9 TRAFFIC AND TRANSPORT

9.1 Introduction

9.1.1 This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the effects of the Torrance Wind Farm Extension II ('the Proposed Development') on the Access, Traffic & Transport resource. Vehicle movements to the site will likely consist of abnormal load vehicles (for the delivery of turbine components), heavy goods vehicles, light goods vehicles and cars.

9.1.2 This assessment was undertaken by Arcus Consultancy Services Limited (Arcus), an ERM Group company.

9.1.3 This Chapter of the EIA Report is supported by the following Technical Appendix documents provided in Volume 3 Technical Appendices:

- Technical Appendix A9.1: Abnormal Load Route Assessment;
- Technical Appendix A9.2: Traffic Count Data; and
- Technical Appendix A9.3: Construction Development Programme.

9.1.4 This Chapter of the EIA Report is also supported by the following figures:

- Figure 9.1: Abnormal Load Route to Site;
- Figure 9.2: General Construction Traffic Route to Site;
- Figure 9.3: Traffic Count Locations;
- Figure 9.4: Road Traffic Collision (RTC) Assessment; and
- Figure 9.5: Main Site Entrance Visibility Splay Assessment.

9.1.5 This Chapter is structured as follows:

- Legislation, policy and guidance;
- Assessment methodology and significance criteria;
- Scoping Responses and Consultation;
- Baseline conditions;
- Assessment of potential effects;
- Assessment of cumulative effects;
- Mitigation measures;
- Residual effects and
- Summary.

9.2 Legislation, Policy and Guidance

9.2.1 The following guidance, legislation and information sources have been considered in carrying out this assessment:

Table 9.1 - Legislation, Policy and Guidance

Author	Title	Policy
The Scottish Government	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[1] ('the EIA Regulations')	These regulations establish in broad terms what is to be considered when determining the effects of development proposals on the transport network.

[1] The Scottish Government (2017) The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 26/04/22)

Author	Title	Policy
The Scottish Government	Scottish Planning Policy (2020)[2]	This provides a statement of the Scottish Government's policy on nationally important land use planning matters including renewable energy and indicates that proposals for onshore wind should consider the impact on road traffic and on adjacent trunk roads.
The Scottish Government	National Transport Strategy[3]	This document provides an overview of the Scottish National Transport Strategy 2, which discusses sustainable freight movements.
The Scottish Government	Planning Advice Note 75 (PAN 75) – Planning for Transport3	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 is to be proportionate to the complexity and scale of impact of the development.
Institute of Environmental Management and Assessment (IEMA, 1993)	Guidelines for the Environmental Assessment of Road Traffic4	Sets out guidelines for determining the appropriate and significance of traffic effects as a result of a proposed development. The document focuses on the assessment of potential environmental effects associated with road traffic.
Department for Transport	Design Manual for Roads and Bridges LA 111 – Noise and Vibration[5]	This guidance sets out the requirements for the assessment of noise and vibrations from roads.

[2] The Scottish Government (2020) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/pages/2/ (Accessed 26/04/22)
[3] The Scottish Executive (2005). Planning Advice Note, PAN 75, Planning for Transport. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/publication/2005/08/planning-advice-note-pan-75-planning-transport/documents/0016795-pdf/0016795-pdf/govscot%3Adocument. Accessed on (26/04/22)
[4] Institute of Environmental Assessment – Guidelines for the Environmental Assessment of Road Traffic
[5] Department for Transport – LA111 Noise and Vibration. Available at: https://www.standardsforhighways.co.uk/dmrb/search/cc8cfcf7-c235-4052-8d32-d5398796b364 [Accessed 18/11/22]

9.3 Assessment Methodology and Significance Criteria

Scope of Assessment

9.3.1 This assessment considers access, traffic, and transportation effects of the Proposed Development during the construction, operational, and decommissioning phases for the following:

- Traffic generation;
- Hazardous loads;
- Accidents and Safety;
- Driver delay;
- Pedestrian amenity;
- Severance; and
- Noise and vibration.

Elements Scoped Out of Assessment

9.3.2 Operational traffic is expected to be minimal and negligible in terms of existing traffic flow levels on routes within the vicinity of the Proposed Development, with one weekly maintenance visit to the site expected. Assessment of operational traffic has therefore been scoped out of this assessment, and this approach was proposed within the Scoping Request.

9.3.3 Traffic associated with decommissioning of the Proposed Development will be less than that experienced during construction, this is due to all below ground infrastructure being left in-situ. It is not possible to accurately forecast baseline traffic flow levels 40 years into the future. For the above reasons, 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.

Study Area

9.3.4 The site is located to the north of Harthill Service Station off the M8 in North Lanarkshire. The site and the Proposed Development is wholly located within the administrative boundary of North Lanarkshire Council ('the Council'). Two site entrances will be used during the construction phase as follows.

9.3.5 The 'Main Site Entrance' will be formed off the B718 Westcraigs Road to the north of Harthill (Grid Ref: NS906651). This entrance will consist of a crossroad junction onto the B718. The west arm of the crossroad will provide access to the main construction compound and three of the four turbines, with the eastern arm providing access to a further one turbine. ALVs will traverse across the crossroad junction under escort.

9.3.6 The existing staggered crossroad junction will be partially realigned with the existing western arm moved south to a position directly across from the existing eastern arm. A visibility splay assessment was undertaken for the proposed crossroads which indicates that 2.4m x 160m is achieved in each direction. **Figure 9.5** indicates the proposed junction layout and visibility splay assessment.

9.3.7 The 'Abnormal Load Site Entrance' will be formed within the existing Harthill service station off the M8 (Grid Ref: NS898647). This entrance will be used only for the delivery of wind turbine components, which will be loaded on HGVs and by the accompanying escort vehicles. This entrance will only be used under escort with deliveries likely to take place at night.

9.3.8 GreenGridPower3 Ltd (The Applicant) is currently in dialogue with the operators of the Harthill service station to explore whether the 'Abnormal Load Site Entrance' can also be utilised by general construction traffic (HGVs) during the peak months of the construction phase; this is not a confirmed option at the time of writing but is considered as part of the application should an agreement between the service station and Applicant be reached.

9.3.9 That notwithstanding, this Chapter focuses on assessing the effects of access being taken via the 'Main Site Entrance' as the environmental worst-case. If the alternative access option were to be implemented, the effects identified in this assessment would be significantly less than those assessed within this Chapter.

