CONTENTS

INTRODUCTION

12.1 This Chapter considers the environmental impacts that are potentially significant where the Kirkton Energy Park (the proposed development) is likely to result in increased traffic flows.

12.2 The assessment focuses on the construction phase of the proposed development as the worst-case scenario for traffic generation. Potentially significant traffic related environmental effects may result from two forms of potential impact:

- the transport configurations made for the movement of wind turbine components (including blade, tower sections and nacelle), transported as abnormal loads. Abnormal indivisible loads (AILs) are those which exceed the length, weight or height criteria defined in 'Abnormal Load Movements – A brief guide to Notification and Authorisation requirements' (Transport Scotland, June 2007); and
- the import of general construction materials transported via 'conventional' heavy goods vehicles (HGVs) and low loaders, for both the battery storage facility and the wind farm.

12.3 The assessment detailed within this Chapter is based around worst-case assumptions made for the purpose of forming a robust assessment of the proposed development within the parameters identified in **Chapter 3: Description of Development**.

12.4 This Chapter does not focus on the transport configurations made for the movement of wind turbine components. The potential route impacts have been considered in the separate Abnormal Loads Route Assessment (ALRA) document prepared by Pell Frischmann which is available in **Technical Appendix 12.1** and includes a detailed review of the preferred delivery route to site from the port of Scrabster and any road route constraints with swept path analysis. The ALRA has been reviewed by SLR and the findings have been used to inform this Chapter.

12.5 During operation, the proposed development would generate regular maintenance trips which are not anticipated to lead to any variation in the baseline traffic flows beyond that of everyday fluctuation. Given that there is a thirty year lifetime for the proposed development, the focus of the assessment within this Chapter is the construction phase.

12.6 This Chapter is accompanied by the following Technical Appendices (TA):

- **Technical Appendix 12.1: Abnormal Load Route Assessment** (ALRA);
- **Technical Appendix 12.2: Outline Construction Traffic Management Plan** (CTMP);
- **Technical Appendix 12.3: Department for Transport Data**; and
- **Technical Appendix 12.4: Accident Data**.

12.7 This Chapter is supported by the following **Figures 12.1** to **12.3**.

12.8 Planning policies of relevance to this assessment are provided in **Technical Appendix 4.1: Legislation, Planning Policy and Guidance**.

12.9 The traffic impact assessment and reporting required for the preparation of this Chapter has been undertaken by SLR Consulting Ltd.

SCOPE AND CONSULTATION

Consultation and Scoping Responses

12.10 SLR prepared scoping material for discussion with the determining authority (the Energy Consents Unit (ECU)) and with other relevant stakeholders and organisations, including The Highland Council (THC) as the roads authority. A Scoping Report was submitted to the ECU and stakeholders in March 2021 and a Scoping Addendum was submitted in July 2021. **Table 12-1** below includes all responses relevant to site access, traffic and transport.

12.11 Account has been taken of the scoping responses received from, and discussions undertaken with THC.

12.12 **Table 12-1** summarises the identified key issues associated with the access, traffic and transport of the proposed development, and where these issues have been addressed within this Chapter.

Table 12-1: Key Issues

Consultee and date	Summary of Key Issues	Where addressed in Chapter
The Highland Council, Scoping Response (25/05/21)	Requirements for a Transport Assessment (TA), Construction Traffic Management Plan (CTMP) and an Abnormal Load Route Assessment (ALRA) within the EIAR.	TA included as Site Access, Traffic and Transport EIAR Chapter. ALRA has been prepared by Pell Frischmann and can be viewed at **Technical Appendix 12.1**. The findings from the ALRA are reported within the EIAR Chapter. Framework CTMP is included at **Technical Appendix 12.2**.
	Transport Assessment Methodology must include: 1. Identify all public roads affected by the development. 2. Establish current condition of the roads – engineering appraisal of routes. 3. Traffic generation and distribution of the proposals throughout the construction and operation periods. 4. Current traffic flows including use by public transport services, school buses, refuse vehicles,	 1. The study area is confirmed in paragraph 12.19. 2. To be conditioned as part of any planning consent. 3. Paragraphs 12.77 to 12.91. 4. Paragraphs 12.45 to 12.55.

	commercial users, pedestrians, cyclists and equestrians. 5. Impacts of proposed traffic including to the carriageway, road users, adjacent communities etc. 6. Cumulative impacts with other developments in progress and committed developments including Renewable Energy projects. 7. Proposed mitigation measures to address impacts identified. 8. Details of residual effects.	5. Paragraphs 12.103 to 12.138. 6. Paragraphs 12.144 to 12.148. 7. Paragraphs 12.95 to 12.98. 8. Table 12.18.
	Details of new site access should be clearly set out on dimensioned drawings related to OS data and include confirmation of geometry, construction form, drainage details to prevent water running out onto the public road and evidence that appropriate visibility splays can be achieved. Vehicle swept paths should also be provided to evidence that the proposed junction with the public road, post construction is also required.	The ALRA includes consideration of the full route to site, with swept paths in all constrained locations. The two turning area options provide the facility for abnormal loads to turn and the designs can be seen in Figures 3.2a and 3.2b.
Transport Scotland, Scoping Response (22/04/21)	Traffic generation information to be used to determine whether there are likely to be any significant environmental issues associated with increased traffic on trunk road network, and any requirement for further trunk road assessment, in particular, the trunk road in the vicinity of the A9(T)/A836 junction.	Paragraphs 12.84 to 12.94
	A full ALRA should be provided with the EIA that identifies key pinch points on the trunk road network. Swept path analysis should be undertaken and details provided with regards to any required changes to street furniture or structures along the route.	ALRA has been prepared by Pell Frischmann and can be viewed at **Technical Appendix 12.1**. The findings from the ALRA are reported within the EIA Chapter.

Effects Scoped Out

Operational Effects

12.13 It is estimated that the operational phase of the proposed development would generate no more than five vehicle trips in any one day and zero trips most days. Typical duties onsite would include routine maintenance, such as safety checks and repairing faults. These visits would normally require light vans or similar vehicles and would use the same routes as those used during construction.

12.14 The trips generated by the operational activities onsite would be no greater than those expected and accounted for in background variations to the existing traffic flows. As such, negligible traffic flows would be indistinguishable from normal daily traffic flows and, therefore, assessment of operational effects has been scoped out of this assessment.

Decommissioning Effects

12.15 The proposed development has been designed with an operational life of up to 30 years. At the end of this period or before time if necessary, the turbines would be decommissioned. It is currently anticipated that the decommissioning of the proposed scheme would comprise the following elements which would lead to future traffic movements:

- dismantling and removal of turbine components;
- removal of all turbine foundations to a depth of one metre below ground level, with deeper infrastructure remaining in-situ;
- removal of hardstanding areas adjacent to turbines to a depth of one metre below ground level;
- demolition and removal of the substation building including external areas; and
- removal of substation compound to a depth of one metre below ground level.

12.16 Similarly to the operational phase, the decommissioning phase is expected to generate less vehicle traffic than the construction phase, and so this is not included in the assessment.

APPROACH AND METHODS

12.17 The assessment is required to evaluate the effects of the proposed development and to determine the magnitude and significance of the impacts on the identified sensitive receptors. The main receptors which are sensitive to increased traffic levels and environmental impacts are anticipated to be located along the A836 at the areas of Melvich, Reay and Burnside. Residential properties and sensitive non-residential properties, such as schools, are also considered. This assessment also considers the impacts associated with the transportation of turbine components.

12.18 Consideration has been given to the proposed access route to the site. The assessment process comprised the following principal stages:

- baseline survey and characterisation of the existing traffic network through desk study and traffic surveys;
- review of the findings from the ALRA document (**Technical Appendix 12.1**), prepared by Pell Frischmann, and identification of the preferred route and potential effects along this route;
- derivation of mitigation measures, where appropriate, to address any identified effects; and
- description of any residual effects.

