Traffic and Transport

Non-Technical Summary

7.1. An assessment of the effect of the Development on Traffic and Transportation has been undertaken.

7.2. The majority of construction vehicles are anticipated to approach the Development from the south, via the A9 and A835. The route for Abnormal Load Vehicles, which will be used for the delivery of wind turbine components, is from the Port of Invergordon via the A9, Cromarty Bridge and A835.

7.3. During construction overall traffic flow levels, and levels of HGV flow, can be expected to increase on routes approaching the Development. The peak month for traffic flow is expected to be month eight. During month eight overall traffic flow is expected to increase by 3% and HGV flow by 7% on the A835 within the vicinity of the Development, this represents the highest predicted percentage increase on any route in the study. The predicted increase in traffic flow on all routes in the study is therefore negligible in terms of the EIA regulations.

7.4. As the predicted increase in traffic flow during construction is low and temporary no significant effects on traffic and transport are expected to occur.

7.5. Traffic associated with operation of the Development is predicted to be minor, amounting to an average of three vans per day. The effect of operational traffic is therefore not significant.

Introduction

7.6. This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the proposed Lochluichart Wind Farm Extension II (hereafter known as 'the Proposed Development') on Traffic and Transport resources within the study area.

7.7. This assessment identifies potential effects of increased road traffic arising from the construction, operation and decommissioning of the Proposed Development. The significance of these effects is assessed against recognised guidelines. Where required, appropriate mitigation measures are proposed to reduce these effects.

7.8. The following aspects are assessed when considering the effects the development could have on access, traffic and transportation:

- Traffic generation;
- Hazardous Loads;
- Driver Delay;
- Pedestrian Amenity;

- Severance;
- Noise and Vibration;
- Air Quality; and
- Visual Effects.

7.9. This Chapter is supported by the following Technical Appendices provided in Volume 4 of this EIA Report:

- Appendix 7.A: Abnormal Loads Risk Assessment.

7.10. This Chapter is supported by the following figures:

- **Figure 7.1**: Traffic Count Location Plan
- **Figure 7.2**: Construction Development Traffic Programme

Scoping and Consultation

7.11. The Scoping Opinion, as described in Chapter 2 of this EIA Report, included responses detailing the scope of assessment to be undertaken with regards to traffic and transportation resources. Specific issues highlighted during scoping and subsequent consultation are detailed below.

7.12. In their consultation response the Highland Council (THC) stated that whilst the proposed delivery route from the Port of Cromarty Firth at Invergordon had been used previously for the Lochluichart Wind Farm & Lochluichart Wind Farm Extension (hereafter known as 'the Operational Schemes') the use of larger turbines may require the route to be reassessed, particularly with regard to the effect on any structures.

7.13. Transport Scotland no longer responds to a formal request for a Scoping Opinion, enacted by the submission of a Scoping Report as required under the Town & Country Planning Act (Environmental Impact Assessment) (Scotland) Regulations 2017, as part of the planning application process.

Issues Scoped Out of the Assessment

7.14. No visitor traffic is expected for the Proposed Development, and therefore this will not be assessed within this chapter.

Abnormal Loads and Construction Access

7.15. The wind turbine components would be classified as abnormal loads when being delivered to the Proposed Development. The abnormal loads would consist of components summarised below which due to the size and weight, would need to be transported on specialist vehicles. The figures in brackets are those used in the Route Access Survey.

- Turbine blades – 57 m in length;

- Tower sections – 30 m, 31 m and 28 m; and
- Nacelle – 18 m.

7.16. In order to avoid undue disruption to the road network, the Scottish Government advises that, where possible, abnormal loads should be directed to the nearest suitable water port, in this case, Invergordon. It is worth noting that this harbour has previously been used for the delivery of wind turbine components for both the Operational Schemes and Corriemoillie Wind Farm.

7.17. Arcus has undertaken an Abnormal Load Route Assessment (ALRA) which established that the delivery route is suitable for the delivery of the specified turbine components. The route is as follows:

- Exit Port of Cromarty Firth and turn left onto B817;
- Turn right at mini roundabout and right to join A9 southbound;
- Continue straight through roundabout with A862 and cross Cromarty Bridge;
- Take fourth exit at Tore Roundabout and continue west on A835;
- Take second exit at Maryburgh Roundabout to continue west on A835; and
- Turn left into the Site entrance.

7.18. **Figure 7.1**, contained in **Appendix 7.A** Figures, indicates the above route. **Appendix 7.A** contains the ALRA.

7.19. Other construction materials and components may be imported from elsewhere, and will therefore use different routes. It is anticipated that the majority of other materials will arrive from the south, through Inverness via the A9 and A835.