9.3.10 The Study Area has been defined by the public road network in the vicinity of the Proposed Development and potential delivery corridors to be used during construction by Abnormal Load Vehicles (ALVs) and by general construction traffic, including staff. These consider the local strategic / trunk road network, sources of labour and the potential sources of construction materials, specifically stone and concrete from local quarries.

9.3.11 The proposed Port of Entry (PoE) for turbine components is the King George V Dock, Glasgow and these will then be transported to the site via the M8. This port has been used by is frequently used for renewables deliveries in the past for a large number of wind farms, because it has a sufficient quay and is well located for the trunk road network.

9.3.12 Whilst all ALVs will originate from PoE, the origin of general construction traffic is not currently known and is likely to be distributed throughout the region.

9.3.13 Three approach corridors are considered in this assessment:

Abnormal Load Route

- Loads will exit the PoE onto Kings Inch Drive;
- Vehicles will then turn left onto Kings Inch Road and continue through the roundabout onto Hillington Road;
- Vehicles will then join the M8 and continue to Harthill Services; and
- Exiting the M8 at Harthill Services the vehicles will turn directly into the Abnormal Load Site Entrance.

General Construction Traffic Route

- General construction traffic is assumed to approach via the M8 corridor and will exit at Junction 4A;
- Traffic would then join the link road south towards the B7066 through a series of roundabouts;
- Traffic will continue westbound on the B7066 to Harthill before turning right onto Westcraigs Road the B718; and
- Traffic will turn left into the Main Site Entrance.

9.3.14 Depending on the point of origin, some HGV traffic may choose to exit the M8 at Junction 5 and travel through Harthill via the route listed below similarly to the quarry. This assessment has considered a worst-case scenario in which all general construction traffic passes each point within the study, therefore the assessment covers this eventuality.

Potential Route from Quarry

9.3.15 It should be noted that this route may be used if Tams Loup Quarry (west of Harthill) is used for the supply of aggregates and/or Salsburgh Quarry (nearby Tams Loup to the west of Harthill) is used for the supply of aggregates or ready-mix concrete. At this stage commercial agreements for the supply of aggregates and ready-mix concrete have not been reached, therefore this route is considered within this assessment as a potential option only.

- Traffic may originate from Salsburgh Quarry turning left onto Duntilland Road;
- Traffic would then turn right onto the B7066 Hirst Road passing by the entrance to Tams Loup Quarry;
- Any traffic originating at Tams Loup Quarry would turn right onto the B7066 Hirst Road towards Harthill;
- All traffic would continue on the B7066 through Harthill before turning left onto the B718 Westcraigs Road; and
- Traffic would turn left into the Main Site Entrance.

9.3.16 Each of the above routes are shown in Figure 9.1 and 9.2.

Baseline Survey Methodology

9.3.17 Baseline traffic flow surveys were undertaken by a third-party sub-contractor *Tracsis plc* at two locations near to Harthill in August 2022. At each of the two locations, Automatic Traffic Counts (ATCs) were undertaken over a 7-day period commencing on the 23rd of August 2022, this date was selected to avoid the school summer holidays in North Lanarkshire.

9.3.18 Further traffic count information for the M8 motorway was acquired from a traffic counter maintained by the Department for Transport (DfT)[6] Count ID: 40700. This traffic count was last manually counted in 2018, and therefore this is the data which has been used in this assessment. It should be noted that this data would also have been collected prior to the Coronavirus Pandemic, which had a major impact on traffic flow observations. A traffic growth factor was applied to the 2018 data as detailed in the following sub-section.

9.3.19 Traffic Count locations are shown on **Figure 9.3**.

Future Baseline Scenario Calculations – Traffic Growth

9.3.20 Traffic growth factors were applied to the measured baseline traffic flow levels. Traffic growth factors were determined using the Trip End Model Presentation Programme (TEMPRO)[7]. This software was used with a dataset from the National Trip End Model (NTEM) for the Scotland geographical area. The above method is an industry standard method for the determination of traffic growth factors.

[6] Department for Transport – Road Traffic Statistics website: https://roadtraffic.dft.gov.uk/#6/55.254/-11.096/basemap-regions-countpoints [Accessed 17/11/22]

[7] Department for Transport – Trip End Model Presentation Programme (TEMPRO) Software Version 8.0 (November 2022) using NTEM Dataset 8.0 Core Scenario, Scotland geographical area.

Assessment Methodology

9.3.21 A The magnitude of the effect of increase in traffic flow is a function of the existing traffic volumes on routes and the percentage increase in flow as a result of the Proposed Development.

9.3.22 An initial screening exercise was undertaken to identify routes where an adverse effect could potentially occur. The Institute of Environmental Management and Assessment (IEMA 1993) Guidelines suggest two broad principles:

- 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.

9.3.23 Where the predicted increase in traffic flow is lower than these thresholds, the significance of the effects can be considered to be low or not significant with no further detailed assessments warranted. Consequently, where the predicted increase in traffic flow is greater than these thresholds, the potential effects are considered to be significant and are assessed in greater detail.

9.3.24 The IEMA (1993) guidelines are intended for the assessment of environmental effects of road traffic associated with major new developments giving rise to traffic generation, as opposed to short-term construction. In the absence of alternative guidance and as the traffic generation during the operational phase is very low, these guidelines have been applied to assess the short-term construction phase of the Proposed Development.

9.3.25 Where existing traffic levels are generally low (e.g., rural roads and some unclassified roads), any increase in traffic flow may result in a predicted increase that would be higher than the IEMA (1993) guideline thresholds. In these situations, it is important to consider any increase in terms of overall traffic flow in relation to the capacity of the road, before making a conclusion on whether the effect is significant as defined under the EIA Regulations.

9.3.26 Any change in traffic flow which is greater than the thresholds set out in the IEMA (1993) guidelines would be subject to further analysis. The magnitude of potential impacts will be identified through consideration of receptor sensitivity against the degree of predicted change to baseline conditions, the duration and reversibility of this change and professional judgement.

Sensitivity of Receptors

9.3.27 The sensitivity of the baseline conditions, including the importance of environmental features on or near to the site or the sensitivity of potentially affected receptors, will be assessed in line with best practice guidance, legislation, statutory designations and / or professional judgement. Table 9.2 details the framework for determining the sensitivity of receptors.

