

Mid Moile Wind Farm

Environmental Statement Chapter 11: Traffic and Transportation

December 2021

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11 INTRODUCTION

Introduction

- 11.1 This chapter assesses the likely effects of the Proposed Development on the existing transport network and on sensitive receptors as a result of the construction, operation and decommissioning phases of the Proposed Development. The key objectives of the chapter are to:
- Describe the assessment methodology and significance criteria used in completing the assessment;
 - Describe the current traffic and transport conditions;
 - Identify and assess the likely environmental effects associated with increased traffic;
 - Identify and describe the mitigation measures proposed to address any significant effects; and
 - Assess any residual effects post mitigation implementation.
- 11.2 This chapter is supported by the following figures and appendices, which are referenced in this chapter:
- Figure 11.1: Study Area
 - Figure 11.2: Traffic Counter Locations
 - Figure 11.3: Abnormal Loads Route
- 11.3 This chapter has been prepared by SYSTRA Ltd (SYSTRA), who have extensive experience in the preparation of Traffic and Transport EIA Report Chapters. SYSTRA's EIA team has produced Traffic and Transport EIA Report Chapters and Abnormal Loads Assessment reports for numerous wind farm developments across Scotland and for several developments within South Ayrshire and Dumfries and Galloway. This chapter has been reviewed by Alan DeVenny *BEng, PhD, CEng, MICE*, a Projects Director of SYSTRA. Alan has 22 years' experience working in traffic and transport consultancy and over 12 years' experience of working on wind farm projects. Alan has advised on over 130 energy developments delivering EIA chapters, access assessments, infrastructure design and traffic management plans.

Legislation and Policy Context

- 11.4 This chapter has been prepared taking cognisance of the following policy documents, data sources and guidelines. These have been used to inform this assessment:
- Planning Advice Notice (PAN) 75 – 'Planning for Transport';
 - The Scottish Government – 'Scottish Planning Policy' (SPP) (2014);
 - The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations (2017) (EIA Regulations)

- The Department for Transport (DfT) - ‘Design Manual for Roads and Bridges’ (DMRB) (2013).
- The Institute of Highways and Transportation (IHT) - “Guidelines for Traffic Impact Assessment” (1998);
- The Institute of Environmental Management and Assessment (IEMA) - “Guidelines for the Environmental Assessment of Road Traffic” (“the IEMA Guidelines”) (1993); and

Stakeholder Consultation

11.5 Consultation has been undertaken with Dumfries and Galloway Council and Transport Scotland. The consultation responses are summarised in Table 11.1 below.

Table 11.1: Consultation Responses

Consultee	Issue Raised / Comment	Response / Action Taken
Dumfries and Galloway Council	No comments received on transport matters	
Transport Scotland (30/08/21)	1. A full Abnormal Loads Assessment report should be provided 2. Details of the proposed site access junction onto the A77 to be provided. 2. Assessment should be based on the IEMA Guidelines 4. Methods adopted to assess likely traffic and transportation impacts should comprise: a) Determination of baseline traffic conditions b) Predicted construction and operational requirements c) Assessment of significance of predicated impacts	1. The Abnormal Loads route is discussed within this chapter. 2. Preliminary design plans for the proposed Site access junction are included with the application. 3. This assessment is based on the IEMA Guidelines 4. Noted, these methods have been applied in this assessment.

Assessment Methodology and Significance Criteria

Scope of Assessment

- 11.6 The assessment is made with reference to the Proposed Development, as described in Chapter 3: Project Description and Construction Methods.
- 11.7 The most identifiable traffic and transport characteristic associated with wind farm developments is the need to transport the wind turbine components to the Site. Turbine components would be delivered to an appropriate Port of Entry (PoE) and then transported as abnormal loads, given their size and weight, from the selected Port of Entry (PoE) via the public road network.

- 11.8 Initial assessment has identified the likely PoE for the turbines would be the port at Cairnryan to the south of the site, from where the abnormal load vehicles would navigate onto the A77 trunk road and head north to the Site access point. Abnormal loads may require a police escort and would likely restrict traffic along the route for a short duration of time. An Abnormal Loads Assessment (ALA) report will be prepared post-planning consent which contains further details of the proposed route and mitigation measures required to facilitate the movement of abnormal loads between the PoE and the Site access point from the A77.
- 11.9 There is also a need to transport general construction materials (concrete, aggregates, pipes, cabling, etc.) to the Site in standard Heavy Goods Vehicles (HGVs). The characteristic of this form of traffic is a temporary intensification of HGV traffic on the road network. This intensification varies depending on the scale of the development, the construction stage and operational requirements. A small amount of traffic would also be generated by construction workers commuting to / from the Site during the construction and operational stages.
- 11.10 The potential for a cumulative assessment in respect of the traffic and transport effects has been considered for other developments within the surrounding area that would potentially utilise the same road network as the Proposed Development during the construction period.
- 11.11 It is recognised that the construction period represents the greatest intensification in traffic although it is important to note that this intensification is temporary in nature. The parameters and assumptions used to inform this chapter have been designed to represent a robust and worst-case scenario, where practical.

Potential Effects Scoped Out

- 11.12 Potential effects associated with traffic during the operational and decommissioning stages and potential effects on the access tracks during the construction stages have been scoped out of this assessment through the scoping exercise with the relevant stakeholders. The Scoping Report is included in Vol III Appendix 1.1 of this EIAR.
- 11.13 The effect of construction related vehicles on the road network, in respect of traffic flows, both in isolation and cumulatively, is considered unlikely to be significant in terms of peak hour congestion. Therefore, full detailed junction capacity assessments have not been undertaken.

Assessment of Effects

- 11.14 The assessment of effects is based on the Proposed Development description as outlined in Chapter 3: Project Description and Construction Methods.