Methodology

National and Local Policy

National Policy

7.20. Scottish Planning Policy (SPP) (The Scottish Government, 2014) provides a statement of the Scottish Government's policy on nationally important land use planning matters including Renewable Energy and Transport. SPP indicates that safe and appropriate access design should reflect the type of road involved, the scale of the development, the nature of the area, and the volume and character of traffic likely to use both the road and access. Direct access on to strategic roads should be avoided as far as practicable.

7.21. At a national level, traffic and access policy largely focuses upon freight by rail and sea and therefore does not apply to the Proposed Development.

7.22. Planning Advice Note 75 (PAN 75), Planning for Transport (The Scottish Executive, 1999) provides guidance on sustainable transport planning in the

context of new and existing development. The document also indicates that all planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail will be proportionate to the complexity and scale of impact of the Proposed Development.

Local Policy

7.23. Regarding traffic and transport THC Highland-Wide Local Development Plan (HwLDP) (2012) states that renewable energy developments will be supported where, taking into account any mitigation measures, they will not have any significant effect on land and water-based transport interests.

7.24. THC's Renewable Energy Strategy (2006) states that developments must "demonstrate that the implications associated with access to the Site have been considered and set out measures to safeguard road infrastructure".

Guidance

7.25. In undertaking the assessment of potential access and traffic effects on the local road network, planning policy as set out in Chapter 4: *Planning Policy* of this EIA Report has been referred to.

7.26. A brief review of key policy is set out below to provide context to the sensitivity aspect of significance criteria.

7.27. In addition to the planning policy, the following guidance documents have been taken into account:

- Institute of Environmental Assessment ("IEA", 1993) Guidelines for the Environmental Assessment of Road Traffic; and
- The Transport Assessment Guidance (Transport Scotland, 2012).

Description of Methodology

7.28. The methodology adopted within this assessment has been developed from guidance given in the Institute of Highways and Transportation (IHT) 'Guidelines for Traffic Impact Assessment' and also the IEMA 'Guidelines for the Environmental Assessment of Road Traffic'. Methodologies detailed in the IHT guidelines recommend that EIA's for large developments should be assessed in accordance with the IEMA guidelines noted above.

7.29. The potential traffic effects of the Proposed Development were assessed utilising the following approach:

- Relevant transport policies were reviewed to establish any local or regional Heavy Goods Vehicles (HGV) or freight access strategies;
- ALR assessment has been carried out (see Appendix 7.A);
- Consultation with relevant local authorities and roads authorities was carried out

- The road sections likely to be affected by the Proposed Development have been identified;
- The existing character of the road network has been determined;
- Existing traffic levels on the road network have been determined;
- The additional traffic generated by the Proposed Development has been estimated;
- The effect of the additional traffic has been assessed;
- The delivery routes for construction and Abnormal Load Vehicles (ALVs) were identified and appraised; and
- An appropriate mitigation strategy has been prepared to ensure that any potential traffic effects are kept to a minimum.

Other Effects

7.30. IEMA guidelines identify that the following environmental effects should be considered when assessing the effects of traffic related to the Proposed Development:

- Hazardous loads;
- Accidents and Safety;
- Driver Delay;
- Pedestrian Amenity;
- Severance;
- Noise and Vibration;
- Air Quality; and
- Visual Effects of traffic.

7.31. A qualitative assessment of these impacts has been undertaken, using the criteria detailed below.

Significance of Effects

7.32. Two broad principles outlined within the IEMA guidelines are advised for use as a screening process to limit the scale and extent of the assessment as follows:

- Rule 1 – include road links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Rule 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

7.33. Where the predicted increase in traffic flow is lower than these thresholds, then the significance of the effects can be considered to be low or not significant with further detailed assessments not warranted. Consequently, where the predicted increase in traffic flow is greater than

these thresholds, the effects are considered to be potentially significant and are assessed in greater detail.

7.34. For the purposes of this assessment and in accordance with the criteria set out within the IEMA guidelines, the scale (magnitude) of any increase in traffic flows on a particular section of the road network as a result of the Proposed Development construction activities will determine the significance of any effects associated with such increases. For example, an increase in traffic flows of more than 90% on a particular section of the road network, will likely have a major effect on the road section being assessed.

7.35. An assessment has been made of the significance of further effects taking into account the importance / sensitivity of the receptor, the magnitude of effect, the duration/ persistence of the effect and the likelihood of the effect occurring. The criteria used to make judgements on the importance/sensitivity of the receptor(s) and the magnitudes of the effects are presented in **Tables 7.1** and **7.2**.