Table 9.2 - Receptor Sensitivity Framework

Sensitivity	Definition
Very High	The receptor has no ability to absorb change without profoundly altering its present character, is of high strategic value, or of national importance. For example: ▪ Routes with existing high traffic levels which are at or very close to exceeding capacity; ▪ Receptors such as populated urban areas where existing traffic levels are high and there is no capacity to absorb additional traffic flow on adjacent routes; ▪ Strategic nationally important routes with no capacity to absorb additional traffic flow; ▪ At severe/fatal accident hotspots where an increase in traffic flow is likely to increase the likelihood or severity of accidents; ▪ A route with very poor pedestrian facilities and a high traffic flow level where an increase in traffic is likely to decrease pedestrian amenity severely; ▪ At a settlement which is bisected by a major route where a significant change in traffic flow or composition is likely to severely increase severance; ▪ A receptor where due to the presence of noise and vibration inducing road surfaces (e.g. cattle grids or cobbles) close to a residential property or similarly sensitive receptor, a change in traffic flow or traffic composition is likely to severely affect the perception of noise and vibration due to traffic; and ▪ At a location where pedestrian crossing facilities are informal and where a significant change in traffic flow level might induce severe pedestrian crossing delay also where children/elderly people might frequently cross an informal crossing.

Sensitivity	Definition
High	The receptor has little ability to absorb change without fundamentally altering its present character, is of high strategic value, or of national importance. For example: ▪ Routes with existing high traffic levels which have little additional traffic flow capacity; ▪ Receptors such as populated urban areas where existing traffic levels are high and there is little capacity to absorb additional traffic flow on adjacent routes; ▪ Strategic nationally important routes with little capacity to absorb additional traffic flow; ▪ At severe accident hotspots where an increase in traffic flow may increase the likelihood or severity of accidents; ▪ A route with poor pedestrian facilities and a high traffic flow level where an increase in traffic is likely to decrease pedestrian amenity significantly; ▪ At a settlement which is bisected by a major route where a significant change in traffic flow or composition is likely to significantly increase severance; ▪ A receptor where due to the presence of noise and vibration inducing road surfaces (e.g. cattle grids or cobbles) close to a residential property or similarly sensitive receptor, a change in traffic flow or traffic composition may significantly affect the perception of noise and vibration due to traffic; ▪ At a location where pedestrian crossing facilities are informal and where a significant change in traffic flow level might induce significant pedestrian crossing delay also where children/elderly people might regularly cross an informal or priority crossing.

Sensitivity	Definition
Medium	Areas where the transport network has moderate capacity to change, without significantly altering its state. For example: ▪ Routes with existing moderate traffic levels which have some additional traffic flow capacity; ▪ Receptors such as populated urban areas where existing traffic levels are moderate and there is some capacity to absorb additional traffic flow on adjacent routes; ▪ Receptors such as rural roads where existing traffic levels are moderate and there is some capacity to absorb additional traffic flow on adjacent routes; ▪ Strategic nationally important routes with some capacity to absorb additional traffic flow ▪ At slight accident hotspots where an increase in traffic flow may increase the likelihood or severity of accidents; ▪ A route with moderate pedestrian facilities where an increase in traffic is may decrease pedestrian amenity; ▪ At a settlement which is bisected by a major route where a significant change in traffic flow or composition is likely to moderately increase severance; ▪ A receptor where due to the presence a road close to a residential property or similarly sensitive receptor, a change in traffic flow or traffic composition may moderately affect the perception of noise and vibration due to traffic; and ▪ At a location where pedestrian crossing facilities are informal or substandard and where a significant change in traffic flow level might induce a moderate pedestrian crossing delay.

Sensitivity	Definition
Low	Areas where the transport network is tolerant to change without detriment to its state, for example; ▪ Routes with existing low traffic levels which have additional traffic flow capacity; ▪ Receptors such as populated urban areas where existing traffic levels are low and there is capacity to absorb additional traffic flow on adjacent routes; ▪ Receptors such as rural roads where existing traffic levels are low and there is capacity to absorb additional traffic flow on adjacent routes; ▪ Strategic nationally important routes with capacity to absorb additional traffic flow; ▪ On routes with a low level of historical accident data where a change in traffic flow or composition would have a low effect on the likelihood or severity of accidents; ▪ A route with formal pedestrian facilities where an increase in traffic would have a low effect on pedestrian amenity; ▪ A settlement which is bisected by a road, but where the effect of increased traffic or change in composition would have a low effect on severance; ▪ A receptor which is not highly sensitive to changes in noise level (e.g. a school) or where receptors are set back from the road and therefore their sensitivity to changes in noise as a result of changes in traffic flow or composition are low; and ▪ A location where pedestrian crossing facilities are formal but priority, or pedestrian flows are sufficiently low that changes to traffic flow or composition are unlikely to cause a significant pedestrian delay.

Sensitivity	Definition
Negligible	Areas where the transport network is highly tolerant to change without detriment to its state, for example: ▪ Routes with existing very low traffic levels which have a lot additional traffic flow capacity; ▪ Receptors such as populated urban areas where existing traffic levels are very low and there is a lot of capacity to absorb additional traffic flow on adjacent routes; ▪ Receptors such as rural roads where existing traffic levels are very low and there is a lot of capacity to absorb additional traffic flow on adjacent routes; ▪ Strategic nationally important routes with a lot of capacity to absorb additional traffic flow; ▪ On routes with a very low level of historical accident data where a change in traffic flow or composition would have a negligible effect on the likelihood or severity of accidents; ▪ A route with formal pedestrian facilities where an increase in traffic would have a negligible effect on pedestrian amenity; ▪ A settlement which is not bisected by a road or where the effect of increased traffic or change in composition would have a negligible effect on severance; ▪ A receptor which is negligibly sensitive to changes in noise level (e.g., a sports stadium) or where receptors are set very far back from the road and therefore their sensitivity to changes in noise as a result of changes in traffic flow or composition are negligible; and ▪ A location where pedestrian crossing facilities are formal and controlled, or pedestrian flows are negligible (i.e., where there are no footways) such that changes to traffic flow would not result in a change to pedestrian delay.