Study Area

12.19 The study area for the focus of this assessment includes the local road network that would be utilised by the traffic associated with the proposed development. This area includes:

- site access junction with the A836;
- A836 east of the site access to junction with the A9; and
- A9 to Scrabster Port.

12.20 It is understood that the road network to the west of the site access will not be used by general construction traffic and so much of this road has not been included in the assessment. However, abnormal loads will travel a further 1.9km or 4.65km to the west past the site access along the A836 to a turning area. As such, this section of the A836 is to be included in the assessment. The A897 has been excluded from the study area as this route would not be utilised by HGV traffic related to the construction of the proposed development. Details of HGV routing are set out in the CTMP (**Technical Appendix 12.2**).

Information and Data Sources

12.21 The following data collection and analysis has been undertaken:

- a review of the ALRA document prepared by Pell Frischmann (**Technical Appendix 12.1**);
- analysis of commissioned traffic count data and accident data; and
- assessment of traffic impacts of previous developments to understand identified effects.

12.22 An understanding of the existing situation and baseline conditions within the study area has been established through a visual inspection of the road network via desktop studies.

Assessment Methods

12.23 The likely significance of the potential effects has been determined by considering the magnitude of change in traffic movements and the sensitivity of the receptors which would be affected by these changes. This has been undertaken in accordance with the IEMA guidance (IEMA, 1993) and standard good practice, based on the experience of the assessor.

12.24 The IEMA guidance suggests that a day-to-day traffic flow variation of +/- 10% is to be expected in the baseline situation, and that projected traffic flow increases of less than 10% would be imperceptible to the general public and would create no discernible environmental impact. Therefore, increases in traffic levels of below 10% are considered insignificant.

12.25 Based on the IEMA guidance, the following factors have been identified as being the most discernible potential environmental effects likely to arise from changes in traffic movements. These are therefore considered in the assessment as potential effects which may arise from changes in traffic flows resulting from the proposed development:

- **noise and vibration** – the potential effect caused by additional traffic on sensitive receptors, which in this case would relate to residential properties near to the road (see also **Chapter 13: Noise**);

- **driver severance and delay** – the potential delays to existing drivers and their potential severance from other areas;
- **community severance and delay** – the potential severance to communities and the delays to movements between communities;
- **vulnerable road users and road safety** – the potential effect on vulnerable users of the road (e.g. pedestrians/cyclists);
- **hazardous and dangerous loads** – the potential effect on road users and local residents caused by the movement of abnormal indivisible loads (AILs); and
- **dust and dirt** – the potential effect of dust, dirt and other detritus being brought onto the road.

12.26 In addition to the effects listed above, human health effects are considered in transport terms in reference to pedestrians within the vulnerable road user and road safety effects.

Significance of Effect

12.27 Criteria for the determination of sensitivity (e.g. 'high', 'medium', or 'low') or of importance (e.g. 'international', 'national', 'regional', or 'authority area') have been established based on prescribed guidance, legislation, statutory designation and/ or professional judgement, as described in **Chapter 5: Environmental Impact Assessment**.

12.28 The significance of the likely effect has been determined by consideration of the sensitivity of receptors to change, taking account of the specific issues relating to the study area, and then the magnitude of that change.

Sensitivity of Receptors

12.29 The potential sensitivity of receptors to changes in traffic levels has been determined by considering the study area and the presence of receptors in relation to each potential impact.

12.30 The IEMA guidelines provide two thresholds when considering predicted increase in traffic, whereby a full assessment of the impact is required:

- where the predicted traffic flows would increase by 30% or more (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and/or
- where traffic flows are predicted to increase by 10% or more in areas identified specifically as sensitive.

12.31 In this context, the IEMA guidance does not define a sensitive area and therefore the assessor has made a judgement based on experience and the nature of the study area. Each receptor has been assessed individually to determine its sensitivity and the assessment criteria chosen are shown in **Table 12-2**.

Table 12-2: Receptor Sensitivity

Impact	Low Sensitivity	Medium Sensitivity	High Sensitivity
Driver severance & delay	Road network not affected.	Road network not experiencing congestion at peak times.	Road network experiencing congestion at peak times.
Road safety	-	-	High sensitivity recepetors
Community severance & delay	No presence of existing communities severed by road.	Presence of existing communities with a moderate level of existing severance (subjective assessment).	Presence of existing communities with low existing severance (subjective assessment).
Noise	No sensitive receptors.	Presence of sensitive receptors near to the road.	Presence of sensitive receptors adjacent to the road.
Vulnerable road users	-	-	High sensitivity receptors
Wider disruption due to dangerous loads	No hazardous or dangerous loads on the road network.	Some hazardous or dangerous loads on the road network. Loads are legally permitted on UK roads.	Abnormal and oversized loads to use road network.
Dust & dirt	Limited presence of sensitive receptors (subjective assessment).	Low to medium presence of sensitive receptors (subjective assessment).	High presence of sensitive receptors (subjective assessment).

Magnitude of Impact

12.32 The magnitude of impact or change has been considered according to the criteria defined in **Table 12-3**.

Table 12-3: Magnitude Criteria

Impact	Negligible	Minor	Moderate	Major
Noise	<25% increase in traffic	>25% increase in traffic. Quantitative assessment based on predicted increase in traffic against measured baseline (see **Chapter 13: Noise**).		
Driver severance & delay	<10% increase in traffic.	Quantitative assessment of road capacity based on existing traffic flows and predicted future traffic levels.		
Community severance & delay	<10% increase in traffic.	<30% increase in traffic.	<60% increase in traffic.	>60% increase in traffic.
Vulnerable road users	<10% increase in traffic.	Qualitative assessment of existing provision and future traffic levels.		
Road safety	<10% increase in traffic.	Quantitative assessment of existing accident records and predicted increases in traffic.		

Dangerous loads	0% increase in traffic.	<30% increase in traffic.	<60% increase in traffic.	>60% increase in traffic.
Dust & dirt	<10% increase in traffic.	<30% increase in traffic.	<60% increase in traffic.	>60% increase in traffic.

Significance of Effect (Potential Effects)

12.33 Sensitivity and magnitude of change as assessed under the criteria detailed above have then been considered collectively to determine the significance of effect, as described in **Table 12-4**T. The collective assessment is a considered assessment by the assessor, based on the likely sensitivity of the receptor to the change (e.g. is a receptor present which would be affected by the change), and then the magnitude of that change. Effects of 'major' and 'moderate' significance are considered to be 'significant' in terms of the EIA Regulations while effects identified and 'minor' or 'negligible' are generally considered to be 'not significant' in EIA terms.

Table 12-4: Significance of Effects

Significance of Effects					
Sensitivity of Receptor	**Magnitude of Impact**				
	No Change	**Negligible**	**Low**	**Moderate**	**High**
Negligible	Negligible	Negligible	Negligible	Negligible	Minor
Low	Negligible	Negligible	Minor	Minor	Moderate
Moderate	Negligible	Minor	Minor	Moderate	Major
High	Negligible	Minor	Moderate	Major	Major
Very High	Negligible	Minor	Major	Major	Major

Potential Cumulative Effects

12.34 An assessment has been undertaken to establish potential cumulative effects from all relevant developments upon the local road network within the study area, including local wind farms, within a 40km radius of the site (either in the planning system or under construction) which may utilise the same local road network and access routes as the proposed development.

Operational Cumulative Effects

12.35 As the operational impact of the proposed development on the study area is indiscernible, the operational cumulative effects have not been assessed.