Table 7.1 – Receptor Sensitivity

Receptor Sensitivity	Description
High	People whose livelihood depends upon unrestricted movement within their environment; this includes commercial drivers and the companies who employ them. Local residents whose daily activities depend upon unrestricted movement within their environment. Receptors such as schools, colleges, accident hotspots.
Medium	People who pass through or habitually use the area but whose livelihood is not wholly dependent on free access. Receptors such as congested junctions, hospitals and conservation areas.
Low	Occasional users of the road network. Receptors such as public open space and residential areas.
Negligible	Users not sensitive to transport effects.

Table 7.2 – Magnitude of Change

Magnitude	Definition
Major	The proposals could result in an appreciable change in terms of length and/or duration to the present traffic routes or schedules or activities, which may result in hardship.
Moderate	The proposals could result in changes to the existing traffic routes or activities such that some delays or rescheduling could be required, which cause inconvenience.
Minor	The proposals could occasionally cause a minor modification to routes, or a very slight delay in present schedules, or on activities in the short-term.
Negligible	No effect on movement of road traffic above normal level.

7.36. A combination of the sensitivity of the receptor and the magnitude of the effect are then used to inform the significance of the effect as outlined in **Table 7.3**.

Table 7.3 – Significance of Effect

Magnitude / Sensitivity	**Major**	**Moderate**	**Minor**	**Negligible**
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Moderate	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

7.37. Effects assessed as major or moderate are considered to be significant for the purposes of the EIA Regulations. Effects assessed as minor or less are considered to be not significant.

Embedded Mitigation

7.38. The selected route has been proven as a suitable delivery route for turbine components for the Operational Scheme and Corriemoillie Wind Farms. The route is to be used for the Proposed Development and was selected as the most appropriate route for abnormal loads deliveries.

7.39. A detailed Traffic Management Plan (TMP) would be submitted and agreed with THC should the Proposed Development receive planning permission. The TMP would contain further information regarding transport routes, road upgrades and working hours.

7.40. The TMP will be prepared prior to construction and will include discussion on any mitigation requirements to ensure there are no effects on receptors on this route.

Proposed Development Design Mitigation

7.41. The Proposed Development has sought to minimise effects on the local road network by using the A83 and A816 which are established transport routes in the area.

7.42. On-site borrow pits will be used to source aggregate for access tracks and concrete batching, subject to sufficient quantity and quality of aggregate being available.

Baseline Conditions

Access Routes

7.43. The route to the Proposed Development for ALVs from Invergordon is the A9 southbound, continuing on the A835 westbound to the Proposed Development entrance. Other materials and components will be imported by road, it is anticipated that the majority of these will approach from Inverness via the A9 and A835. The general route for all construction traffic from Tore Roundabout is indicated on **Figure 7.1**, included in **Appendix 7.A**.

7.44. This assessment will consider the effect of construction traffic on routes from the A9 to the Proposed Development entrance. For the purposes of this assessment it shall be assumed that all ALVs will approach from Invergordon and all other vehicles from Inverness.

Qualitative Assessment of Existing Roads

B817

7.45. From the Port of Cromarty Firth vehicles will join the B817 westbound. The B817 is a rural single-carriageway of approximately 6m in width which connects the town of Invergordon with the nearby A9 trunk road. This route has been used previously for the transportation of wind turbine components, including abnormal loads.

A9 North

7.46. From the B817 vehicles will join the A9 trunk road southbound. The A9 is a rural single-carriageway of approximately 7 m in width. It is a long-distance route of strategic national importance connecting Thurso with Perth via Inverness. This route has been used previously for the transportation of wind turbine components, including abnormal loads.

7.47. The A9 proceeds over the Cromarty Bridge.

A9 South

7.48. Vehicles approaching from the south will use the A9 trunk road northbound. This route crosses the Kessock Bridge at Inverness. This bridge has a 100 tonne weight restriction without lane closures and 120 tonnes with lane closures. Continuing northbound the A9 is a rural dual carriageway with two lanes in each direction.

A835

7.49. All construction vehicles approaching the Proposed Development will use the A835 trunk road from Tore Roundabout to the Proposed Development entrance. The A835 is a rural single carriageway of over 6m width and is a route of strategic national importance, connecting Inverness with Ullapool and its onward ferry connections to the Western Isles.

Baseline Traffic Flow Data

7.50. Baseline traffic flow data has been established using publically available traffic counts published by the Department for Transport (DfT). These counts detail the annual average daily traffic (AADT), and the proportion of HGVs, at appropriate locations on each road within the study area. **Figure 7.2** indicates the locations of each traffic count.