Magnitude of Change

9.3.28 The magnitude of potential change will be identified through consideration of the Proposed Development, the degree of change to baseline conditions predicted as a result of the Proposed Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

9.3.29 The criteria for assessing the magnitude of change on those receptors described above are presented in Table 9.3.

Table 9.3 - Magnitude of Effects

Magnitude	Definition
High	• 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; • The proposals could result in a high likelihood of increased accidents or a large increase in the severity of possible accidents; • The proposals could result in a significant loss of pedestrian amenity; • The proposals could result in a significant increase in severance; • The proposals could result in a significant increase in traffic caused noise or vibration; or • The proposals could result in a significant increase in pedestrian delay.
Medium	• 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; • The proposals could result in a medium likelihood of increased accidents or a moderate increase in the severity of possible accidents; • The proposals could result in a moderate loss of pedestrian amenity; • The proposals could result in a moderate increase in severance; • The proposals could result in a moderate increase in traffic caused noise or vibration; or • The proposals could result in a moderate increase in pedestrian delay.
Low	• 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; • The proposals could result in a low likelihood of increased accidents or a low increase in the severity of possible accidents; • The proposals could result in a low loss of pedestrian amenity; • The proposals could result in a low increase in severance; • The proposals could result in a low increase in traffic caused noise or vibration; or • The proposals could result in a low increase in pedestrian delay.
Negligible	• Barely perceptible effect on movement of road traffic above normal level; • Barely perceptible effect on likelihood or severity of accidents; • Barely perceptible effect on pedestrian amenity • Barely perceptible effect on severance; • Barely perceptible effect on traffic caused noise and vibration at receptors; or • Barely perceptible effect on pedestrian delay Where there is no effect, this is stated.

Significance of Effect

9.3.30 The sensitivity of the receptor and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 9.4 summarises guideline criteria for assessing the significance of effects.

Table 9.4 - Framework for Assessment of the Significance of Effects

Magnitude of Change	Sensitivity of Resource or Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

9.3.31 Effects predicted to be of major or moderate significance are 'significant' in the context of the EIA Regulations and are shaded in light grey in the above table.

9.4 Scoping Responses and Consultation

9.4.1 Throughout the scoping exercises, and subsequently during the ongoing EIA process, relevant organisations were contacted with regards to the Proposed Development. Table 9.5 outlines the consultation responses received in relation to the Development.

Table 9.5 - Scoping Responses and Consultation

Consultee	Details	Response	Where addressed in EIA Report
Transport Scotland	Scoping Response 11/12/20	Transport Scotland no longer respond to consultation.	N/A
North Lanarkshire Council Roads	Scoping Response 14/01/21	The Applicant should identify and demonstrate the suitability of access points. Likely traffic generation, volume, vehicle type, frequency and times during construction and operational period should be indicated.	Addressed throughout Chapter 9.

9.5 Baseline Conditions

Description of Routes

9.5.1 The following paragraphs provide a brief overview of the characteristics of each of the roads which form the Abnormal Load Route, General Construction Traffic Route, and the Potential Route from Quarry. These descriptions follow the route to site from the M8 motorway towards the respective site entrance junctions.

9.5.2 The M8 Motorway (M8) is a significantly important trunk road which connects Edinburgh and Glasgow. Within the vicinity of the site, it is a rural motorway with two lanes in each direction and has a 70 miles per hour (mph) speed limit.

Harthill Services (Eastbound) is located to the south-west of the site and is accessed directly from the motorway via a slip road, this will be used by ALVs. Junction 4a of the motorway, which will be used as part of the General Construction Traffic Route, is a dumbbell interchange with two roundabouts and an overbridge.

9.5.3 Junction 4a of the M8 is connected to the B7066 via a short section of dual-carriageway with a series of three at-grade roundabouts followed by a signalised junction. The thereafter the B7066 is a rural single-carriageway two-lane road with a 50-mph speed limit until it reaches the eastern boundary of Greenrigg (a suburb of Harthill).

9.5.4 Upon reaching Greenrigg the B7066 East Main Street and its continuation West Main Street is an urban single-carriageway two-lane road. Within the vicinity of Polkemmet Road, which serves Greenrigg Primary School, the B7066 has a permanent 20 mph speed limit. To the east of this area the speed limit is 40 mph before becoming 50 mph. To the west of this area, towards Harthill, the speed limit is 30 mph.

9.5.5 There are three signalised pedestrian crossings within Harthill on the B7066, these can be summarised as one to the west of the town centre, one within the town centre and one to the east of the town centre. There are further pedestrian crossing islands located throughout the town on this route.

9.5.6 The junction between the B7066 and the B718 Westcraigs Road is a mini-roundabout. The B718 is initially an urban single-carriageway two-lane road with a 30-mph speed limit. There are no formal pedestrian crossings on this road. Upon leaving Harthill the B718 becomes a rural single-carriageway two-lane road under national speed limit.

Baseline Traffic Flow

9.5.7 The ATCs collected 'classified' traffic data i.e., data which identifies vehicle classification or vehicle type as it passes the counter. A full copy of the data, as provided by *Tracsis* is presented in **Technical Appendix A9.2**. A summary of results which will be used in this assessment are presented in Table 9.6 below. The below data presents the Average Daily Traffic (ADF) at each count location for total traffic and Heavy Goods Vehicle (HGV) traffic.

Table 9.6 - Baseline Traffic Flow

Ref.	Road	Location	Source	Year	ADF	HGV ADF	%HGV
1	M8	Between J5 and Services	DfT	2018	54,692	7,237	13
2	B7066 West Main Street	West of Westcraigs Road Junction	Tracsis	2022	7,991	831	10
3	B718 Westcraigs Road	At proposed Site Entrance	Tracsis	2022	3,928	455	12

Road Capacity

9.5.8 Typical capacity values for a variety of road types are provided within the Design Manual for Roads and Bridges (DMRB) – Volume 15[8]. It is acknowledged that this document has been withdrawn, however the quoted traffic flow capacities remain the most up to date available reference source and are useful within the framework of this assessment. Capacity is defined as the maximum sustainable flow of traffic passing in one hour under favourable road and traffic conditions and depends on the road type, speed limit and width. Table 9.6 gives the estimated capacity of each of the roads within the Study Area noting that within Volume 15 speed limits are defined in kilometres per hour (kph)

9.5.9 It should be noted that where a given road has multiple sections with differing characteristics within the study area, the section with the lowest capacity has been used in this assessment and is indicated in Table 9.7 below.