Mitigation

12.36 The proposed development has been designed to include a range of measures to mitigate potential effects and the assessment assumed that general good practice would be deployed, with a detailed Construction Traffic Management Plan (CTMP) being secured prior to the commencement of development (**Technical Appendix 12.2**). The CTMP would be submitted to and approved by THC as required by condition to the deemed planning permission.

Residual Effects

12.37 Following consideration of mitigation measures, an assessment of the residual effects has been made. Potential residual impacts include general wear and tear to roads and verges as a result of increased traffic, and temporary road closures caused by AIL deliveries.

Statement of Significance

12.38 A statement of significance is provided at the end of the chapter which provides a summary of the complete assessment for each receptor, taking into consideration any proposed mitigation measures, and it reports the significance of the residual effects in compliance with the EIA Regulations.

Limitations to the Assessment / Difficulties Encountered

12.39 The assessment of the potential impacts to the baseline traffic relies on the accuracy of the traffic flow data. The subconsultants, Nationwide Data Collection (NDC), commissioned to collect the data are considered to be reliable and no issues were reported during the survey period.

12.40 The development trip generation has been based on the quantity of materials as confirmed at the time of the assessment (February 2022). While there is a possibility that these may alter, assumptions have been made to ensure that the figures are robust.

12.41 The ALRA has been prepared by another consultancy, Pell Frischmann. It is assumed that all information included within the ALRA is accurate and that the assessment of impacts from the transport of abnormal loads has been fully assessed.

12.42 The assessment has not specifically taken into account the potential changes in base traffic flows due to seasonal peak periods, however the traffic counts were undertaken during the end of August and so are considered to capture the latter stages of any summer peak season.

BASELINE CONDITIONS

12.43 This section details the baseline conditions that exist in the study area in relation to the existing road network, existing traffic flows and the current safety of the study area.

Current Baseline

Existing Road Network

12.44 The study area for this assessment has been defined as predominantly the A836:

- site access junction with the A836;
- A836 east of the site access to junction with the A9; and
- A9 to Scrabster Port.

Existing Traffic Flows

12.45 Baseline traffic flows were undertaken by 'Nationwide Data Collection' (NDC) who installed an automatic traffic count (ATC) within the study area along the A836 near to the existing site access junction.

12.46 The ATC location is shown on **Figure 12.1**. The ATC collected data continuously over the seven day period between Sunday 29 August 2021 to Saturday 04 September 2021, a period which lies outside of any school, public or bank holidays.

12.47 The raw data are provided in **Technical Appendix 12.3** and a summary of the average weekday (12-hour) traffic is provided in **Table 12-5**. The data includes directional and two-way flows.

Table 12-5: Average Weekday Traffic Flows – 12 Hour Flows

Period	Eastbound			Westbound			Two-Way		
	Total	HGV	%HGV	Total	HGV	%HGV	Total	HGV	%HGV
12-hour	538	4	1%	698	5	1%	1,236	9	1%

12.48 **Table 12-5** shows that the A836 in vicinity of the site access supports just over 1,200 vehicles (two-way) during an average 12 hours (07:00-19:00) on a weekday (Monday-Friday). The westbound flow of vehicles is slightly higher than the eastbound flow, making up 56% of the total two-way numbers. There are low numbers of HGVs shown to be on the A836 during the survey period, with 1% of total vehicles recorded as HGVs.

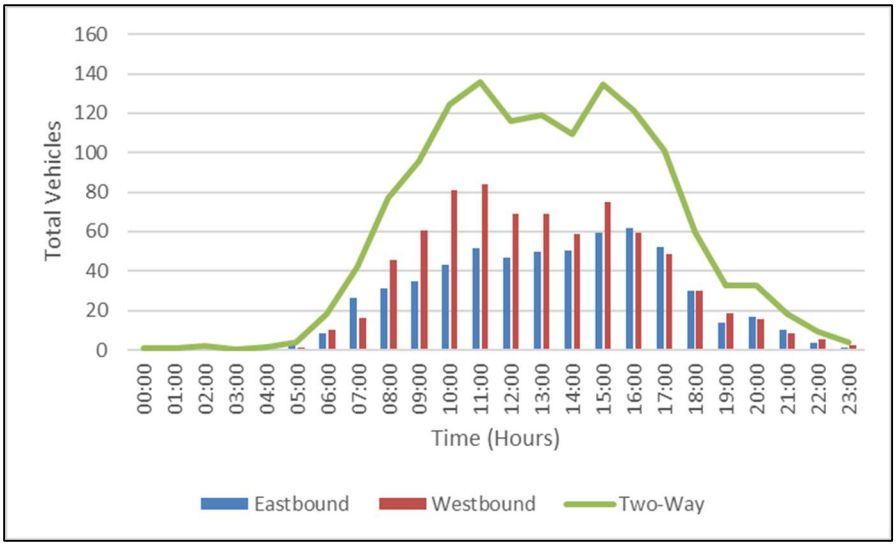
12.49 The Department for Transport (DfT) has two counters located on the A836 in vicinity to the site access junction. Point 40935 is located at Strathy to the west, and point 10934 is located at Forss to the east. The counts provide annual average data from manual counts with data in subsequent years estimated from the manual counts.

12.50 Count point 40935 last recorded data in 2013; the estimated 2019 figures based on this suggested a total of 733 vehicles over an annual average day, with 2.8% HGVs. Count point 10934 provides annual average data from a manual count recorded in 2020. This recorded 1,927 total vehicles over an annual average day, with 1.4% HGVs. It is noted that the previous year's estimation was slightly higher, however the data shows a common trend in manual count recorded flows being lower than

previous estimated flows, and so the data is considered robust and not shown to be impacted by the Covid-19 pandemic. The DfT data confirms that the traffic survey results are within expected values being an approximate mid-point.

12.51 Traffic flow profiles showing the eastbound, westbound and two-way traffic flows over a 24-hour period have been plotted on **Graph 12-1**. The data plotted have been obtained from an average of weekday vehicle numbers recorded at the traffic count location.

Graph 12-1: 24 Hour Average Weekday Traffic Profile



12.52 **Graph 12-1** shows that traffic flows along the A836 fluctuate between 100 and 140 total two-way vehicles, with the peak of two-way flows at approximately 11:00. There is also an obvious PM peak recorded in the two-way flows at approximately 15:00. It is evident that the direction of traffic is dominant in a westbound direction over the course of an average weekday receiving approximately 56% of the total flow.

12.53 The A836 is part of the North Coast 500 route and is likely to experience higher flows during seasonal peak periods. The traffic counts were undertaken outside of the summer vacation period in Scotland, however as the tourist season extends from May through to September it is likely that traffic flows were higher during the survey.

Network Capacity Performance

12.54 The capacity performance of the A836 has been calculated from Design Manual for Roads and Bridges, Volume 5, Section 1 TA 46/97, and compared against the existing 24-hour baseline traffic flows. The spare capacity has then been calculated and presented in **Table 12-6**.

Table 12-6: Existing Capacity of A836

Baseline Flow (24-hr)	Capacity	Spare Capacity	Spare Capacity %
1,359	18,329	16,970	93%

12.55 The A836 has been calculated to have a theoretical spare capacity of approximately 93%.

Accident Records

12.56 Personal Injury Accident (PIA) collision data have been obtained for the A836 from Transport Scotland (TS), and all data provided can be viewed at **Technical Appendix 12.4: Accident Data** and on **Figure 12.2**. The data provided by TS covered the years from 2014 to 2019; at the time there was no data available for 2020. The data have been cross referenced with the CrashMap[1] database to confirm the location of each accident and to review any data available for 2020. The data for 2014 and 2015 has been removed so that five years of accident data is provided (2016-2020).

12.57 Data detailing the specific causes of the recorded accidents, vehicle classification and number of vehicles involved has not been included in the data provided by TS; meanwhile, CrashMap has been used to confirm the number of vehicles involved in each accident.