7.51. Background traffic growth will occur on the local road network irrespective of whether or not the Proposed Development is constructed. Projected baseline traffic growth flows for the expected year of construction (anticipated to be 2021) have been calculated by applying growth factors from the National Trip End Model (NTEM) forecasts. NTEM[i] is designed by the DfT and provides traffic growth forecasts for use in local and regional transportation models. NTEM is the industry standard tool for estimating traffic growth. During this assessment the 'central' (as opposed to 'high' or 'low') growth factor was used.

7.52. A growth factor of 1.063 was applied to the 2016 base flows to forecast traffic for the year 2021, assumed to be the year of construction. This growth factor was calculated using the Trip End Model Presentation Program (TEMPro), which determines growth factors based upon the NTEM forecasts. These factors were determined by using the Highland (Main) geographic area.

Table 7.4 - Baseline AADT and Factored AADT

			2016 Baseline AADT		**2021 Factored AADT**	
	Road	**Location**	**HGVs**	**All Vehicles**	**HGVs**	**All Vehicles**
1	A835	Aultguish Inn	175	1932	186	2054
2	A835	Tarvie	227	3723	241	3958
3	A835	West of A832	363	4068	386	4324
4	A835	East of A832	243	4547	258	4833
5	A835	West of Tore Roundabout	492	10342	523	10994
6	A9	North of Tore Roundabout	815	10182	866	10823
7	A9	North of Cromarty Bridge	1091	13588	1160	14444
8	A9	West of B817	894	11549	950	12277
9	A9	South of Tore Roundabout	1164	24495	1237	26038

7.53. Typical capacity values for a variety of road types are provided within the Design Manual for Roads and Bridges (DMRB), in which capacity is defined as the maximum sustainable flow of traffic passing in one hour under favourable road and traffic conditions. Table 5/3/1 in DMRB Volume 15, Section 1, Part 5[ii] gives the link capacity for various urban and rural road types, these are summarised in Table 7.5 of this assessment.

Table 7.5 – Theoretical Link Speed and Capacity

Road	Description	Speed Limit (kph)	Capacity (Vehicle/hr/direction)	Two- Way Hourly Flow
A9 North	Rural – good single	96	1,200	2,400
A9 South	Rural – dual 2 lanes	113	3,400	6,800
A835	Rural – good single	96	1,200	2,400

Road Traffic Collision Assessment

7.54. A study of all 'serious' and 'fatal' road traffic collisions (RTCs) within the last five years on routes within study area was undertaken, in this case the A835 from and including Tore Roundabout to the site entrance was considered.

7.55. 'Serious' RTCs are defined as those which result in hospitalisation of one or more of the parties involved. 'Fatal' RTCs are defined as those in which one or more parties' dies within 30 days as a result of injuries sustained.

7.56. Three 'serious' and two 'Fatal' RTCs were identified. **Figure 7.3**, included in **Appendix 7.A**, indicates the location of these. No trends, or clusters of RTCs, were evident in the data.

Sensitive Receptors

7.57. There are a number of residential areas within the study area; those located closest to the Proposed Development being Contin and Garve, 27 km and 17 km from the Site entrance respectively. Each will be considered as a sensitive receptor as a result of the residential / commercial frontage on one or both sides of the carriageway.

7.58. Tore Primary School is located off the A835 west of Tore Roundabout, 45 km from the Site entrance. Access to the school may be via A835 and/or A9. Staff, pupils and visitors are therefore likely to use these routes on their journey to and from school. Tore Primary will be considered a highly sensitive receptor.

Information Gaps

7.59. In relation to existing traffic flow information for the road network surrounding the Proposed Development, sufficient information has been obtained to allow an assessment to be made of the potential traffic effects as a result of the Proposed Development.

Anticipated Construction Development Traffic

7.60. A detailed programme of anticipated construction development traffic is provided in **Figure 7.4** included in **Appendix 7.A**. The following subsections provide detail for each element of work. A summary is provided at the end of this section.

Site Mobilisation and Demobilisation

7.61. HGV and other vehicle movements will be required during site mobilisation. This will comprise the erection of welfare facilities, delivery of construction site vehicles and importation of plant and equipment, including equipment for processing material from the on-site borrow pits and for concrete batching. The majority of these movements will be as HGVs and low loaders which will deliver and then depart the site empty.

7.62. During site demobilisation, the majority of this equipment will be removed from Site. Vehicle movements for demobilisation will result from empty HGVs and low loaders travelling to Site and then departing loaded. Table 7.6 indicates the anticipated number of vehicle movements associated with site mobilisation and demobilisation.