Table 9.7 - Theoretical Road Capacities

Road	Type	Speed Limit (kph)	Capacity (veh/hour/direction)	Two-Way Hourly Flow (veh/hour)	Two – Way Daily Flow (veh/day)
M8	Rural – Motorway D2	123	3,800	7,600	182,400
B7066	Urban - Single 7.3 m	48*	800	1,600	38,400
B718	Urban – Single 6.0	48	800	1,600	38,400

*The B7066 and has a 32 kph limit but 48 is the lowest given in Volume 15.

Receptors

9.5.10 For the assessment of effects of traffic generation, effects on road safety, and driver delay the receptor is the road network itself. The sensitivity of the road network in terms of each of these types of effect is determined with reference to Table 9.3 and is set out in each assessment section.

9.5.11 As per (IEMA 1993) Guidelines, particular groups of locations which may be sensitive to changes in traffic conditions should be identified. The Guidelines suggest, for example, that people, home, schools and the elderly may be sensitive to changes in traffic conditions. A desktop search was undertaken for the route to site within the Study Area.

9.5.12 Several receptors of medium or high sensitivity to changes in traffic have been identified within the Study Area and are detailed in table 9.8.These receptors are either located on proposed delivery routes or located within close proximity and require access through the proposed delivery routes.

[8] Standards for Highways (2013) Volume 15, Economic Assessment of Road Schemes in Scotland, DMRB

Table 9.8 - Sensitive Receptors

Receptor	Route	Relevant Traffic Count Location	Sensitivity	Justification
Greenrigg Primary School, Polkemmet Road, Harthill	B7066 and B718	2 and 3	High	This school is located in Harthill and although not directly on the general construction traffic route pupils may walk on or cross the route on their journey to and from school. This receptor is considered high sensitivity due to the lack of formal pedestrian crossing facilities on the B718.
Harthill	B7066 and B718	2 and 3	High	There are a number of residential and commercial properties which front directly onto the general construction traffic route.
St Catherine's Catholic Church, Westcraigs Road, Harthill	B718	3	High	This church fronts directly onto the general construction traffic route. There are no formal pedestrian crossings on the B718 and therefore this receptor is likely to be sensitive to pedestrian amenity and delay.
Alexander Peden Primary School	B7066	2	High	This school is located near to the B7066 West Main Street, Harthill which may be used for transporting aggregates from the west. Pupils are likely to cross this route on their way to/from school via the signalised pedestrian crossing.
Polkemmet Country Park	B7066	2	Low	The country park is located off the B7066 to the east of Harthill, near to the General Construction Traffic Route. An increase in traffic could affect amenity of the park, and cause delays for motorists driving to the park.
Harthill Royal Junior Football Club	B7066	2	Medium	This club is located just off the B7066 is east Harthill. It is likely that users of this facility will use the B7066 to travel to and from here. There is a signalised pedestrian crossing of the B7066 just to the east of the club.

9.5.13 Individual properties are not listed in this assessment.

Road Traffic Collision Assessment

9.5.14 Analysis of all 'slight', 'serious' and 'fatal' Road Traffic Collisions (RTCs) on the General Construction Traffic Route between the M8 Junction 4a and the site entrance within the last five years was carried out using CrashMap[9]. The Abnormal Load Route was not assessed for RTCs as all ALVs will travel to the site under police escort during the night, the risk of RTCs is therefore considered negligible.

9.5.15 The RTC assessment identified three 'serious' RTCs and four 'slight' RTCs within the study area. Each of the identified RTCs is shown on **Figure 9.4**. No clear trends or strongly identifiable hotspots were apparent within the data and no RTCs were identified at the proposed site entrance location on the B718.

9.5.16 The routes identified in the study have therefore been categorised as having 'medium' sensitivity to accidents. This assessment was made using the professional judgement of the authors whilst comparing these routes to other examples. Whilst several RTCs were noted within the study it was noted that these roads are busy, and that as stated above no clear hotspots can be identified.

9.6 Future Baseline Scenarios

Traffic Flow

9.6.1 Background traffic growth will occur on the local road network irrespective of whether or not the Proposed Development is constructed.

9.6.2 Traffic growth factors were calculated for the relevant geographic area as from TEMPRO[10] and applied to the baseline traffic flow information collected for each route to give the estimated traffic flow for the year of construction (2024). Table 9.9 indicates the traffic growth factor and projected baseline traffic flow at each of the locations for the anticipated year of construction.

Table 9.9 - Projected Baseline Traffic Flow (2024)

Ref.	Road	Survey Year	Baseline ADF	Baseline HGV ADF	Growth Factor	Projected ADT	Projected HGV ADF
1	M8	2018	54,692	7,237	1.0164	55,589	7,356
2	B7066 West Main Street	2022	7,991	831	1.0033	8,017	834
3	B718 Westcraigs Road	2022	3,928	455	1.0033	3,941	457

[9] AGILYSIS (2019) CrashMap. UK Road Safety Map. Available at: www.crashmap.co.uk. Accessed 09/11/22

[10] Department for Transport – Trip End Model Presentation Program Version 8.0 (November 2022)

9.7 Anticipated Construction Development Traffic

9.7.1 An indicative programme of construction traffic associated with the Proposed Development is provided in Technical Appendix A9.3. Construction is expected to take place over a 12 month period commencing in the third quarter of 2024. The following sub-sections provide detail for each element of work and should be read in conjunction with the programme provided in Technical Appendix A9.3. A summary of all predicted construction traffic is provided at the end of this section.

Site Mobilisation and Demobilisation

9.7.2 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. The majority of these movements will be as HGVs and low loaders which will deliver and then depart the site empty.

9.7.3 During site demobilisation, most 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 9.10 indicates the anticipated number of vehicle movements associated with site mobilisation and demobilisation.

Table 9.10 - Vehicle Movements - Site Mobilisation and Demobilisation

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
On-site vehicles	Car/LGV	1,12	20	10
Construction Compound	HGV Low Loader	1,12	100	50
Overall			**120**	**60**

Forestry

9.7.4 In order to create working areas for construction of the turbines and access tracks existing trees within the area of the site will need to be removed. It is proposed that a 'keyholing' method of tree removal will be undertaken, i.e., trees will be removed only where required to support infrastructure as opposed to 'clear felling' the whole Site.