12.58 This data is used to determine the existing road safety situation and to establish a base against which the effects of the proposed development are assessed. The data includes PIA collision records on the A836 from west of the existing access junction to the junction with the A9(T).

12.59 For clarification, those accidents recorded which result in slight injury indicate that the victim was likely to suffer from slight shock with occurrences of sprains or bruises from the accident, whereas a serious accident accounts for breakages, lacerations, concussion or hospital admittance. A fatal accident means there was a resultant death from the injuries sustained.

12.60 The injury accident data obtained from TS is summarised in **Table 12-7**.

Table 12-7: Injury Accident Data (at the time of writing)

Date	Severity of Injury	Number of Vehicles	Number of Casualties
17/02/2016	Fatal	2	3
15/08/2016	Serious	1	1
26/09/2016	Slight	2	2
09/11/2016	Slight	1	1
18/11/2016	Slight	1	1
15/12/2016	Slight	3	4
26/03/2017	Slight	1	3
15/05/2017	Serious	2	1
26/05/2017	Slight	1	1

[1] www.crashmap.co.uk

18/09/2017	Slight	1	1
27/05/2018	Slight	1	4
26/06/2018	Serious	1	1
06/07/2018	Slight	2	1
23/04/2019	Slight	1	1

12.61 A total of 14 accidents were recorded throughout the study area. A total of 25 casualties resulted from the 14 accidents and of these there was one fatality recorded, three serious injury accidents and 21 slight injury accidents. Most accidents appear to have occurred during 2016 and 2017 with six and four accidents recorded respectively; there were three accidents recorded in 2018 and 1 recorded in 2019. This would appear to show a pattern of reduced injury accidents and this gradual reduction in the number of accidents recorded in recent years could result from improvements along the route or to an improved awareness of road safety.

12.62 It would appear as though there were no accidents on the A836 in the vicinity of the junction of the Kirkton Farm road with the A836, with the closest accident recorded 2.2km east along the A836; this accident occurred in November 2016 and involved a single vehicle, resulting in slight injury. There were two separate accidents recorded at Reay, a serious accident in 2016 and a slight accident in 2019; over half (9No) of the accidents recorded involved a single vehicle. There has been one fatal accident as reported in the Transport Scotland data, located to the east of the site close to Forss. The accident occurred in 2016 and involved two vehicles resulting in slight injury to two casualties and fatal injuries to a third casualty.

12.63 The review of data available at CrashMap has enabled the locations of accidents to be confirmed. The data has not identified any accident clusters and there have been no accidents recorded at junction locations; this would indicate that there are no localised accident issues. Nine of the 14 accidents involved a single vehicle. The road is subject to the national speed limit and includes a variety of bends as well as straight sections. With 64% of the accidents involving a single vehicle, speed could be a factor in some of the recorded accidents.

12.64 CrashMap includes information about a second fatal accident that was not captured in the data provided by TS. This accident occurred in May 2018 and involved a single vehicle with fatal injuries to a single casualty. Any fatal accidents are a concern, however the two recorded are located more than 17km east from the site on the A836, close to Thurso.

Existing Road Network Performance

12.65 From the sections above which had provided an assessment of the baseline situation, the following may be concluded:

- the existing road network is laid out to allow substantial reserve capacity against existing traffic demand; and
- the study area does not have a significant safety issue and the number of accidents recorded in the vicinity of the site are not high.

Cumulative Situation

12.66 From the sections above which had provided an assessment of the baseline situation, the following may be concluded: To assess the potential cumulative effects resulting from the site traffic it is necessary to identify other projects which have the potential to result in cumulative effects where the construction period may coincide with the construction of Kirkton Energy Park. The relevant sites have been identified and are described below in paragraph 12.145.

THE PROPOSED DEVELOPMENT (FUTURE BASELINE)

12.67 The proposed development is detailed in full within **Chapter 3: Description of Development**. The proposed development consists of 11 wind turbines with a maximum tip height of 149.9m. Access to the site would be provided via the existing access which runs past Kirkton Farm (Kirkton Farm Road).

12.68 Investigations on-site have confirmed that the full volume of aggregate rock material required during the construction phase will be obtained via on-site borrow pits. A concrete batching plant is to be provided on site for use in the upgrade and construction of the internal access tracks.

12.69 The proposed development is also to include:

- abnormal load turning area off the A836;
- upgrades to internal site tracks;
- new internal site tracks;
- turbine foundations and crane hardstandings;
- substation compound including control building, battery storage, external equipment and ancillary grid service equipment;
- underground electrical cabling from turbines to the onsite substation;
- a temporary construction compound;
- two borrow pit search areas; and
- a temporary construction compound.

Site Access and On-Site Tracks

12.70 There are multiple areas where the ALRA swept paths have determined that third-party land will be required on both sides of the road to allow for the manoeuvring of AILs. In addition, improvement works have been identified for the Kirkton Farm Road, as the road will need to be widened to a minimum of 4.5m to accommodate the transport of the wind turbine components.

12.71 A blade transfer/ tower turning area to the west of Kirkton Farm Road will be constructed on third-party land. There are currently two sites identified as possible locations for the turning area, however only one will be required. This will allow AILs to turn around and access onto Kirkton Farm Road more easily at a better turning angle.

12.72 There are some existing tracks within the site which will be utilised, with some upgrading; however, there will also be approximately 5.5km of additional new track required.

Turbine and Turbine Foundations

12.73 The wind turbines would be delivered in component parts (7 per turbine) and are defined as abnormal loads; loads which exceeds 6.1m in overall width, 30m in length or a weight exceeding 150,000kgs. Precise turbine details have not been determined at this stage, however for the purpose of this assessment and as set out within the ALRA, the Vestas V136 turbines will be used, with a reduced tip height of 149.9m and a blade length of 66.5m.

12.74 The proposed turbine delivery route begins at Scrabster port at Thurso; the route can be seen in **Figure 12.3**. There is one main route from Thurso to the site which is described in the Trip Distribution section.

12.75 Turbine foundations would be constructed in reinforced concrete, with concrete batched on site using imported cement and aggregates either imported or sourced from the on-site borrow pits.

Construction Programme

12.76 The proposed development would be constructed over a period of up to 18 months which is expected to commence in late 2025. Depending on the weather conditions, the site may be shut down over winter. Activities will include:

- off-site highway works;
- site establishment (construction compounds);
- construction of access tracks and crane pads;
- turbine foundation construction;
- substation civil and electrical works;
- cable delivery and installation;
- turbine delivery and erection;
- energy park commissioning; and
- reinstatement/restoration.

12.77 The main construction works which are expected to generate the most vehicle trips to the site will be undertaken during months 5 to 18, with the final 7 months of the construction programme

accommodating the wind turbine deliveries and erection. An indicative construction programme has been prepared and is set out in the construction timeline shown in **Chapter 3: Description of Development**, as summarised in **Table 12-8**.

Table 12-8: Indicative Construction Programme

Construction Activity	Months																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Access road improvements and reinstatement																		
Site establishment and restoration																		
Construction of haul road and site access to borrow pits																		
Construction of access tracks, crane pad and building compounds																		
Felling Required to facilitate infrastructure																		
Turbine foundation construction																		
Substation/ storage – civil and electrical works																		
Cable laying and sand for cable bedding																		
Crane delivery																		
Turbine delivery and erection																		

Site Construction Traffic Generation

12.78 The construction phase working hours for the proposed development would be 07:00 to 19:00 Monday to Friday and 07:00 to 16:00 on Saturdays. It should be noted that out of necessity some activity, for example abnormal load deliveries and the lifting of the turbine rotors, may need to occur outside the specified hours stated, although they would not be undertaken without prior approval from THC. The impact of the proposed development has been assessed over a 12-hour weekday period, which considers the natural peak usage of the road network.