Table 7.6: Anticipated Vehicle Movements – Site Mobilisation/Demobilisation

Operation	Vehicle Type	Operational Months	Total	Max Monthly
On-site vehicles	Car/LGV**	1, 14	16	8
Construction Compound	HGV Low Loader	1, 14	50*	25*
Borrow Pit and Concrete Batching Equipment	HGV Low Loader	2, 14	54*	27*
Overall			**120**	**60**

*Includes transporter vehicle leaving and then returning to site during demobilisation
**Self-propelled vehicles which arrive in one month and depart in another

Access Track and Hardstanding Construction

7.63. All stone required for construction of the access tracks and hardstandings is expected to be sourced from on-site borrow pits and processed on Site. Therefore, there are not anticipated to be any vehicle movements associated with the importation of stone for access track construction.

7.64. One team is expected to operate during access track construction and is expected to utilise an excavator, roller and four dumper trucks. It is assumed that the excavator and rollers will be delivered to the site via low loaders at the commencement of this operation and will generate two vehicle trips for delivery and another two trips during removal for each vehicle, the dumper trucks will be self-propelled to and from the Site.

7.65. Other materials will require to be imported regularly throughout construction of the access tracks such as geo-membrane, drainage pipes and culvert sections.

7.66. Table 7.7 indicates the anticipated number of vehicle movements associated with access track and hardstanding construction.

Table 7.7: Anticipated Vehicle Movements - Access Track and Hardstanding Construction

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Plant Delivery	HGV Dump Truck**	3,7	8	4
	HGV Low Loader (Excavator/Rollers)	3,7	8*	4*
Material Deliveries	HGV	3-7	40	8
Overall			**56**	**16**

*Includes transporter vehicle leaving and then returning to site during demobilisation
**Self-propelled vehicles which arrive in one month and depart in another

Turbine Foundation Construction

7.67. It is anticipated that concrete for each of the turbine foundations will be batched on site. It is possible that aggregate for this concrete will be won from the on-site borrow pits, however this is subject to the quality and quantity of rock available.

7.68. In order to provide a robust assessment, and to account for the worst case scenario, it has been assumed that all aggregate for turbine foundations will be imported to the site. This estimate therefore represents a conservative assessment, and the actual number of vehicles associated with turbine foundations is likely to be significantly lower.

7.69. Each foundation will require approximately 30 HGV loads of sand and aggregate, 7 HGV loads of cement and 3 HGV loads of steel reinforcement (rebar). This will result in a total of 540 vehicle movements for sand and aggregate, 126 vehicle movements for cement and 54 vehicle movements for rebar over the three month course of this phase of works. Table 7.8 details the expected vehicle movements associated with turbine foundation construction.

Table 7.8: Anticipated Vehicle Movements - Turbine Foundation Construction

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Sand & Aggregate	HGV Dump Truck	6-8	540	180
Cement	HGV	6-8	126	42
Rebar	HGV Low Loader	6-8	54	18
Overall			**720**	**240**

Control Building and Substation Construction

7.70. Material for construction of the substation compound is assumed to be won from on-site borrow pits, however concrete and other building materials will require to be imported to construct the control building. This is anticipated to require 50 HGV loads, resulting in a total of 100 vehicle movements, over the seven month duration of this phase of works.

7.71. Electrical components, switchgear and cabling will require to be imported and is predicted to result in 20 HGV loads, totalling 40 movements.

7.72. Table 7.9 indicates the anticipated vehicle movements associated with control building and substation construction.

Table 7.9: Anticipated Vehicle Movements - Substation Construction

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Control Building Materials	HGV	2-8	100	15
Electrical Components	HGV	2-8	40	6
Overall			**140**	**21**

Crane Delivery

7.73. A large crawler or track mounted crane of approximately 1,000 tonne capacity will be required for turbine erection along with an additional 160 tonne pilot crane. The crawler crane will be transported in component form and assembled on site, this will require approximately 52 HGV movements to be undertaken prior to the commencement of turbine delivery. The pilot crane will be self-propelled although will constitute an abnormal load vehicle due to its weight.

7.74. Both cranes will remain on site for the duration of the turbine assembly phase. Table 7.10 indicates the number of vehicle movements associated with crane delivery.

Table 7.10: Anticipated Vehicle Movements - Crane Delivery

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Crawler Crane	HGV	7, 10	52	26
	Abnormal Load Vehicle**	7, 10	2	1
Overall			**54**	**27**

**Self-propelled vehicles which arrive in one month and depart in another

Turbine Delivery

7.75. Turbines will be delivered as separate components the majority of which will require to be transported by abnormal load vehicle (ALV). Each turbine will require 11 abnormal load deliveries, resulting in a total of 198 vehicle movements over the two month phase of turbine delivery.

