as likely to occur during the decommissioning phase in respect of resources and utility infrastructure.

14.4.4.5 Grid Connection

The construction and operation of the proposed Grid Connection is likely to result in an improvement and strengthening of the electricity/utility network in the wider region of the Proposed Development. The Proposed Development will significantly increase the volume of renewable electricity generated in Co. Roscommon, by approximately 100%, without resulting in any likely adverse effects on renewable or non-renewable resources.

14.4.4.6 Cumulative Effects

The Proposed Development is not assessed as likely to result in any cumulative effects on resources or utility infrastructure, either individually or in combination with other existing, permitted or Proposed Developments.

14.4.5 Mitigation & Monitoring Measures

14.4.5.1 Construction Phase

No specific mitigation measures are proposed or required during the construction phase. Prior to the commencement of the construction of grid connection infrastructure, a detailed survey of the route will be undertaken to ensure that no additional underground utility infrastructure has been installed. Following the completion of this survey, the appointed contractor will engage with all providers of services found to be located along the route (including broadband, water services etc.) and will engage with same regarding appropriate construction methodologies and measures to be implemented at the interface between the Grid Connection infrastructure and the respective services.

14.4.5.2 Operational Phase

No specific mitigation measures are proposed or required during the operational phase.

During the operational phase, should a utility/service provider seek to install infrastructure through the proposed Wind Farm site or along the proposed Grid Connection route, they will be obliged to consult with the Applicant (or project owner) to ensure that no health and safety or operational requirements are adversely affected by their proposal.

14.4.5.3 Decommissioning Phase

No specific mitigation measures are proposed or required during the decommissioning phase.

14.4.5.4 Residual Effects

No likely significant residual effects are assessed as likely to occur.

14.4.6 Summary

This assessment concludes that the Proposed Development, is unlikely to result in any significant adverse effect on renewable and non-renewable resources or on utilities infrastructure. The operation of the Proposed Development will bring about a benefit in terms of electricity generated from renewable sources and a strengthening of national electricity grid infrastructure in the wider region of the Proposed Development site. This assessment similarly concludes that the Proposed Development is unlikely to result in any significant adverse cumulative effects in combination with existing, permitted or Proposed Developments.