- 11.15 This assessment is structured around the consideration of potential environmental effects relating to traffic and transport, as identified by the IEMA Guidelines and including the following:
- Noise;
 - Severance;
 - Driver delay;
 - Pedestrian delay;
 - Pedestrian amenity;
 - Accidents and safety;
 - Hazardous loads (e.g. nuclear products); and
 - Dust and dirt.
- 11.16 The environmental effects associated with visual impact and noise are addressed in Chapter 6: Landscape and Visual and Chapter 10: Noise respectively. There are no hazardous loads associated with the Proposed Development.
- 11.17 Guidance for the assessment of the environmental effects of traffic is provided in the IEMA document, "*Guidelines for the Environmental Assessment of Road Traffic*". The document is the only guidance document currently available that sets out a specific methodology for assessing potentially significant environmental impacts where a Proposed Development is likely to give rise to changes in traffic flows.
- 11.18 The guidance suggests that in order to determine the scale and extent of the assessment and the level of impact the Proposed Development would have on the surrounding road network, the following two 'rules' should be followed:
- Rule 1 – Include highway links where flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles (HGVs) is predicted to increase by more than 30%); and
 - Rule 2 – Include any other specifically sensitive area where traffic flows are predicted to increase by 10% or more.
- 11.19 Rules 1 and 2 are used as a screening tool to determine whether or not a full assessment of effects on routes within the study area is required as a result of intensification of road traffic. Therefore, it should be noted that an increase in total traffic or HGV levels of more than 30% (or 10% depending on the sensitivity of the area) does not necessarily equate to a significant effect. The process for determining significance where Rules 1 or 2 are triggered is undertaken on a site-specific basis. The assessment methodology is described in detail within paragraphs 11.28 – 11.35. Areas / receptors which have been identified as sensitive are outlined in paragraph 11.45 – 11.48.

- 11.20 Paragraph 2.5 of the IEMA Guidelines identifies groups, locations and special interests which may be sensitive to changes in traffic conditions. These are:
- People at home;
 - People in work places;
 - Sensitive groups including children, elderly and disabled;
 - Sensitive locations, e.g. hospitals, churches, schools, historic buildings;
 - People walking or cycling;
 - Open spaces, recreational sites, shopping areas; and
 - Sites of ecological / nature conservation value tourist attractions.
- 11.21 The significance of each impact is considered against the criteria within the guidelines. However, the guidelines state that:
- “For many effects, there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources.”*
- 11.22 The significance falls into two categories; **significant** and **not significant**. The latter corresponds to significant effects in accordance with the EIA Regulations.

Study Area

- 11.23 The study area for the assessment of traffic and transport is illustrated in Vol II Figure 11.1 and has been identified using the assessment thresholds within the IEMA Guidelines as an aide.
- 11.24 The study area has been predicated on the access point for the Proposed Development and the proposed routes to the access point from the wider external road network. To determine appropriate access routes to the Site, detailed consideration and assessment of the surrounding road network has been undertaken and the location of nearby sensitive receptors has been taken into account. Notwithstanding this, the route taken by construction vehicles would largely depend on where the construction materials are sourced. A comprehensive desk-based study was undertaken to fully understand the surrounding road network.
- 11.25 The results of the desk-based study have established that the most appropriate routes for general construction HGV traffic to reach the Site access point is from the A77 from either the north or south depending on the point of origin of materials. It is also likely that a proportion of construction traffic would travel to and from the east via the A75 trunk road which connects to the A77 to the south of the site via the A751 connecting road. The study area is therefore identified as:
- The A77 between the A751 and the site.
 - The A77 to the north of the site
 - A751 between the A77 and A75

- A75 east of the A751

11.26 It is considered highly unlikely that there would be any significant effects on the road network outside of the study area identified above as traffic would be diluted across the road network beyond these points. Receptors within the study area that are considered as sensitive are indicated in paragraphs 11.45 – 11.48.

Desk Based Research and Data Sources

11.27 The traffic and transport study area characteristics have been determined by a desk-based assessment and traffic count data provided by Transport Scotland for the A77, A751 and A75 routes. The source of the traffic count information, at each of the road links identified in the study area, is set out below and is illustrated by Figure 11.2:

- 1) Transport Scotland counter located on A77 just south of Ballantrae (Site ID ATC08527)
- 2) Transport Scotland counter located on the A77 at Cairnryan (Site ID ATC00383) represents baseline flows for the A77 south of the proposed Site access junction.
- 3) Transport Scotland counter located on the A751 just east of the A77 junction (Site ID JTC00116) represents baseline flows for the A751 link between the A77 and the A75.
- 4) Transport Scotland counter located on A75 just to the east of the junction with the A751 (Site ID JTC00118).

Assessment of Significance

11.28 The following paragraphs set out the methodology used to assess the significance of effects at locations along the routes within the study area where total traffic levels or the level of HGV traffic exceeds the screening thresholds set out by IEMA Rules 1 or 2 (depending on the sensitivity of the receptor) described in paragraph 11.18.

Sensitivity

11.29 The sensitivity to change in traffic levels of any given road segment and the receptors located along that road segment are generally assessed by considering the residual capacity of the network under existing conditions. Where there is a high degree of residual capacity, the network may readily accept and absorb an increase in traffic and therefore the sensitivity may be said to be low. Conversely, where the existing traffic levels are high compared to the road capacity, there is little spare capacity, and the sensitivity to any change in traffic levels will be considered to be high.

11.30 Consideration has been given to the composition of the traffic on the road network, under both existing and proposed conditions. For example, light goods vehicles (LGVs) have less effect on traffic and the road system than HGVs. Similarly, HGVs can have less effect than abnormal load vehicles, depending on the frequency of the abnormal loads.

11.31 The criteria that have been used to make judgements on the sensitivity of the receptor(s) and the magnitude of change are presented in Table 11.2.