12.79 The proposed development would require the transportation of a range of construction materials to the site. The key elements of construction work which would result in vehicle trip generation have been summarised in **Table 12-9**.

Table 12-9: Construction Activities Requiring Vehicle Trips

Key Work Element	Details and Assumptions	Conventional HGVs	Abnormal Loads
Site establishment	Provision of hardstanding, cabins and plant for construction activities at commencement of construction and later removal from site.	Yes	No
Site access	Provision of plant and materials associated with improvements to the site access.	Yes	No
Borrow Pits	Delivery of plant associated with establishing the borrow pit.	Yes	No
Access track upgrade and construction	5.5km of new onsite track, together with passing places and turning heads.	Yes	No
Crane hardstandings, turbine laydown areas and turbine foundations	Construction of crane hardstandings at each turbine location with additional laydown areas for blades in addition to cement, aggregate and reinforcement materials for turbine foundations.	Yes	No
Control buildings and substation	Construction of building foundations, structure and finishings. Installation of electrical equipment.	Yes	Yes
Electrical installation	Delivery of sand and cables to connect turbines to substation.	Yes	No
Wind turbine delivery	Transport of abnormal load turbine components to site. Bringing in of crane equipment to erect turbines. Includes escort vehicles associated with movement of abnormal loads.	Yes	Yes

12.80 An estimation of the aggregate material quantities for all elements of the proposed development has been made. **Table 12-10** provides a summary of the material quantities (aggregates only) required on site and for the offsite turning areas.

Table 12-10: Estimated Aggregate Quantities

Proposed Infrastructure	Volume of Aggregate (m^3)	Approximate Tonnages of Aggregate (tonnes)
Access tracks on site (excavated)	27,199	40,799
Existing Upgraded (on site)	2,034	3,051
Floating Track (on site)	2,559	3,839
Turning heads	864	1,296
Passing Places	1,008	1,512
Turbine bases – formation only	2,200	3,300
Fill above turbine bases	15,378	23,067
Hardstanding and Temporary Laydown	28,188	42,282
Turning Areas (offsite)	4,000	6,000
Substation	7,500	11,250
Construction compound	3,125	4,688
TOTAL	**94,055**	**141,084**

12.81 A total of 141,084 tonnes (t) of aggregate material will be required for the construction of the proposed development. Two borrow pit search areas would be located in the north of the site. The first borrow pit is expected to deliver 93,000t (62,000m^3) of aggregate and the second borrow pit is expected to deliver approximately 102,000t (68,000m^3) of aggregate. As such, with 195,000t of aggregate sourced from within the site, it is expected that a limited amount of additional aggregate will be imported. To ensure a robust prediction of HGV numbers travelling to the site, it is assumed that 10% (14,108t) of the overall aggregate material will be required at the site before the borrow pits have been accessed.

12.82 It is possible that the turning areas will require construction before the borrow pits are available and so it has been assumed that the 6,000t of aggregate for the turning area would be imported.

12.83 **Table 12-11** provides material quantities for all other non-aggregate materials and also includes the quantity of aggregate assessed to be imported.

Table 12-11: Estimated Material Quantities Excluding Aggregate Sourced From Borrow Pits

Construction Activity	Infrastructure	Material Quantities
Site aggregate	Imported aggregate	14,108t
Turning Areas	Imported aggregate	6,000t
Turbine foundations	Installation 6N structural fill	4,342t
	Blinding	624t
	Installation of can/ bolts	11no
	Reinforcement	902t
	Plinth shutter	41.03t
	Base slab perimeter shutter	96.03t
	Ducts (200mm diameter)	66no
	Ducts (75mm diameter)	66no
	Transformer plinths	11no
	Step plinths	11no
Electrical connection	Sand layer – (5,484m length by 0.5m x 0.25m)	1,371t
	Cable – drums hold 500m	11 drums
Cement	-	198t
Control Building	Reinforcement	48t
Battery storage	Batteries, containers, inverters & transformer	28no
Substation compound	Imported type 1 running surface	1,255t
	Imported 6F2 capping	2,515t
	Class 1C1 Roadbox bulk fill	6,284t
	Class 1 general fill	18,828t

Trip Generation

HGV Trip Generation

12.84 The total number of HGV trips predicted to arise during the construction phase of the proposed development has been calculated based on estimated material quantities provided in **Table 12-11**. These have been doubled to provide the two-way movements that would occur from delivery and then returning vehicles, as shown in **Table 12-12**.

Table 12-12: Total Number of HGV Trips

Construction Activity	Infrastructure	Load Size	No. of Loads	Two-Way Movements
On-site	Imported Aggregate	20t	705	1411
Turning areas	Imported aggregate	20t	300	600
Turbine foundations	Installation 6N structural fill	20t	218	436
	Blinding	20t	32	64
	Installation of can/ bolts	-	1	2
	Reinforcement	20t	46	92
	Plinth shutter	-	1	2
	Base slab perimeter shutter	-	1	2
	Ducts (200mm diameter)	-	1	2
	Ducts (75mm diameter)	-	1	2
	Transformer plinths	-	11	22
	Step plinths	-	11	22
Electrical connection	Sand layer – 5,484m of trench (0.50m x 0.25m)	20t	69	138
	Cable – drums hold 500m	-	11	22
Cement	-	9t	22	44
Control Building	Reinforcement	20t	2	4
Battery Storage	Batteries, containers, inverters & transformer	-	25	50

Substation compound	Imported type 1 running surface	20t	63	126
	Imported 6F2 capping	20t	126	252
	Class 1C1 Roadbox bulk fill	20t	315	630
	Class 1 general fill	20t	942	1,884
Total Loads/ Two-Way Movements			**2,903**	**5,807**

12.85 The two-way movements for HGVs have been spread over the construction programme according to the relevant activity. HGV trips associated with the construction of the control building have been added. The total two-way trip generation has been divided by the number of construction working days in each month to provide daily two-way trip generation. **Table 12-13** provides the total two-way vehicle generation for an average day within each month (30 days) of the 18 month programme.

12.86 For ease of phasing the construction period, the following categories have been used which state the materials used (the final three months, not included, are reserved for commission of the wind turbines and for takeover):

- site establishment and restoration – it has been assumed that the majority of work will involve the use of aggregates and so there will be no trips from off-site. The import of the aggregate for the turning areas has been included in this phase;
- access track construction – this also will require aggregates, 10% of which will be sourced from external locations for delivery during the first five months of construction;
- substation construction – this will include some aggregates and all materials associated with the substation compound, including the battery storage elements;
- cement – materials for cement;
- cabling – electrical connection materials; and
- turbine foundations – turbine bases, fill above turbine bases (aggregates) and all associated materials for turbine foundations. The delivery of the turbines is not included here.

Table 12-13: Daily Two-Way HGV Trip Generation by Construction Month

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site establishment and restoration					7	7	7							-	-	-	-	-
access tracks & haul roads	10	10	10	10	10	-	-	-	-	-	-							
Substation works										11	11	11	11	11	11	11	11	11
Cable laying											1	1	1	1	1	1	1	1
Cement											1	1	1	1	1	1	1	1
Turbine foundations												3	3	3	3	3	3	3
TOTAL	10	10	10	10	17	7	7	-	-	11	13	16	16	16	16	16	16	16

HGV Trip Generation

Table 12-13 confirms that month 5 and months 12 to 18 would see the highest number of HGV two-way movements over a consistent period, with an average of 17 and 16 per day as the maximum. Through the working day this would result in less than 2 two-way HGV movements per hour.