9.7.5 Chapter 8 of this EIA Report details the proposed felling methodology and other considerations. The traffic impact of felling will be as a result of HGVs laden with felled timber departing the site, empty timber HGVs approaching the site, and for the delivery and removal of forestry plant and equipment.

9.7.6 In total 40 HGV loads of timber are estimated to be exported from the site, this will result in 80 HGV vehicle movements. Three deliveries of plant and equipment are expected at the start of this phase of works, which will result in six HGV movements as the vehicle on which the plant is delivered will depart the site. A further six movements will be required at the end of this phase of works. Therefore, in total 92 vehicle movements are expected in relation to forestry. Table 9.11 details the anticipated vehicle movements for forestry.

Table 9.11 - Forestry

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Plant/Equipment	HGV Low-Loader	1	12	12
Timber Extraction	HGV Timber Lorry	1	80	80
Overall			**92**	**92**

Access Tracks and Hardstandings

9.7.7 All stone required for formation of on-site access tracks, crane pads and hardstandings will be imported to site. Commercial agreements on the source of this aggregate have not been reached at the time of writing this EIA Report, so a number of potential options will be considered. The most likely source of this material is Tams Loup Quarry, operated by Tillicoultry Quarries Ltd, located to the west of Harthill which is a supplier of crushed stone. This is the closest quarry to the site.

9.7.8 Whilst there are several existing minor tracks located within the site, for the purposes of this assessment, it has been assumed that all tracks will be constructed as new tracks. This approach represents a worst case scenario in terms of material import requirements as the bearing capacity of existing tracks is unknown and may not be suitable for the transport of wind turbine components.

9.7.9 Therefore, the total length of access tracks required for the Proposed Development is estimated at 1,837 m. Tracks will be of an average width of 4.5 m, therefore the total surface area of tracks is approximately 8,266 m^2. In addition, some areas of widened track for ALV movements and turning heads are required, resulting in an additional 5,631 m^2 surface area being required.

9.7.10 Tracks will be constructed to an average depth of 0.45 m. Taking the total surface area of 13,897 m^2 and applying a 0.45 m depth results in a total volume of material of 6,254 m^3 being required.

9.7.11 Additionally, four turning heads will be constructed which each have a surface area of 970 m^2. These will be constructed to a depth of 0.45 m resulting in a total volume of aggregate of 1,746 m^3 being required for turning heads.

9.7.12 Four crane pads will require to be constructed, each has a surface area of 7,754 m^2, resulting a total surface area of 31,016 m^2. Crane pads will be constructed to a depth of 0.45 m, therefore the volume of stone required is approximately 13,957 m^3.

9.7.13 The substation will be constructed on an area of hardstanding which is approximately 1,405 m^2 to a depth of 0.45 m, resulting in a volume of 632 m^3 of aggregate being required.

9.7.14 Summing the above elements, a total of 22,589 m^3 of aggregate is estimated to be required for the Proposed Development. Aggregate will be transported by HGV dumpers which have a capacity of 9 m^3, therefore 2,510 vehicle loads will be required which will result in 5,020 vehicle movements.

9.7.15 In addition to the aggregate itself, an excavator and roller will be required on-site to process the aggregate and construct the tracks and hardstandings. Both the excavator and roller will be transported to site via HGV low-loader which will result in an additional two deliveries, or four HGV movements, at the commencement of this phase of works and a further 2 deliveries, or 4 HGV movements, at the end of this phase.

9.7.16 Other miscellaneous deliveries will be required throughout this phase for drainage materials, and geotextiles for example. This is estimated to result in an additional 2 deliveries per month, or 10 deliveries in total or 20 HGV vehicle movements over the 5-month period for this element of works.

9.7.17 Table 9.12 below shows the number of vehicle movements anticipated from the above elements.

Table 9.12 - Vehicle Movements - Access Tracks, Crane Pads and Substation Aggregates

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
On-site vehicles	HGV Low Loader	2, 6	8	4
Aggregate	HGV Dumper	2-6	5,020	1,004
Miscellaneous	HGV	2-6	20	4
Overall			**5,048**	**1,012**

Control Building and Substation

9.7.18 Stone for construction of the hardstanding on which the control building and substation will site has been accounted for in the above section which is summarise in Table 9.12.

9.7.19 Concrete will be required for the control building, this is assumed to require 10 HGV concrete wagon loads, resulting in 20 movements. An additional 10 HGV loads have been assumed for the delivery of the control building electrical components and switchgear, resulting in 20 vehicle movements.

9.7.20 One transformer will require to be delivered by ALV due to its weight. This will result in four vehicle movements, one ALV movement and one HGV movement from the unloaded vehicle departing site. Two escort vehicles are assumed to accompany the ALV resulting in four vehicle movements.

9.7.21 Table 9.13 indicates the number of vehicles associated with substation construction.

Table 9.13 - Vehicle Movements – Control Building and Substation

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Concrete	HGV Concrete Wagon	4-6	20	8
Electrical Equipment	HGV	4-6	20	8
Transformer	ALV	6	2	2
ALV Escort	Car/Van	6	4	4
Overall			**46**	**18***

*Max movements for this element occur in Month 6. Refer to Appendix A9.3

Turbine Foundations

9.7.22 The concrete for each turbine foundation will be formed from imported ready-mix concrete. Each foundation will require up to 950 m^3 of concrete, this is based upon a worst-case scenario and is dependent on ground conditions. Therefore, for the 4 foundations which are required a total of 3,800 m^3 of concrete will be required.

9.7.23 Assuming a volumetric capacity of 8 m^3 per concrete wagon, approximately 119 ready-mix HGV loads would be required to supply the required concrete for each foundation, resulting in 476 movements in total for foundation pouring.

9.7.24 Concrete delivery will occur over a 4-month period; however, each foundation is required to be poured over a continuous (approximately) 10-hour period. Foundations would be poured on non-consecutive days during this period of works with 4 days of foundation pouring required to deliver concrete for the 4 turbines. Therefore, on concrete pouring days, 119 HGV vehicle movements will be experienced in addition to the deliveries experienced for other concurrent elements of work.

9.7.25 In addition to concrete, steel rebar will require to be imported. It is assumed that up to 5 HGV loads per turbine will be required, therefore 20 loads will be required for the 4 turbines resulting in 40 vehicle movements. Rebar will be delivered throughout the concrete delivery period.