Table 11.2: Receptor Sensitivity

Sensitivity	Description
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance. Local residents whose daily activities depend upon unrestricted movement within their environment. Receptors such as schools, colleges, hospitals and accident hotspots.
Moderate	The receptor/resource has moderate capacity to absorb change without significantly altering its present character or is of high importance.
Low	The receptor/resource is tolerant of change without detriment to its character, is of low or local importance. Areas such as trunk road or A class roads constructed to accommodate significant HGV volumes.

Magnitude

- 11.32 The magnitude of traffic effects is a function of the existing traffic volumes, the percentage increase and change due to a development, changes in the type of traffic and the temporal distribution of traffic (day of week, time of day). The determination of magnitude has been undertaken by reviewing the Proposed Development, establishing the parameters of the receptors that may be affected and quantifying these effects utilising IEMA Guidelines and professional judgement.
- 11.33 The criteria that have been used to make judgement on the magnitude of the effect on the receptor(s) is presented in Table 11.3.

Table 11.3: Magnitude of Change

Magnitude	Description
Major	Total loss of or major/substantial alteration to key elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes would be fundamentally changed. Generally, a rule of >90% (or >70% at sensitive receptors) change in traffic is considered to be a major magnitude
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of the baseline would be materially changed. Generally, a rule of 60% - 90% (or 40% - 70% at sensitive receptors) change in traffic is considered to be a moderate magnitude.
Minor	A minor shift away from baseline conditions. Change arising from the loss / alteration would be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition would be similar to the pre-development circumstances/situation. Generally, a rule of 30 – 60% (or 10% - 40% at sensitive receptors) change in traffic is considered to be a small magnitude.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation. Generally, a rule of <30% (or <10% at sensitive receptors) change in traffic is considered to be a negligible magnitude.

Significance

- 11.34 As a guide to inform the assessment, but not as a substitute for professional judgement, a criteria matrix for determining the significance of traffic related effects is set out in Table 11.4. This is based on combining the magnitude of the effect with the receptor sensitivity.

Table 11.4: Significance Criteria Matrix

	Magnitude of Change				
		Major	Moderate	Minor	Negligible
Sensitivity	High	Major	Major/ Moderate	Moderate	Moderate/ Minor
	Moderate	Major/ Moderate	Moderate	Moderate/ Minor	Minor
	Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible

- 11.35 Significance is categorised as major, moderate, minor or negligible. Effects judged to be of major or moderate significance are considered to be **Significant** in accordance with the EIA Regulations. Effects judged to be of minor, slight or negligible significance are considered **Not Significant**.

Baseline Conditions

- 11.36 The following paragraphs detail the baseline conditions of the road links identified as being within the study area.

A77

- 11.37 The A77 forms part of the strategic trunk road network running between Glasgow in the north to Stranraer in the south. The road is a dual carriageway between Glasgow and Ayr before stepping down to a single carriageway between Ayr and Stranraer. The A77 is very well-used by HGVs for the transportation of materials and goods to and from the ferry terminals at Cairnryan which are located north and south of the proposed site access point for the Proposed Development.
- 11.38 In the context of the Proposed Development, the A77 forms the primary route within the study area and will provide access to the Site via an upgraded junction. Construction traffic would approach the Site from both directions along the A77, depending on the origin of materials and staff. Abnormal load vehicles would approach the Site from the south assuming that the turbine components are delivered to Cairnryan Port just to the south of the Site access point on the A77.

- 11.39 There are a number of settlements that either sit within the A77 corridor or take access from the A77. The main settlements within the study area are the village of Cairnryan, the village of Ballantrae to the north and Stranraer to the south. For most of its length, the A77 is subject to the National Speed Limit (60mph at single carriageway sections and 70mph on dual carriageway sections) and is rural in nature in the locality of the Proposed Development. The speed limit reduces through settlements to either 30mph or 40mph and a 30mph speed limit is in place at the location of the proposed Site access junction.

A751

- 11.40 The A751 is a single carriageway road running in a north-south direction to the east of Stranraer. The road connects the A77 and A75 trunk roads and acts as a more direct route for vehicles seeking to connect to either trunk road rather than coming into Stranraer. The road is subject to a 60ph speed limit and there are no settlements lying within the road corridor or accessed from the road.

A75

- 11.41 The A75 is part of the strategic road network running from Stranraer in the west to the M6 motorway in the east (east of Dumfries). The road is generally made up of some single carriageway sections with just a few dual carriageway sections. Some 3-lane overtaking sections are also present through the single carriageway sections in recognition of the large percentage of HGV traffic that the road carries to and from the west coast seaports. The road is subject to national speed limits and the speed limits reduce through settlements.

Baseline Traffic Flows

- 11.42 Table 11.5 indicates the two-way Average Annual Daily Traffic Flows (AADF) for the routes within the study area and the percentage of traffic which is classified as HGVs. The source of the data is described in paragraph 11.27. The table below also indicates the carrying capacity of each road link as per the guidance contained within the DMRB. The National Road Traffic Forecast (NRTF) 'low growth' rate has been applied to the baseline data where necessary to bring it up to a 2023 assessment year.

Table 11.5: Study Area Baseline and Projected Traffic Flows

Counter Location	DMRB Road Category	DMRB Capacity (two-way per 12hrs)	Baseline AADF	Baseline HGV	2023 Projected AADF	2023 Projected HGV	% HGV
1. A77 North	Rural – typical single 7.3m	28,800	3,535 (2019)	947	3,573	957	26.8%
2. A77 South	Rural – typical single 7.3m	28,800	4,810	1,486	4,862	1,502	30.9%
3. A751	Rural – typical single 7.3m	28,800	1,955	1,061	1,976	1,072	54.3%
4. A75	Rural – typical single 7.3m	28,800	6,482	1,296	6,552	1,310	20.0%

Road Safety

11.43 The *CrashMap* (www.crashmap.co.uk) website has been utilised to determine the number of accidents that have occurred in the previous five years (2016 – 2020) within the identified study area. The results of this investigation are indicated by Table 11.6 with additional commentary provided on serious and fatal accidents where applicable.