Abnormal Load Trip Generation

12.87 Each wind turbine consists of seven abnormal load deliveries: three blades, three tower sections and the nacelle (generator). Other loads would be associated with the delivery of the hub, cranes and drilling rigs, which would not be considered to be AILs, these however would be delivered at a similar time. Towers would be carried in a 4+7 clamp adaptor style trailer, whereas loads such as the hub, nacelle housing and top towers would be carried on a six axle step frame trailer. All components would be transported under suitable traffic management procedures. Where constraints are extreme, loads would be transferred onto a Goldhofer blade lifting trailer. This trailer has the ability to lift blades up to a maximum angle of 60 degrees, lifting blades over potential constraints and shortening the length plan view.

12.88 On the premise that the 77 components are to be delivered in convoys of three, the AILs could be completed over 26 days. Over the seven-month period allocated for the erection of the turbines, this would equate to an average of approximately 1 delivery day per week.

12.89 To ensure a robust assessment, it has been assumed that three abnormal load transport vehicles would deliver components on a day during the 'worst case' month, with an additional two HGV deliveries included for the crane and drilling rigs.

Light Vehicles and Staff Trip Generation

12.90 Light vehicles of which consist of smaller vehicles such as cars and vans, which would typically be associated with the workforce, have also been calculated to provide total two-way vehicle movements predicted to arise from the proposed development. It is envisaged that a maximum of 30 personnel would be required on the site at any one time. Based on the conservative assumption that 20% of workers would car share, this would equate to 24 vehicle trips per day (48 two-way movements per day).

Accumulative Trip Generation

12.91 **Table 12-14** provides the calculated daily and hourly two-way movements during the 'worst-case' month of the construction phases (month 5).

Table 12-14: Trip Generation (two-way)

	HGV/ AIL	Lights	Total
Daily	22	48	70
Average Hour	2	4	6

Trip Distribution

12.92 All construction vehicles (except abnormal loads) would enter the site from the east, having travelled along the A836. It is anticipated that all HGVs and deliveries will travel from further afield via the A9 to the A836, with no construction traffic travelling from the west. In addition, it is assumed that the A897, which extends south from the A836 at Melvich to the A9 at Helmsdale, is not suitable for HGVs and so this route is not included.

12.93 Abnormal load deliveries will continue westbound along the A836 past the Kirkton Farm Road access road where they will utilise one of the two blade transfer/ tower turning locations before turning back onto the A836 and travelling eastbound to turn right onto Kirkton Farm Road for access to the site.

12.94 Light vehicle trip generation would see a maximum of 48 two-way trips each day during the worst-case months. It has been assumed that the majority of light vehicles will travel to the site via the A9 and the A836, however a small number may travel along the A897 to the A836 and may also travel west along the A836. As such, it is assumed that 90% of light vehicles will travel along the A836 to the A9, with 5% heading west from the site along the A836 and 5% heading east before heading south onto the A897.

ASSESSMENT OF EFFECTS

Potential Construction Effects

Embedded Measures

12.95 The proposed development has been designed to include a range of measures to mitigate potential effects. Embedded mitigation for the site includes design of two candidate off-site turning areas, only one of which will be utilised, to ensure that abnormal loads access the site with ease. All such measures are described fully in **Chapter 2: Site Description and Design Evolution** and **Chapter 3: Description of Development**.

12.96 The assessment has been undertaken under the assumption that general good construction practice would be deployed and that, prior to the commencement of development, a detailed Construction Traffic Management Plan (CTMP) would be agreed with THC and through consultation with the Police and Transport Scotland as required. A Framework CTMP (**Technical Appendix 12.2**) has been prepared to outline the likely measures to manage the impacts from site traffic and this will be used to form the structure of the detailed CTMP, to be adopted by the on-site contractor.

12.97 The detailed CTMP would include a number of measures to reduce the effects of the construction of the proposed development on local receptors and communities, including effects from turbine deliveries (abnormal loads). This would include details of any required temporary widening and other road improvement measures, together with detailed consideration of vehicle swept paths, loadings, structural assessments (where required), temporary street furniture removal details, dust and dirt management, and community engagement. An element of preparation of the CTMP would be a trial run, which would be undertaken through a special licence, with THC and TS as the Roads Authorities, and Police Scotland in attendance. Information, with regards to abnormal loads, would be provided to local residents and users of amenities to alleviate stress and anxiety.

12.98 It has also been assumed that:

- a reputable construction contractor would be procured, with an Environmental Policy and good environmental track record;
- all HGVs delivering materials to the site would be roadworthy, adequately maintained and sheeted as required;
- adequate traffic management and banksmen would be deployed for the movement of HGVs and abnormal loads; and
- HGV loads would be maximised to ensure that part load deliveries would be minimised.

Construction Effects

12.99 The predicted increases in traffic levels against the baseline levels have been calculated in this section, and an assessment of the significance of the effect has been made against the criteria described in **Table 12-2** and **Table 12-3**.

12.100 The IEMA guidelines provide two thresholds when considering predicted increases in traffic, whereby a full assessment of impact would be required:

- where the predicted traffic flows would increase by 30% or more (or where the number of HGVs is predicted to increase by more than 30%; and/or
- where traffic flows are predicted to increase by 10% or more in areas identified as sensitive.

12.101 Although sensitive receptors, e.g. residential properties are present within the study area, the study area in its entirety is not considered to be sensitive, and therefore the threshold of 30% has been applied.

12.102 Construction phase working hours for the proposed development would be 07:00 to 19:00 Monday to Friday and 07:00 to 16:00 on Saturdays, other than in exceptional circumstances. It should be noted that out of necessity some activity, for example abnormal load deliveries and the lifting of the turbine rotors, may need to occur outside the specified hours stated, although they would not be undertaken without prior approval from THC. The impact of the proposed development has been assessed over the 12-hour weekday period, which considered the natural peak usage of the road network.

12.103 The increase in traffic flows along the A836 has been calculated for the maximum trip generation occurring during the worst-case month and for the average trip generation likely to occur during the rest of the construction phase, without the inclusion of the abnormal load deliveries. **Table 12-15** shows the predicted daily total and HGV traffic increases for these two different occurrences. The baseline flows are those observed on an average weekday over a 12-hour period between 07:00 and 19:00.

Table 12-15: Predicted Daily Increase in Traffic along the A836 – 12 Hour Flows

Road Link	Trip Case	Baseline		Development		Baseline + Development		Increase %	
		Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
A836 East of Site	Maximum day	1,235	9	70	22	1,318	44	6%	244%
	Average day			65	17	1,300	26	5%	189%

Traffic Increase Summary

12.104 The results above show that all percentage increases in total traffic volumes are below the IEMA thresholds (i.e. an increase of 30%); however the increase in HGV traffic along the A836 are in exceedance of the IEMA thresholds.

12.105 The largest increase would be where the total traffic flows increase by 6% (244% HGV increase) for a worst-case day.

12.106 The average day during the construction period would see only an 5% increase to total traffic flows, but a significant 189% increase to HGVs.

12.107 In summary, while total traffic levels are within the IEMA thresholds of a 30% increase to traffic flows along the A836 east of the site access point, HGV trip generation is significantly increased for both the worst-case scenario and the average day. While the increase in HGVs is significant above the base level of HGVs, it can be confirmed that the impact to the theoretical capacity of the road is negligible with capacity remaining at 92% even during the maximum day.

Potential Effects

Effects on Driver Severance and Delay

12.108 The IEMA guidance states that there are a number of factors which determine driver severance and delay; these include delay caused by additional turning vehicles and additional parked cars at the site, delays at junctions due to increased traffic, as well as delays at side roads due to reduced gaps in the oncoming traffic.

12.109 The capacity performance of the A836 (refer to paragraph 12.54) determined that existing traffic levels on this road are substantially below the maximum theoretical capacity of the road with 93% spare capacity. It is therefore considered that the proposed development would not lead to a material adverse capacity impact on the A836. As such, the impact of the construction traffic on driver severance will have a **negligible magnitude**.