7.76. Following delivery of components, the abnormal load vehicles are able to retract to the size of a standard HGV vehicle for the return journey.

7.77. Two escort vehicles are likely to be required to accompany each abnormal load which will result in a worst case of 396 additional vehicle movements. In practice, this figure may be reduced where abnormal load vehicles approach the site in convoy and fewer than two escort vehicles per abnormal load are required.

7.78. Table 7.11 indicates the anticipated vehicle movements associated with Turbine Delivery.

Table 7.11: Anticipated Vehicle Movements - Turbine Delivery

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Turbine Components	ALV	8-9	198	99
	Escort Car or Van	8-9	396	198
Overall			**594**	**297**

Fuel Delivery

7.79. Fuel will require regular delivery to the site regularly throughout the construction period and is expected to total 1 HGV fuel tanker delivery per month, totalling 20 vehicle movements over the duration of construction. Table 7.12 indicates the number of vehicle movements associated with fuel delivery.

Table 7.12: Anticipated Vehicle Movements Fuel Delivery

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Fuel Delivery	HGV Fuel Tanker	1-10	20	1

Construction Personnel and Staff

7.80. It is anticipated that an average of 30 staff will be required onsite per day throughout construction and commissioning, months 1-14. For the purposes of this assessment, the most recent available Scottish private vehicle occupancy rate[iii] of 1.57 people per vehicle was used.

7.81. Assuming a 26-day working month, this is expected to result in a total of 13,910 vehicle trips for staff over the course of construction of the Development. Table 7.13 indicates the number of vehicle movements associated with staff.

Table 7.13: Anticipated Vehicle Movements - Staff

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Staff	Car or Minibus	1-14	13,910	994

Summary

7.82. Table 7.14 provides a summary of all deliveries expected throughout duration of construction.

Table 7.14: Anticipated Vehicle Movements - Summary

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Site Mobilisation/Demobilisation				
On-site vehicles	Car/LGV**	1, 14	16	8
Construction Compound	HGV Low Loader	1, 14	50*	25*
Borrow Pit and Concrete Batching Equipment	HGV Low Loader	2, 14	54*	27*
Subtotal			**120**	**60**
Access Track and Hardstanding Construction				
Plant Delivery	HGV Dump Truck**	3,7	8	4
	HGV Low Loader (Excavator/Rollers)	3,7	8*	4*
Material Deliveries	HGV	3-7	40	8
Subtotal			**56**	**16**
Turbine Foundation Construction				
Sand & Aggregate	HGV Dump Truck	6-8	540	180
Cement	HGV	6-8	126	42
Rebar	HGV Low Loader	6-8	54	18
Subtotal			**720**	**240**
Substation Construction				
Control Building Materials	HGV	2-8	100	15
Electrical Components	HGV	2-8	40	6

Operation	Vehicle Type	Operational Months	Total	Max Monthly
Subtotal			**140**	**21**
Crane Delivery				
Crawler Crane	HGV	7, 10	52	26
	Abnormal Load Vehicle**	7, 10	2	1
Subtotal			**54**	**27**
Turbine Delivery				
Turbine Components	ALV	8-9	198	99
	Escort Car or Van	8-9	396	198
Subtotal			**594**	**297**
Fuel Delivery				
Fuel Delivery	HGV Fuel Tanker	1-10	**20**	**1**
Staff				
Staff	Car or Minibus	1-14	**13,910**	**994**
Total				
Total HGV and Abnormal Load Movements			1292	361
Total Car and Van Movements			14,332	1192
Overall Total			**15,614**	**1554**

*Includes transporter vehicle leaving and then returning to site during demobilisation
**Self-propelled vehicles which arrive in one month and depart in another

Assessment of Effects

Traffic Generation

7.83. A detailed breakdown of the distribution of vehicle movements in each month, and for each element of work, throughout the construction phase of the Development is included in **Figure 7.4** included in **Appendix 7.A**. The peak month of construction, from a traffic perspective, was identified and used to predict the traffic increase on routes within the study area. A worst case scenario in which all predicted traffic passes each location within the study was assumed.

7.84. From inspection of the predicted traffic movements, the peak month for vehicle flow is expected to be month 8 where a total of 1554 vehicle movements are predicted. This will result in an average of 60 vehicle movements per day, assuming a 26-day working month.

7.85. Table 7.15 details the anticipated vehicle flow in the peak month and the percentage increase above the predicted baseline at each point within the study.