Table 11.6: Accident Statistics

Counter Location	Slight	Serious	Fatal	Comment
1. A77 North (Between Site Access Point and Ballantrae)	6	9	2	<p>A fatal accident occurred in 2016 at a junction between the A77 and an unclassified road approximately 2.6km south of Auchencrosh. The accident was in a rural location and involved two vehicles.</p> <p>A second fatality occurred at a bend on the A77 south-east of Ballantrae in 2018. The accident involved two vehicles.</p> <p>A total of 9 serious accidents have occurred along the 16.5km stretch of road between the Site access and Ballantrae. Eight of the accidents were in the vicinity of Ballantrae, Smyrton and Auchencrosh with just one accident close to the site access just north of Cairnryan.</p>
2. A77 South (Between Site Access and A751)	4	1	-	<p>One serious accident occurred on this stretch of the A77 in 2020 just to the south of Cairnryan. The accident involved a single vehicle.</p>
3. A751	3	1	-	<p>One serious accident has occurred on the A751 at the junction with the A75 in 2018. The accident involved 3 vehicles.</p>
4. A75 (between A751 and Barlae)	6	2	-	<p>A serious accident occurred approximately 500m east of the A751 junction at a junction between the A75 and an unclassified road in 2016. The accident involved two vehicles.</p> <p>A second serious accident occurred on the A75 to the west of Dunragit in 2019. The accident occurred on a relatively straight section of road and involved a single vehicle.</p> <p>A further serious accident occurred at the junction of the A75 and an unclassified road at Dunragit. The accident involved two vehicles.</p>

11.44 Table 11.6 indicates that a total of 19 slight, 13 serious, and 2 fatal accidents have occurred within the study area over the previous five-year period. There are no particular issues local to the proposed Site access point nor on the A77 south of the Site access point, the A751 or A75 east of Stranraer. The statistics for the A77 north of the site indicate that there are some accident clusters at Ballantrae and to the south of Ballantrae.

Sensitive Receptors

11.45 Taking into account the IEMA Guidelines for sensitive receptors, it is considered that the A77 to the south of the Site access point within the village of Cairnryan would be classed as a sensitive receptor due to the fact that there would be pedestrians present and local services/amenities with direct frontage onto the road required for use by the Proposed Development.

- 11.46 To the north, the small hamlet of Smyrton and the village of Ballantrae will be treated as sensitive receptors as the A77 passes through these areas where direct access is taken from the A77 and pedestrian activity is present.
- 11.47 No sensitive receptors have been identified on the A751 route or on the A75 within the study area.
- 11.48 Sensitive receptors are subject to Rule 1 whereby a full assessment of effect is undertaken if HGV levels increases by 30% or more, and Rule 2 whereby a full assessment of effects is undertaken if total traffic levels increase by 10% or more. The predicted increase in traffic levels within the study area during the worst-case traffic generating month of the Proposed Development is indicated by Table 11.10.

The 'Do Nothing' Scenario

- 11.49 If the Proposed Development was not implemented then it is likely that there would be no significant changes to the traffic and transport situation in the vicinity of the Proposed Development, other than changes to background traffic as a result of general traffic growth and any nearby committed developments.

Identification and the Evaluation of Key Impacts

Construction Programme

- 11.50 The construction traffic associated with the Proposed Development would comprise of construction workers, HGVs / LGVs carrying construction materials & plant and abnormal load vehicles carrying the main wind turbine components.
- 11.51 Estimates of traffic generation associated with the construction phase of the Proposed Development have been calculated from first principles along with consideration of the following activities:
- Upgrading of site access point onto the A77;
 - Installation of construction compound / storage area for site office facilities and storage of materials and components;
 - The excavation of the borrow pits and extraction of aggregate for new tracks and hardstandings;
 - The felling of existing areas of forestry to make way for ground infrastructure, with suitable buffers to allow normal operation of the wind farm;
 - Construction of new permanent site tracks and the upgrading of existing sections;
 - Installation of hardstandings and outrigger pads for the support of the cranes that would be used for the erection of the turbines;
 - Construction of foundations for the support of the turbine structures;
 - Wind turbine delivery and erection;
 - Installation of transformers in separate housings alongside each wind turbine (if required);

- Installation of on-site High Voltage (HV) cabling, communication cabling and earthing underground adjacent to access tracks;
 - Construction of substation;
 - Commissioning of Site mechanical and electrical equipment; and
 - Reinstatement, landscaping, removal of temporary site offices, reseeding verges, borrow pit and areas around turbine bases.
- 11.52 The works would mainly follow the order detailed above, but many would be carried out concurrently to reduce the overall length of the construction programme. There would be construction phasing, with civil engineering works progressing in some areas whilst turbines are being erected elsewhere. In order to minimise disruption to land use, site restoration would be undertaken as early as possible in development areas.
- 11.53 At this stage, it is proposed that construction activities on site shall only take place between the hours of 07:00 to 18:00 on Monday to Friday inclusive and 07:00 to 13:00 hours on a Saturday, with no construction works on Sundays or Bank Holidays, unless otherwise agreed with the approving authorities. Outside of these hours, there may be a requirement to take advantage of low wind speeds for the erection of turbines. In addition, turbine erection works cannot suddenly cease – in the event of a delay or complication it may be necessary to continue works beyond normal hours until they can end safely. Other activities that may take place outside these hours are limited to emergency works and dust suppression, unless otherwise agreed in writing by the approving authorities.
- 11.54 There is expected to be between 30 to 40 personnel working on-site at any one time. It is important to note that the number of personnel on-site would vary during the construction process. It is expected that staff would travel to the Site by private car or works minibus.
- 11.55 In order to calculate a robust scenario, information was gathered regarding the materials required and the size of average loads associated with the construction vehicles. Table 11.7 includes an estimate of construction vehicle numbers required for each task during the construction period (excluding staff vehicles).