12.110 Using the criteria outlined in **Table 12-2** and **Table 12-3**, driver severance and delay is considered to be of **low sensitivity** as the road network will be affected but is not currently experiencing congestion at peak times, and the magnitude of the potential effect is considered to be negligible (a less than 10% increase in total vehicular flows on the local highway but well within the maximum theoretical capacity of the road network).

12.111 As such, and in line with **Table 12-4**, the over all effects are assessed as **minor and not significant** in terms of EIA Regulations**.**

Effect on Road Safety

12.112 There are no general thresholds used when determining the significance of increased traffic on highway safety, therefore professional judgement is required to identify the potential road safety effects associated with the construction phase. The IEMA guidance confirms that existing road accident rates and professional judgement are needed to assess the implications of the cumulative construction traffic. It should be noted that this assessment does not constitute a road safety audit.

12.113 The accidents recorded within the study area are discussed in paragraphs 12.56 to 12.64. From the data provided by TS, it was identified that a total of 14 injury accidents were recorded within the study area. 10 of the accidents resulted in slight injury with three serious accidents. The review of the CrashMap data identified that there were two fatalities within the five year period, although only one was recorded in the data provided by TS. While any instances of injury accidents are unwelcome, 14 accidents over five years indicates that there is no serious issues with road safety. However as identified in **Table 12-2** the study area would be classified as having a **high sensitivity** to any impact.

12.114 Deliveries of large components such as those required for the substation and turbines would be moved under suitable traffic management procedures, including the provision of banksmen at the site access junction and appropriate warning signage.

12.115 The predicted number of HGV movements would be greater than the 30% threshold as set out in **Table 12-15**, however, this would be easily accommodated within the available capacity of the road network and road safety would not, therefore, be compromised. Any impacts would be limited and temporary due to the relatively short construction period (approximately 18 months) and so the impact to road safety will have a **negligible magnitude**.

12.116 In summary, the proposed development would create a significant increase to HGV traffic levels within the study area but these levels would remain well within the design capacity of the local road network. The accident records for the study area are relatively low, with 14 accidents occurring over the five-year study period. The level of effect is therefore considered to be **minor adverse and not significant**.

Effect on Community Severance

12.117 The IEMA guidance identifies severance as *"the perceived division that can occur within a community when it becomes separated by a major traffic artery"*. As an example, a road that passes through a community such as a town or village, where perhaps amenities are located on one side of the road and residential properties are located on the other side, causes severance to the movements between those places. The degree of severance depends on the traffic levels on the road and the presence of adequate crossing opportunities.

12.118 The A836 does sever the communities of Reay and Melvich with residential properties and local amenities situated on both sides of the road, however there are limited instances where residential dwellings are separated from community facilities. The potential for community severance for this section of the study area is considered to be low and the community receptor is considered to have **negligible sensitivity**.

12.119 While ordinarily vehicle trips from a development would distribute throughout the road network, all generated vehicles for the proposed development will travel to and from the east on the A836, with approximately 100% of HGV trips and 90% of the light vehicle trips impacting these communities. However, the increase in total traffic would be below the IEMA threshold of 30%. As such the additional traffic within the study area will have a **negligible magnitude** of impact.

12.120 In accordance with the significance criteria detailed in **Table 12-2** and **Table 12-3**, community severance has been classified as a low sensitivity receptor and the effects of the proposed development on community severance would be **negligible and not significant**.

Effects on Noise and Vibration

12.121 Noise has been classified as a **moderate to high sensitivity** receptor as residential properties are present adjacent to both sides of the A836 within the study area. As discussed in **Table 12-3**, the IEMA Guidelines state that an increase in noise due to an increase in traffic of less than 25% is deemed to have a **negligible magnitude** noise impact to receptors with anything greater than 25% requiring a quantitative assessment.

12.122 The maximum traffic increase predicted for the proposed development is 70 vehicle movements per day. This is less than 25% of the current number of daily vehicle movements along the A836 and hence, the traffic noise effects are considered to have a **negligible impact and not significant**.

12.123 The full environmental effects of noise and vibration are covered in **Chapter 13: Noise**.

Effects on Vulnerable Road Users

12.124 Vulnerable road users are considered to be a **high sensitivity receptor** according to the assessment criteria detailed in **Table 12-2**.

12.125 The impact of traffic on vulnerable road users would be most significant within settlements along the proposed access routes where the presence of vulnerable road users, such as pedestrians and cyclists, is greatest. This includes the communities of Reay and Melvich. In addition, the A836 is part of the 'North Coast 500', a tourist route around the north of Scotland used frequently by cyclists.

12.126 The percentage increase in traffic would be less than 10%. The majority of trip generation from the proposed development would arise from light vehicles (48 vehicles), with an additional 22 HGVs per day during the worst case months. With the traffic on the A836 to increase by less than 10% and for the period of impacts to be temporary, it can be confirmed that there will be a **negligible magnitude** of impact. The effect on vulnerable road users is therefore considered to be **minor and not significant** over the life of the construction period in terms of the EIA Regulations.

Impact Caused by Movement of Abnormal Loads

12.127 The access route report for abnormal loads is provided in **Technical Appendix 12.1**. The assessments undertaken for the transportation of the AILs has demonstrated a feasible route coming direct from the Port of Scrabster. The route is considered suitable for such movements, subject to localised temporary works at junctions and pinch points to facilitate movements. Two locations have been included for turning areas, with one to be selected for use during the delivery of the turbines. The route would pass all properties from the port to the Site, and so is considered to have **moderate sensitivity**.

12.128 Any modifications to existing road layouts would be confirmed through a trial run and further surveys, and any modifications or works required to accommodate abnormal loads would be discussed with THC and TS as the Roads Authorities and the necessary consents and permits would be obtained in advance of any works or delivery periods.

12.129 Transportation of the turbine equipment would lead to the following effects:

- the rolling closures of roads and footways causing temporary driver and pedestrian delay; and
- the perceived effect to pedestrians and vulnerable road users caused by the movement of large turbine components in close proximity to property and infrastructure.

12.130 The severity of these impacts is considered as follows:

- delays to drivers due to lane/road closures would be inevitable, though abnormal loads would travel in convoy as described above (paragraphs 12.84 to 12.86) and movements would be timed so as to avoid the peak hours. Abnormal load movements occurring outside of the peak hours would have a temporary minor adverse effect; and

- the perceived effect to residents is subjective and it is likely that the transport of abnormal loads close to properties could lead to local objection, stress and anxiety. Residential properties/sensitive receptors within the study area include the communities of Reay and Melvich situated adjacent to the A863.

12.131 It is also important to note that the abnormal load movements would occur over a short period of time.

12.132 Each wind turbine consists of seven component parts: three blades, three tower sections and the nacelle (motor). Other loads would be associated with the delivery of the hub, cranes and drilling rigs, which would not be considered to be AILs, they however would be delivered at a similar time. These movements would be on articulated low loaders and would be moved under suitable traffic management procedures, including the provision of banksmen and appropriate warning signage.

12.133 There may be the potential to group the turbine component deliveries into a number of small convoys. This would allow the deliveries to occur over a reduced number of days, while only slightly increasing the impact on those days.

12.134 Turbine deliveries would be undertaken in consultation with the relevant roads authorities (THC and TS) and Police Scotland and could include movements during the night which would reduce effects on road users at busier daytime periods. Deliveries are also usually scheduled to avoid peak times of the day and school opening/closing times.

12.135 There would be an unavoidable **moderate magnitude** impact associated with the delivery of turbine components, however with suitable public awareness and the proposed grouping of component deliveries, the significance of effect would be **moderate and significant** with all impacts limited to the turbine delivery days.