Table 7.15: Predicted Peak Month Average Daily Traffic

Location	Total Vehicles			HGV Only*		
	2021 Baseline	Peak Month	% Increase	2021 Baseline	Peak Month	% Increase
1	2054	2113	3	186	200	7
2	3958	4017	2	241	255	6
3	4324	4384	1	386	400	4
4	4833	4893	1	258	272	5
5	10994	11053	1	523	537	3
6	10823	10883	1	866	880	2
7	14444	14504	0.4	1160	1174	1
8	12277	12336	0.5	950	964	1
9	26038	26098	0.2	1237	1251	1

*For the purposes of this estimation abnormal load vehicles are included in HGV

7.86. As detailed in Paragraph 7.32, and in accordance with the IEMA Guidelines, a screening exercise was undertaken in order to determine which routes warrant detailed assessment.

7.87. The lower threshold of significance (10%) was considered appropriate for routes located near to the identified highly sensitive receptor of Tore Primary School, reference points 5 and 9. Considering the increase in overall traffic, and HGV traffic, detailed in Table 7.15 at reference locations 5 and 9 it can be seen that the lower (10%) threshold of significance has not been exceeded.

7.88. The upper (30%) threshold of significance was considered appropriate for all other routes within the study. Considering the increase in overall traffic, and HGV traffic, detailed in Table 7.15 it can be seen that this threshold has not been exceeded on any route within the study.

7.89. It is therefore considered that in all cases the effect of traffic generation on routes within the study is negligible and not significant in terms of the EIA Regulations.

Hazardous loads

7.90. Fuel will be regularly transported to the Site over the duration of construction of the Proposed Development. All fuel will be transported by suitably qualified contractors, and all regulations for the transportation and storage of hazardous substances will be observed. No other hazardous substances are

expected to be transported to site. It is therefore considered that the effect of the transportation of hazardous substances is negligible and not significant in terms of the EIA Regulations.

Accidents and Safety

7.91. A road traffic collision (RTC) assessment was undertaken which identified three 'serious' and two 'fatal' accidents, all located on the A835 as indicated in **Figure 7.3** included in **Appendix 7.A**. No trends or clusters of accidents were identifiable.

7.92. In the absence of identifiable trends in RTCs or known accident hotspots, an increase in overall traffic flow or HGV composition is not sufficient to affect a change in safe operation of the road network. Furthermore the predicted increase in traffic is temporary and of negligible magnitude. It is therefore considered that the effect on accidents and safety is negligible and not significant in terms of the EIA Regulations.

Driver Delay

7.93. Comparing the predicted peak month traffic flow from Table 7.15 with the theoretical road capacity in Table 7.5 it can be seen that all roads within the study are operating significantly below capacity and are predicted to continue to do so during construction of the Proposed Development.

7.94. The predicted increase in traffic is temporary and negligible in magnitude. Therefore the effect of general increase in traffic on driver delay is considered to be negligible and not significant in terms of the EIA Regulations.

7.95. Some driver delay can be expected to occur on routes due to the slow movement of abnormal load vehicles between the port of delivery and the Site. Abnormal loads will be timed to avoid peak hours and, where safe to do so, will occasionally stop to allow traffic to pass if necessary.

7.96. Due to the overall small number of loads, the fact that these will be timed to avoid disruption and the short term nature of this phase of works, the anticipated effect of abnormal loads on driver delay is low and not significant in terms of the EIA Regulations.

Pedestrian Amenity

7.97. Pedestrian amenity, fear and intimidation can be affected by changes to traffic flow and composition. A pedestrian footway is located on some sections of the A835 between Tore Roundabout and Maryburgh. Due to the rural nature of the route, and the fact that it is a trunk road, it is reasonable to assume that pedestrian flows are minimal.

7.98. Where the route passes through the settlement of Contin there is the potential for higher pedestrian flows. However, the A835 is a trunk road and has a high existing flow. As the predicted increase in traffic is low, and temporary, and below the threshold of significance in all cases the effect on pedestrian

amenity is considered to be negligible and not significant in terms of the EIA Regulations.

Severance

7.99. Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The A835 passes through the settlement of Contin which has the potential to be affected by severance.

7.100. During construction of the Proposed Development, the predicted temporary increase in traffic is low and falls below the threshold of significance. Therefore, the effect of severance is considered to be negligible and not significant in terms of the EIA Regulations.

Noise and Vibration

7.101. Ground-borne vibration resulting from heavy goods vehicle and turbine delivery vehicle movements is generally only likely to be significant where vehicles traverse discontinuities, such as rough surfaces (including pot-holes) or speed-humps.

7.102. The DMRB Volume II[iv] identifies that there is no evidence that suggests traffic induced vibrations are a source of significant damage to buildings.