Table 11.7: Estimated No. of HGV Trips during Construction

Construction Task	Vehicle Type	Approximate No. of Loads
Site Establishment	Low Loader and Dump Truck	120
General site deliveries	Low Loader and Dump Truck	280
Imported stone (access roads, crane hardstanding areas, other hardstanding areas)	Dump Truck	2,518
Reinforcement	Low Loader	34
Foundations (off-site batched concrete)	Concrete Wagon	1,560
Cabling deliveries and sand	Low Loader	512
Geotextile separators	Low Loader	180
Delivery of HV electrical items	Dump Truck	36
Construction of Sub-station	Various	180
Cranes and related lifting equipment	Crane Vehicle	45
Erection of turbines	Abnormal Loads	120
Site reinstatement and restoration	Various	75
Total (one-way trips)		5,660
Total (two-way trips)		11,320

**assumes 100% stone requirements are imported to the Site*

- 11.56 It is the Applicant's intention to win the majority of stone from on-site borrow pits, however, for the purposes of providing a robust assessment it has been assumed that 100% of stone would be imported.
- 11.57 The construction of the Proposed Development would take approximately 12 months. Forestry removal is expected to begin 6 months prior to the other Site establishment works commencing.
- 11.58 Using the indicative construction programme, the number of HGV deliveries anticipated at the Site per month of the construction period has been calculated as illustrated in Table 11.8.

Table 11.8: Estimated No. of HGV Trips per Month

Task	Month												Totals
	1	2	3	4	5	6	7	8	9	10	11	12	
Site Access, Site Tracks, Hard Standings etc	574	574	574	304	246	246							2,518
Geotextiles	32	32	32	32	32	20							180
Foundations				390	390	390	390						1,560
Foundation Reinforcement Deliveries				9	9	9	7						34
Cabling and Sand							170	256	86				512
Abnormal Loads								40	40	40			120
Cranes and Lifting Equipment							12	11		11	11		45
Site Establishment	60	60											120
Sub-station Construction						20	20	40	40	40	20		180
HV Electrical Items								12	12	12			36
General Site Deliveries (Plant, fuel etc)	30	30	20	20	20	20	20	20	20	20	30	30	280
Site Restoration										15	30	30	75
Total (One-way trips)	696	696	626	755	697	705	619	379	198	138	91	60	5660
Total (Two-way trips)	1392	1392	1252	1510	1394	1410	1238	758	396	276	182	120	11,320

*assumes 100% stone requirements are imported to the Site

- 11.59 The construction site may be operational 11 hours every weekday (07:00 – 18:00) and 6 hours on a Saturday (08:00 – 14:00), therefore, vehicles could be arriving or leaving at any time during this working week of 5.5 days. Construction vehicles would be arriving and departing the Site at regular intervals during expected site working hours.
- 11.60 Table 11.8 indicates that the Month 4 has the highest number of trips which are primarily associated with the importation of stone to construct the site access track network and concrete deliveries for the turbine foundations. The last three months are relatively light in terms of HGV trips when compared with the stone / concrete importation periods.
- 11.61 The worst-case month in terms of the increase in traffic levels therefore occurs in Month 4 of the construction period with 1,510 two-way HGV movements. Assuming 4 weeks per month, this equates to 378 two-way movements per week (approximately 189 inbound and 189 outbound). Month 4 is used to assess the traffic impact and associated environmental effects of the Proposed Development on the study area to represent a robust and worst-case scenario for the assessment.
- 11.62 The daily vehicle trip generation for Month 4 is estimated to be 69 two-way HGV trips assuming 5.5 working days per week. This equates to approximately 6 two-way HGV trips per hour over the course of an 11-hour working day. It is important to note that this represents a minimal number of trips over a temporary period, however the significance of the traffic impact is assessed in the following section in accordance with relevant regulations and guidance.

Abnormal Load Movements

- 11.63 Table 11.8 indicates that the turbine components would be transported over three months of the 12 month construction period. It is noted that no abnormal load movements occur during the peak traffic generating month (Month 4). Assuming 40 abnormal load vehicle trips during the worst-case month for abnormal load movements (Month 8, 9 and 10), this equates to approximately 10 movements per week (which can occur 7 days a week). The movement of abnormal loads may be spread out evenly across the associated months, or concentrated over 2 – 3 days, therefore meaning that there would be no movements on the remaining days of the week. Nevertheless, abnormal load vehicles are restricted in the hours that they can operate. Considering these restrictions, a maximum of four abnormal loads would be transported on any given day, equating to one per hour.
- 11.64 It is also noted that abnormal load vehicles would retract to the size of an HGV for their return journey once the loads had been delivered to the destination, therefore there would effectively be only 10 one-way abnormal load arrivals and then 10 one-way HGV departures per week. The schedule of abnormal load movements would be dependent on the availability and approval of the police escort.
- 11.65 Given this low number of vehicles and the short duration for which abnormal load vehicles would be on the local road network, this number of abnormal load vehicles would not give rise to any significant environmental effects within the study area. As a result, no further assessment of the effect of abnormal load vehicles has been undertaken.

Staff Movements

11.66 In addition to the construction vehicles illustrated in Table 11.7, it is anticipated that there would be 60 – 80 two-way daily private car trips to the Proposed Development associated with construction staff. This equates to a maximum of 40 arrivals and 40 departures at the start and end of the working day, assuming that no car sharing would occur among staff. This represents a small volume of traffic on an existing road network which does not suffer from any significant congestion within the study area. Notwithstanding this, the potential impact of this level of trip generation has been considered in the assessment.