9.7.26 Additional miscellaneous items will be required to be delivered to support the foundation construction phase. These include shuttering, geotextiles and equipment. It is assumed that the majority of these deliveries would occur in month 4, and the further deliveries that are required during the pouring phase would be timed to avoid pouring days so as to lower the peak traffic flow. An allowance for 12 miscellaneous deliveries during this phase of works has been made, this would result in up to 24 two-way HGV movements. Table 9.14 indicates the anticipated number of two-way vehicle movements associated with turbine foundation construction.

Table 9.14 – Turbine Foundations

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Concrete	HGV Concrete Wagon	4-7	476	119
Rebar	HGV Low Loader	4-7	40	10
Miscellaneous	HGV	4	24	24
Overall			**540**	**153**

Electrical Cabling

9.7.27 Electrical cabling for wind farm power distribution will require to be delivered and will constitute 36 HGV movements over the period of delivery. Table 9.15 indicates the number of vehicle movements associated with electrical cabling delivery.

Table 9.15 - Electrical Cabling

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Electrical Cabling	HGV Low Loader	6-8	36	12

Crane

9.7.28 Two cranes will be required to erect the turbines. The main crane will be transported to Site in several loads which will include three ALVs and a further five HGVs which will depart Site and return prior to the crane being removed, resulting in a total of 20 HGV movements.

9.7.29 The ALVs will require a further two escort vehicles to accompany them on their journey to and from the site, it has been assumed that the escort vehicles will depart the site and return prior to the crane departing, therefore the number of escort vehicle movements is eight.

9.7.30 In addition to the main crane, a smaller pilot crane will be required. This will be a mobile crane which will be self-propelled to site and would constitute an ALV due to its weight. An additional HGV delivery will be required for the pilot crane to transport the counterweights, it has been assumed that this HGV will depart Site and then return prior to the crane departing therefore this will result in four HGV movements for delivery and removal of the counterweights. The ALV will require two escort vehicles, resulting an in additional eight car/van movements.

9.7.31 Table 9.16 indicates the number of vehicle movements associated with crane delivery.

Table 9.16 - Crane

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Main Crane	ALV	8, 11	6	3
	HGV	8, 11	20	10
	Escort Car/Van	8, 11	8	4
Pilot Crane	ALV	8, 11	2	1
	HGV	8, 11	4	2
	Escort Car/Van	8, 11	8	4
Overall			**48**	**24**

Turbines

9.7.32 Turbines will be delivered as separate components, the majority of which will require transportation via ALV. The towers will be transported in three separate sections and each blade will be transported individually. Five further abnormal load vehicles will be required to transport the nacelle and hub. Each turbine will therefore require 11 ALV movements, each ALV will be accompanied by 2 escort vehicles.

9.7.33 Therefore, for all 4 turbines 44 ALV movements will be required, with an additional 44 HGV movements occurring due to the retracted ALV departing the site. 88 additional car or van movements will be required for the escort vehicles.

9.7.34 In addition to the above 24 HGV vehicle movements will be required for the delivery of turbine accessories and ancillary equipment. indicates the number of vehicle movements that are expected for turbine delivery.

9.7.35 Table 9.17 indicates the number of vehicles associated with delivery of the turbines.

Table 9.17 - Turbines

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Tubines	ALV	8-11	44	11
	Escort Car/Van	8-11	88	22
	HGV	8-11	44	11
Ancillary Equipment	HGV	8-11	24	6
Overall			**200**	**50**

Fuel

9.7.36 Fuel will require regular delivery to the site regularly throughout the construction period for plant and equipment and is expected to total 1 HGV fuel tanker delivery per week, resulting in 2 vehicle movements per week or 8 vehicle movements per month from site mobilisation; totalling 96 vehicle movements over the duration of construction.

9.7.37 Table 9.18 indicates the number of vehicle movements associated with fuel delivery.

Table 9.18 - Fuel

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Fuel	HGV Fuel Tanker	1-12	96	8

Staff

9.7.38 It is anticipated that during the peak period of construction, 60 staff will be required onsite per day to provide a worst-case scenario assessment it has been assumed that this staffing level will remain consistent throughout construction. For the purposes of this assessment a worst-case scenario has been assumed in which each member of staff travels to work in a sole occupancy vehicle, therefore up to 120 car/van movements per day are expected. In reality some level of car sharing is likely to reduce the traffic numbers below what is estimated below.

9.7.39 Assuming 26 workdays per month, the total number of staff movements per month is expected to be 3,120 per month. This will result in a total of 37,440 vehicle movements associated with staff over the construction phase.

9.7.40 Table 9.19 indicates the number of vehicle movements associated with staff.

Table 9.19 - Staff

Operation	Vehicle Type	Construction Month	Total Movements	Max Movements/Month
Staff	Car/Van	1-12	37,440	3,120

Summary

9.7.41 A summary of the above traffic estimates for each element is provided in Table 9.20 below.

Table 9.20 - Summary of Traffic Movements

Operation	Vehicle Type	Construction Months	Total	Max Monthly
Site Mobilisation/Demobilisation				
Site Mobilisation/ Demobilisation	Car or Minibus	1, 12	20	10
Site Mobilisation/ Demobilisation	HGV	1, 12	100	50
Subtotal			**120**	**60**
Forestry				

Operation	Vehicle Type	Construction Months	Total	Max Monthly
Plant/Equipment	HGV Low-Loader	1	12	12
Timber Extraction	HGV Timber Lorry	1	80	80
Subtotal			**92**	**92**
Access Track and Hardstanding Construction				
On-Site Vehicles	HGV Low-Loader	2,6	8	4
Aggregate	HGV Dumper	2-6	5,020	1,004
Miscellaneous	HGV	2-6	20	4
Subtotal			**5,048**	**1,012**
Control Building and Substation				
Concrete	HGV Concrete Wagon	4-6	20	8
Electrical Equipment	HGV	4-6	20	8
Transformer	ALV	6	2	2
ALV Escort	Car/Van	6	4	4
Subtotal			**46**	**18**
Turbine Foundations				
Concrete	HGV Concrete Wagon	4-7	476	119
Rebar	HGV Low Loader	4-7	40	10
Miscellaneous	HGV	4-7	24	24
Subtotal			**540**	**153**
Electrical Cabling				
Electrical Cabling	HGV	6-8	36	12
Subtotal			**36**	**12**
Crane Delivery				
Main Crane	ALV	8, 11	6	3
	HGV	8, 11	20	10
	Escort Car/ Van	8, 11	8	4
Pilot Crane	ALV	8, 11	2	1
	HGV	8, 11	4	2
	Escort Car/ Van	8, 11	8	4
Subtotal			**48**	**24**
Turbines				
Turbine Components	ALV	8-11	44	11