Effects Due to Dust and Dirt

12.136 The movement of construction traffic to and from the site would have the potential to bring dust, dirt and other detritus onto the highway. Sensitive receptors within the study area include residential properties along the A836 at Reay and Melvich. These residential receptors may experience dust and dirt and have been classified as **moderate sensitivity** receptors.

12.137 HGVs are likely to create the greatest impact in terms of dust and dirt. HGV traffic is anticipated to considerably increase, with a 244% rise on the A836 during the 'worst-case' months. Despite this, the site is relatively remote from the public highway, and would be accessed via a long access track, reducing the risk of dust and dirt being transported onto the highway. As such, the impacts are considered to be of **low magnitude**.

12.138 The percentage increase in HGVs is classified as major in magnitude, however as this would affect low sensitivity receptors, the potential effect would be **minor and not significant**.

Mitigation

12.139 A Framework CTMP has been prepared to outline the mitigation measures that would be suitable to apply during the construction phase. A full and detailed CTMP would be prepared prior to the commencement of the construction phase, as detailed in paragraphs 12.92 to 12.94.

12.140 Mitigation measures to reduce the potential for dust and dirt to make its way on to the local highway network would be undertaken including the cleaning of vehicle wheels during wet periods and the sheeting of aggregate lorries.

12.141 To reduce the impacts associated with the transport of abnormal loads, early consultation with local residents will include discussions around the timing of abnormal load deliveries and all concerns will be taken into account.

Operational Effects

12.142 The operational effects have been scoped out of this Chapter as discussed previously in paragraph 12.13 and 12.14.

Decommissioning Effects

12.143 The post-operational stage effects (decommissioning) have been scoped out of this Chapter as discussed in paragraph 12.15 to 12.16.

Cumulative Impacts

12.144 **Chapter 5: Environmental Impact Assessment** provides further information on the approach to cumulative sites in the assessment process.

12.145 To assess the impacts associated with an accumulation of construction traffic, the timing of surrounding wind farms has been considered. Wind farms which are currently within the planning system, have been given planning permission and are within 40km of the site are included in the assessment.

12.146 The predicted maximum daily two-way generation on the A836 has been included. **Table 12-16** assumes the worst-case trip generation month for all the wind farms would occur at the same time. Trip generation information for some of the developments are not currently accessible form the THC Planning Portal, but where no information is available this has been specified in the table.

Table 12-16: Cumulative Wind Farm Sites

Wind Farm	Status	No. of Turbines	Distance from Site	Direction from Site	A836 Daily (Two-Way)	Notes
Pentland Floating offshore wind farm	Scoping	6-10	25km	North east	-	The scoping report does not include any traffic generation figures. This is an

Wind Farm	Status	No. of Turbines	Distance from Site	Direction from Site	A836 Daily (Two-Way)	Notes
						offshore wind farm, so limited traffic generation.
Bettyhill Wind Farm Extension	In Planning	11	12.39km	West	69	Maximum day two-way movements taken from the Access, Traffic and Transport Chapter.
Limekiln S36 Variation	Approved	19	7.46km	East	102	As per EIAR – Pell Frischman Transport Assessment.
Limekiln Extension	Approved	5	10.47km	East	51	As per Transport Chapter in EIA Report.
Strathy South	Approved (tip height variation approved)	35	7.95km	South west	172	Information taken from *'Technical Appendix 8.3: Strathy South Wind Farm – Consented Scheme: Assessment of the potential traffic and transport effects (based on 2023 Baseline)'* dated 3 August 2020. Figure taken from the worst-case months during the 24-month construction programme.
Strathy Wood	Approved	13	4.60km	South west	18	Both AIL deliveries and HGVs to use A836.
Armadale	In Planning	12	6.64km	West	80	As per Transport Chapter in EIA Report.
Total					492	Total values have been calculated based on all of the wind farm's maximum trip generation occurring at the same time.

12.147 **Table 12-16** shows that a maximum of 492 two-way trips would be added to the A836 should all of the identified be constructed at the same time. As previously discussed, the A836 currently operates significantly below capacity. With the addition of the cumulative assessment movements stated in **Table 12-16**, the A836 would still operate significantly below capacity.

12.148 In the event that construction of the proposed development and any of the identified cumulative wind farm schemes occur concurrently, this would not lead to any additional environmental effect in transportation terms, beyond that already assessed, provided that:

- abnormal load movements are programmed in conjunction with Police Scotland and the Roads Authorities (THC and TS) so as not to occur on the same day; and

- days of specific high density traffic movement (e.g. concrete pour days) are programmed so as not to occur on the same day (to be enforced through inclusion as a factor within the CTMP, to be agreed with THC, along with Police Scotland and the Roads Authority accordingly).

SUMMARY OF PREDICTED EFFECTS

12.149 The effects associated with the proposed development are summarised in **Table 12-17**.

Table 12-17: Summary of Predicted Effects (Pre-Mitigation)

Type	Duration	Sensitivity	Magnitude	Significance
Noise & vibration	Temporary	High	Negligible	Not significant
Driver severance & delay	Temporary	Low	Negligible	Not significant
Community severance & delay	Temporary	Negligible	Negligible	Not significant
Vulnerable road users	Temporary	High	Negligible	Significant
Road safety	Temporary	High	Negligible	Not significant
Hazardous and dangerous loads	Temporary	High	Moderate	Significant
Dust & dirt	Temporary	Medium	Moderate	Significant

12.150 Following the assessment of traffic impacts, the significance of potential effects that could occur during construction both before and after proposed mitigation measures are presented in **Table 12-18**.

Table 12-18: Summary of Predicted Effects (Pre and Post-Mitigation)

Potential Impact	Pre-Mitigation		Proposed Mitigation / Enhancement	Residual Effects	
	Magnitude	Significance		Magnitude	Significance
Noise & vibration	Negligible	Not significant	Traffic Management Plan for the movement of abnormal loads. Framework Construction Traffic Management Plan (CTMP) provided. Trial Run for abnormal loads prior to commencement of construction. Provision of information to local residents and users of amenities, to involve the community in the safe operation of the Traffic	Negligible	Not significant
Driver severance & delay	Minor	Not significant		Minor	Not significant
Community severance & delay	Low	Not significant		Low	Not significant
Vulnerable road users	Moderate	Significant		Minor	Not significant

Potential Impact	Pre-Mitigation		Proposed Mitigation / Enhancement	Residual Effects	
	Magnitude	Significance		Magnitude	Significance
Road safety	Minor	Not significant	Management Plan and to alleviate stress and anxiety. Good construction practices including wheel wash and careful loading.	Minor	Not significant
Hazardous & dangerous loads	Moderate	Significant		Minor	Not significant
Dust & dirt	Moderate	Significant		Minor	Not significant

Residual Construction Effects

12.151 Residual effects are those that would still occur after mitigation measures have been incorporated into the scheme. Potential residual effects are most likely to be those associated with delivery of the abnormal loads and resultant temporary road closures. A summarised in **Table 12-18** above, those impacts identified as significant will be mitigated through the proposed measures, with the impacts managed to ensure that they are not significant.

12.152 Significant other residual effects in relation to the proposed development are unlikely as the percentage increase in total traffic along the A836 is less than the 30% threshold and the road would still be operating well within maximum capacity.

STATEMENT OF SIGNIFICANCE

12.153 Taking account of all the potential effects that are likely to arise and the assessment having tested the worst-case scenario expected, it is considered that the proposed development would not lead to a significant adverse effect due to traffic impacts.

12.154 The assessment concludes that the impacts during the construction phase will not be significant; the review of the worst-case scenario, the temporary nature of the construction phase and the application of mitigation measures will further reduce any impacts in traffic and transportation terms.

REFERENCES

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