Construction Effects

Construction Traffic Distribution

11.67 To assess the impact of construction traffic it is necessary to determine the distribution of trips generated. As previously discussed, abnormal load vehicles would approach the Site from the south along the A77 as the turbine components are expected to be delivered to the P&O Port just to the south of the proposed Site access point.

11.68 The majority of general construction traffic will originate from either the north via the A77 or from the south and east via the A77, A751 and A75 routes. There are numerous possibilities for material sources and residential areas to draw staff from. Based on these assumptions, the distribution of traffic adopted in the assessment across each counter location is indicated by Table 11.9 below. For the purposes of a robust assessment, 90% of traffic has been assigned to each road link within the study area. Clearly, this overall distribution could not occur in reality but it allows for a worst-case assessment to be undertaken for each road link within the study area.

Table 11.9 Construction Traffic Distribution

	1. A77 North	2. A77 South	3. A751	4. A75
% Distribution of HGVs	100%	100%	100%	100%
% Distribution of staff	100%	100%	100%	100%
No. of HGV movements	69	69	69	69
No. of staff movements (private car)	80	80	80	80
Total no. of daily movements	149	149	149	149

Construction Traffic Impact

11.69 Table 11.10 details maximum daily percentage increases associated with the construction of the Proposed Development at traffic counter locations within the study area based upon the distribution demonstrated in Table 11.9.

Table 11.10 Construction Traffic Impacts on Routes within Study Area

	1. A77 North	2. A77 South	A751	A75
2021 AADF	3,573	4,862	1,976	6,552
2021 HGV count	957	1,502	1,072	1,310
Month 4 (worst-case) daily HGV traffic flow (two-way)	69	69	69	69
Month 4 (worst-case) staff vehicle traffic flow (two-way)	80	80	80	80
Month 4 total traffic (HGVs + staff vehicles)	3,722	5,011	2,125	6,701
Existing HGV count + Month 1 HGV traffic	1,026	1,571	1,141	1,379
Percentage increase in total traffic due to the Proposed Development	4.2%	3.1%	7.5%	2.3%
Percentage increase in HGV traffic due to the Proposed Development	7.2%	4.6%	6.4%	5.3%

- 11.70 As paragraph 11.18 details, IEMA Rules 1 and 2 are used as thresholds to determine the requirement for a full assessment of effects in relation to an increase in traffic flows associated with the construction of the Proposed Development. Given the proximity to the sensitive receptors of Cairnryan, Ballantrae and Smyrton, the A77 counters are subject to Rule 2 whereby an increase in total traffic of 10% (or greater) or an increase in HGVs of 30% (or greater) triggers the requirement for a full assessment into the likely significant environmental effects. The other counters are subject to Rule 1.
- 11.71 Table 11.10 indicates that the Proposed Development construction traffic (HGV and staff movements) would increase total traffic flows by a negligible amount (<10%) along the A77 to the north and south of the proposed Site access point during the worst-case month of the construction phase.
- 11.72 Table 11.10 indicates that the level of HGV traffic would increase by a maximum of 7.2% along the A77 to the north of the Site access point and 4.6% to the south. It is noted that the maximum increase in total traffic levels is less than the total traffic and HGV traffic thresholds set out by IEMA Rule 2. As such, a full assessment of effects is not required in accordance with the IEMA Guidelines as the magnitude of the traffic impact is negligible at the A77 counter locations. In accordance with Table 11.4, a negligible magnitude combined with a high sensitivity equates to an effect which is classed as moderate/ minor and therefore not significant in accordance with the EIA Regulations.
- 11.73 For the A751 link, the maximum increase in total traffic levels is 7.5% whilst the maximum increase in HGV levels is 6.4%. For the A75 east of Stranraer and east of the A751, the maximum increase in total traffic levels would be 2.3% and the maximum increase in HGV levels would be 5.3%. As the percentage increases do not exceed the 30% thresholds set out within IEMA Rule 1, a full assessment of effects is not required in accordance with the IEMA Guidelines as the magnitude of the traffic impact is negligible at both counter locations. In accordance with Table 11.4, a negligible magnitude combined with a low sensitivity equates to an effect which is classed as minor / negligible and therefore not significant in accordance with the EIA Regulations.

Cumulative Effects and Interaction of Effects

Cumulative Effects

11.74 Cumulative effects have been considered for other wind farm developments in the vicinity of the Proposed Development. These developments have planning consent but are yet to be constructed or are awaiting decision and could utilise the same route for general construction traffic. The potential for cumulative effects has been assessed by reviewing data available from the Traffic and Transport Chapters within the respective EIA Reports/Environmental Statements for the relevant developments.

11.75 Whilst the wind farm developments identified may share a similar route for abnormal load vehicles, abnormal load deliveries would not be permitted to occur at the same time so there is no scope for a cumulative effect of abnormal load movements.

Kirkhill Windfarm

11.76 Kirkhill Windfarm is a consented scheme by ESB located to the South-east of Kirkoswald which lies to the north of the Proposed Development. The Kirkhill development would be accessed from the A77 and then via the local road network. The scheme is of modest scale at 8 turbines.

Gass Windfarm

11.77 Gass Windfarm is a consented scheme for 9 turbines which lies to the north-west of Kirkcowan. Strategic access to the development would be from the A75 with the majority of the traffic coming to / from the east. It is therefore considered that the consented development would have a negligible impact on the road links within the study area for the Proposed Development.

Larbrax Windfarm

11.78 Larbrax Windfarm is a scheme of 8 turbines at Leswalt which lies to the west of Stranraer close to the coast. It was granted on appeal in 2016 but has not yet been constructed. The development would be accessed from the local road network but strategic access would be achieved from both the A75 and A77 trunk roads.