7.103. Airborne vibrations resulting from low frequency sound emitted by vehicle engines and exhausts can result in detectable vibrations in building elements such as windows and doors and cause disturbance to local people. However due to the short-term and temporary nature of the increase in traffic movements, and the low percentage increase, it is considered that the effect of vibration upon receptors along the route would be negligible and not significant in terms of the EIA Regulations.

Visual Effects of traffic

7.104. The movements of ALVs could be considered visually intrusive. This effect would be short-term and would only occur during the movement of abnormal loads. It is therefore considered the visual effect as a result of the ALVs upon receptors along the routes would be negligible and not significant in terms of the EIA Regulations.

Air Quality

7.105. Maintaining good local air quality is essential for the human health and overall quality of life for people living in the area. Road transport accounts for a significant proportion of emissions of a number of pollutants including carbon dioxide (CO_2), nitrogen dioxide (NO_2), and particulate matter (PM10). Nitrogen oxide emissions are also of concern for nearby vegetation and ecosystems.

7.106. The DMRB gives guidance on matters relating to air quality in Volume 11 Section 3 and advises that significant impacts to local air quality may be found in the following cases:

- Where the road alignment will change by 5 m or more; or

- Daily traffic flows will change by 1,000 AADT or more; or
- Heavy Duty Vehicle flows will increase by 200 AADT or more; or
- Daily average speed will change by 10 km/hr or more; or
- Peak hour speed will change by 20 km/hr or more.

7.107. Given the assessment of the expected volume of construction traffic, it is considered that none of the above criteria have been met or exceeded. It is therefore considered that the effect of the increase in traffic on local air quality would be negligible and not significant in terms of the EIA Regulations.

7.108. It should also be noted that due to the temporary nature of the increase in vehicles using the proposed access route, any effects on local air quality will be short term and reversible.

Operational Effects

7.109. Traffic associated with operation of the Proposed Development is limited to maintenance and is expected to be insignificant in comparison to traffic generated during construction. General maintenance and site monitoring visits will likely be undertaken by car and light goods vehicle (LGV) and can be expected to be in the region of three visits per day average. The effect of operational traffic is therefore expected to be negligible and not significant.

Decommissioning Effects

7.110. Traffic and transport effects associated with decommissioning of the Development are expected to comprise removal of the turbines and all associated above ground equipment. Turbine towers and blades are likely to be dismantled into smaller sections prior to their removal to ease transport requirements.

7.111. At this stage, it is not possible to forecast quantitatively or accurately the traffic effect during decommissioning of the Proposed Development as the baseline data would no longer be valid in 25 years. It is reasonable to assume that baseline traffic would continue to increase. The implication of applying further background traffic growth would be that the proportional impact of the decommissioning traffic would reduce in comparison to the construction traffic impact that has been assessed.

7.112. The decommissioning effects would also be greatly reduced as the majority of the construction traffic is created by the import of concrete for turbine foundations, which is likely be left in situ at depth of greater than 1 m below ground level.

7.113. Prior to decommissioning of the Proposed Development, a traffic assessment would be undertaken and appropriate traffic management procedures agreed with the relevant authorities at the time.

Assessment of Cumulative Effects

7.114. Significant cumulative effects may occur during construction of the Proposed Development where this overlaps with construction of another nearby development. An assessment of nearby developments was undertaken, no developments with the potential to cause cumulative effects were identified. It is therefore considered that the impact on traffic and transport due to cumulative effects is negligible and not significant in terms of the EIA Regulations.

Conclusion

7.115. An assessment of the potential effects on traffic and transportation during construction of the Proposed Development has been undertaken. This assessment did not identify the potential for any significant effects as a result of the Proposed Development traffic. Therefore the effect on traffic and transport resources is considered at maximum low and not significant in terms of the EIA Regulations.

[i] UK Government (2017) Trip End Model Presentation Program [Online] Available at: https://www.gov.uk/government/collections/tempro (Accessed 13/06/2018)

[ii] SIAS (2013) DMRB Volume 15 Economic Assessment of Road Schemes in Scotland; Section 1 The NESA Manual, March 2013 [Online] Available at: http://www.sias.com/2013/NESA.htm (Accessed 14/06/2018)

[iii] The Scottish Government (2011) High Level Summary of Statistics Trend, Car Occupancy [Online] Available at: http://www.gov.scot/Topics/Statistics/Browse/Transport-Travel/TrendCarOccupancy (Accessed 13/06/2018)

[iv] The Design Manual for Roads and Bridges Volume II, Section 3 Annex 5 'Research into Traffic Noise and Vibration'.