Chirmorie Windfarm

11.79 Chirmorie Windfarm is a consented scheme for 21 turbines located to the east of the Proposed Development. The development would be accessed from the A77 at Innermessan. The EIA Report chapter for the windfarm, indicates that it will have a 3.64% increase in HGVs on the A77 near the U90W route and an overall traffic impact of 1.07%. The impact on the A751 is estimated as 4.63% in terms of HGV increase and 2.12% increase in total traffic. The impact is further diluted on the A75, where the percentage increase in HGVs is estimated as 0% for HGVs and 1.07% for total traffic. The study concluded that the Chirmorie development would not have a significant impact on the local and strategic road network. It is noted that no cumulative assessment was undertaken.

Stranoch 2 Windfarm

- 11.80 The Stranoch 2 windfarm would take access at a similar location to the Chirmorie Windfarm just north of Innermessan via a junction with the A77 trunk road. The Stranoch 2 windfarm is the most recent of the potential cumulative developments and contains a table that looks at the cumulative percentages associated with total traffic levels for the above developments including the Stranoch 2 development and including count points on the A77, A751 and A75.
- 11.81 The calculated percentage cumulative increases in total traffic (with Mid Moile Traffic Added) at the affected count points are indicated by Table 11.11 below.

Table 11.11 Cumulative Construction Traffic Impacts on Routes within Study Area

	Base Traffic	Mid Moile (All vehs)	Other Windfarms (All Vehs)	Mid Moile Plus Others	Percentage Increases
A77 North	3573	149	499	648	18.1%
A77 South	4862	149	256	405	8.3%
A751	1,976	149	172	321	16.2%
A75	6,552	149	394	543	8.3%

- 11.82 The above table indicates that the IEMA Rule 1 threshold (30% increase in total traffic levels) is not exceeded. The IEMA Rule 2 threshold (10% in total traffic levels at sensitive locations) is exceeded on the A77 to the north but this includes Kirkhill Windfarm traffic which would actually occur much further north than the count point location and on the A751 which is not considered to be a sensitive location. It is also important to recognise that the above table and percentage impacts are very much a worst case scenario and are based on the following assumptions:

- That the busiest months of each development occur at the same time – In reality, this is very unlikely and it is more realistic that the developments will progress at different times with some modest overlaps.
- That all of the traffic will use all of the route – In reality, some traffic will use part of a route depending on the original and distance from any of the sites considered, for example construction personnel movements.
- In the case of the Proposed Development, it has been assumed that 100% of traffic will use each of the routes when in reality the traffic will be shared between the available routes and therefore the impact would be reduced.

- 11.83 Taking the above into consideration, it can be concluded that the cumulative effects of the identified windfarm developments in the area will not have a detrimental effect on the roads within the study area. Notwithstanding this, mitigation is proposed in the form of a Construction Traffic Management Plan (described below) which would ensure that the construction activities associated with the Proposed Development are co-ordinated with other development projects in the area to prevent key traffic generating activities from coinciding.

Interaction of Effects

- 11.84 In addition to the effects considered within this chapter, there are also visual and noise effects which are inter-related to the traffic and transport impacts associated with the construction phase of the Proposed Development. These effects are assessed respectively within Chapter 6: Landscape and Visual Amenity and Chapter 10: Noise.

Mitigation Measures

- 11.85 The assessment does not predict any significant effects (without mitigation). As a result, no mitigation is required to address predicted environmental effects associated with traffic and transport in line with the EIA Regulations.
- 11.86 While not strictly necessary to address the environmental effects associated with the increase in traffic within the study area in terms of EIA Regulations, a Construction Traffic Management Plan (CTMP) is proposed as a “good practice” measure to support the Proposed Development.
- 11.87 The CTMP would identify measures to reduce the number of construction vehicles as well as considering reducing or avoiding the impact of vehicles through construction programming / routing and identification of an individual with responsibilities for managing traffic and transport impacts and effects.
- 11.88 The CTMP would specifically look at measures to maintain access to the Loch Ryan Coastal Path (Core Path Number 429) which crosses the proposed access track up to the windfarm, from the A77 via the U152W which also form part of the Path. The CTMP would include measures to maintain access and use of the U152W (which also forms part of the Coastal Path) at its junction with the A77. It is anticipated that the path can remain accessible throughout the duration of the construction works and the CTMP will look at the measures that will need to be put in place to formalise the crossing of the access track while maintaining the safety of pedestrians.
- 11.89 The existing access to the Proposed Development from the A77 will be upgraded to accommodate both general construction traffic and abnormal load movements. A preliminary design for the junction layout has been produced to support the Proposed Development along with visibility splay plans and swept path plans (Figure 3.1a). The proposal is to construct an access junction for general construction traffic along with an overrun area to the south of the junction which would be used for abnormal load movements only. This approach to the design will ensure that the junction is legible to motorists and highway safety is maintained at this location. Visibility splays that meet highway design standards can be achieved at this location.
- 11.90 The design will be further developed post consent and will be designed with pedestrians and cyclists in mind as well as the requirements of construction vehicles.

11.91 The CTMP would also identify measures to reduce and manage construction staff travel by private car, particularly single occupancy trips. The CTMP would be developed during the detailed design phase of the Proposed Development. Potential measures could include (but are not limited to):

- Immediately upon commencement, all deliveries, operatives and visitors to the Site would report to the security gate. This would be communicated to all early works contractors at their pre-start meeting.
- The main contractor would develop a logistics plan highlighting the access point for the project, loading bay, pedestrian / vehicular segregation, welfare, storage, security and material handling that would be enforced following full site establishment.
- Approved haul routes would be identified to the Site and protocols put in place to ensure that HGVs adhere to these routes.
- All contractors would be provided with a site induction pack containing information on delivery routes and any restrictions on routes.
- Temporary construction site signage would be erected along the identified construction traffic routes to warn people of construction activities and associated construction vehicles.
- A construction traffic speed limit (for example, 20mph) would be imposed through the village of Cairnryan.
- The construction material 'lay down' areas would allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours (i.e. before 06:00 and after 22:00).
- An integral part of the progress meetings held with all trade contractors is the delivery schedule pro-forma. All contractors would be required to give details of proposed timing of material deliveries to the Site. At this stage, they would be given a specific area for delivery.
- The CTMP and the control measures therein would be included within all trade contractor tender enquiries to ensure early understanding and acceptance / compliance with the rules that would be enforced on this project.
- Under no circumstances would HGVs be allowed to lay-up in surrounding roads. All personnel in the team would be in contact with each other and with Site management, who in turn would have mobile and telephone contact with the subcontractors.
- Roads would be maintained in a clean and safe condition.
- A wheel washing facility would be installed on-site during the construction period in order to reduce mud and debris being deposited onto the local road network.

Residual Effects

11.92 Given that a CTMP is proposed and that construction effects prior to this are of negligible or minor significance, it is considered that any residual effects associated with the construction phase would be negligible. As a result, the residual effects after implementation of a CTMP are classed as **Not Significant**.

Table 11.12: Table of Residual Effects

Predicted Effect	Pre-mitigation Significance	Mitigation	Significant of Residual Effect
Severance	Negligible – Not Significant	Not required - CTMP as good practice	Negligible-None – Not Significant
Driver Delay	Negligible – Not Significant	Not required – CTMP as good practice	Negligible-None – Not Significant
Pedestrian Delay and Amenity	Negligible – Not Significant	Not required – CTMP as good practice	Negligible-None – Not Significant
Accidents and Safety	Negligible – Not Significant	Not required – CTMP as good practice	Negligible-None – Not Significant
Dust and Dirt	Negligible – Not Significant	Not required – CTMP as good practice	Negligible-None – Not Significant

Summary

- 11.93 This assessment has considered the effects on the road network within the study area of traffic associated with the construction phase of the Proposed Development.
- 11.94 The construction programme associated with the Proposed Development is anticipated to cover a 12 month period. During this time 11,320 HGVs would access the Site, assuming a conservative approach whereby 100% of the stone requirement is imported to the Site while it is anticipated that a large proportion of stone would be won from on-site borrow pits.
- 11.95 This equates to 69 daily two-way HGV trips during the busiest construction month (Month 4). The movement of abnormal loads is not anticipated to exceed 10 one-way trips per week over the course of three months (with no overlap during the busiest construction month).
- 11.96 A robust assessment has been undertaken using the worst-case scenario for two-way construction traffic movements. The impact of construction traffic could increase total traffic flows along the road links within the study area by the following:
- 4.2% along the A77 to the north of the site access;
 - 3.1% along the A77 to the south of the site access
 - 7.5% along the A751 between the A77 and the A75
 - 2.3% along the A75 east of Stranraer and east of the A751 junction
- 11.97 The percentage increase in HGVs associated with the worst-case month of the construction programme for the Proposed Development could increase HGV levels by the following:
- 7.2% along the A77 to the north of the site access;
 - 4.6% along the A77 to the south of the site access

- 6.4% along the A751 between the A77 and the A75
- 5.3% along the A75 east of Stranraer and east of the A751 junction

11.98 It is important to note that these increased traffic levels are temporary in nature and represent the expected traffic generation during the busiest month of construction.

11.99 The significance of the predicted effects of the Proposed Development on the traffic and transport network during the construction phase has been discussed in this chapter and is summarised in Table 11.10.

11.100 With reference to Table 11.10, this chapter concludes that effects of increased traffic as a result of the Proposed Development are deemed to be **Not Significant** prior to any mitigation measures. This chapter concludes that the traffic levels anticipated during the busiest month of construction can be accommodated by the existing road network within the study area and further managed / minimised by the implementation of a Construction Traffic Management Plan.

References

Agilysis, 2018, *Crashmap*, Analysis, viewed 25 November 2021 www.crashmap.co.uk

Design Manual for Roads and Bridges, 2013, '*The NESAs Manual*', Vol 15, Section 1, Part 5: Chapter 3

Acronyms

Abbreviation	Expanded Term
CTMP	Construction Traffic Management Plan
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
HGV	Heavy Goods Vehicle(s)
IEMA	Institute of Environmental Management and Assessment
LGV(s)	Light Goods Vehicle(s)

Non-Technical Summary

11.101 Access to the Proposed Development would be via an upgraded access track from the A77 at a point just north of Cairnryan. Turbine components are expected to be delivered to the port at Cairnryan just south of the Proposed Development Access and would be transported by abnormal load vehicles north along the A77 for a short distance to the site access point. Other construction traffic (general construction HGVs and staff trips) would arrive to the Site from the A77, from the north and south whilst the A751 and A75 routes would also be used by a proportion of construction traffic travelling to and from the east.

- 11.102 The impact of traffic generated by construction of the Proposed Development will be a temporary increase in baseline levels by an amount which is considered to be negligible in accordance with the IEMA Guidelines. As such, traffic and transport related effects during construction are not considered to be significant.
- 11.103 There are a number of other developments in the area and a possibility of the construction phases overlapping with the Proposed Development. A Construction Traffic Management Plan would be produced for approval by Dumfries and Galloway Council in consultation with South Ayrshire Council, Police Scotland and Transport Scotland. The CTMP would confirm the routeing proposals for the abnormal loads and construction equipment and materials, timing of deliveries, route condition surveys and measures proposed to mitigate potential transport effects such as setting speed limits and informative road signage, as necessary. The CTMP would ensure that there is communication with the other wind farm developments in order to stagger high traffic generating activities, such as stone and concrete importation, to avoid significant cumulative effects.
- 11.104 With these appropriate mitigation measures in place, no significant residual effects from construction traffic is predicted to arise either as a result of the Proposed Development in isolation or cumulatively with other developments considered within the cumulative assessment. During the operational phase, only a small number of vehicles will attend the Proposed Development infrequently to undertake inspections or maintenance activities.