Operation	Vehicle Type	Construction Months	Total	Max Monthly
	Escort Car or Van	8-11	88	22
	HGV	8-11	44	11
Ancillary Equipment	HGV	8-11	24	6
Subtotal			**200**	**50**
Fuel				
Fuel Delivery	HGV Fuel Tanker	1–12	96	8
Subtotal			**96**	**8**
Staff				
Staff	Car or Minibus	1-12	37,440	3,120
Subtotal			**37,440**	**3,120**
Totals			**Total**	**Max Monthly***
Total HGV and Abnormal Load Movements			6,098	1,185
Total Car and Van Movements			37,568	3,150
Overall Total			**43,666**	**N/A****

*Max monthly traffic in the peak month for each vehicle type (Month 4 for HGVs and Months 8 and 11 for cars/vans).

** Does not apply as peak months for cars/vans and for HGVs do not coincide. Refer to * and Appendix A9.3.

9.8 Assessment of Potential Effects

Traffic Generation

9.8.1 A detailed breakdown of the distribution of vehicle movements in each month and by element of work, throughout the construction period of the Development, is included in Appendix A9.3. The peak month from a traffic perspective, Month Four, was identified and used to predict the traffic increase along the construction traffic route.

9.8.2 Not all traffic will pass each point within the study. ALVs will exit the M8 at Harthill Services and use the Abnormal Load Site Entrance therefore they will only pass traffic count location 1. However, delivery of turbine components will not occur during Month Four and therefore this will not affect the peak month which has been assessed below.

9.8.3 Due to the nature of foundation pouring, i.e., all concrete for one pour will be delivered within a single day, it is not appropriate to distribute this traffic across the month. Instead, a calculation of the traffic flow increases on the 4 non-consecutive days of concrete pouring, and on days during the peak month with no concrete pouring, has been made.

9.8.4 From inspection, during the peak month, Month Four, 4,186 vehicle movements (excluding concrete delivery) are predicted. Assuming a 26-day working month, 161 vehicle movements per day, made up of 120 car/van movements and 41 HGV movements, are predicted on non-concrete pouring days; while 280 vehicle

movements per day, made up of 120 car/van movements and 160 HGV movements, are expected on concrete pouring days.

9.8.5 Table 9.21 details the anticipated vehicle flow in the peak month on days with no concrete deliveries and the percentage increase above the predicted baseline at each point within the Study Area.

Table 9.21 - Predicted Peak Month Average Daily Traffic - Non-Concrete Day

Traffic Count Location	Total Vehicle Movements			HGV Movements		
	2024 Baseline	Baseline + Development	Increase (%)	2024 Baseline	Baseline + Development	Increase (%)
1	55,589	55,750	0.3%	7356	7397	0.6%
2	8,017	8,1718	2.0%	834	875	4.9%
3	3,941	4,102	4.1%	457	498	9.0%

9.8.6 Table 9.22 details the anticipated vehicle flow in the peak month on days where concrete deliveries will take place; this will occur on a maximum of four non-consecutive days over the four-month period of this phase of works. Therefore, there is anticipated to be one concrete pouring day per month between months four and seven.

Table 9.22 - Predicted Peak Month Average Daily Traffic - Concrete Delivery Days

Traffic Count Location	Total Vehicle Movements			HGV Movements		
	2024 Baseline	Baseline + Development	Increase (%)	2024 Baseline	Baseline + Development	Increase (%)
1	55,589	55,869	0.5%	7,356	7,636	3.8%
2	8,017	8,297	3.5%	834	1,114	33.6%
3	3,941	4,221	7.1%	457	737	61.3%

9.8.7 As detailed in Section 9.3.22 a screening exercise was undertaken to determine which roads warrant detailed assessment. Due to the presence of several highly sensitive receptors as shown in table 9.8 the lower threshold of significance of 10% as set out in Paragraph 9.3.22 was used for traffic count locations 1 and 2.

9.8.8 Using the assessment methodology and assessing the estimated percentage increases in overall traffic and HGV traffic, further detailed assessment of effects on the road network due to traffic generation is only required at traffic count locations 2 and 3 due to the increase in HGVs on four non-consecutive days of concrete delivery. Except for the above, overall traffic and HGV traffic is predicted to increase by less than the 10% threshold of significance on all other days of construction.

9.8.9 The largest increase in overall traffic, outwith concrete days, will occur on the B718 Westcraigs Road and is predicted to be 4.1%. This increase is negligible and would not be perceptible to receptors as it is likely to be less than the existing

inter day variation in traffic flow on that route. A corresponding 9.0% increase in HGV traffic is predicted at this location, this increase is low and is below the threshold of significance.

9.8.10 During four non-consecutive days of concrete delivery overall traffic levels on Westcraigs Road are predicted to increase by 7.1%, the highest increase in overall traffic identified in the study. This increase is negligible and would be barely perceptible for receptors on the route; this increase is likely to be within the existing daily variation in traffic flow on the route. This increase is low and is below the threshold of significance.

9.8.11 On the basis of the above, it is concluded that at all stages of construction the change in overall traffic is negligible at all traffic count locations. This change will result in an effect of 'minor' significance at a location of high sensitivity (as defined in Table 9.4). Except for the specific case detailed below the effect on traffic generation is therefore considered to be minor and not significant in terms of the EIA Regulations.

9.8.12 On four non-consecutive days of concrete pouring the change in HGV traffic on Westcraigs Road is predicted to be 61.3% with a corresponding 33.6% increase on the B7066 West Main Street. When considering the magnitude of these changes the following circumstances have been considered:

- These changes occur for a short time period, four non-consecutive days over a 12-month construction period;
- The changes are fully reversible as they will no longer occur once the foundation has been poured; and
- The B718 Westcraigs Road and the B7066 West Main Street have a significant baseline level of HGV traffic, 457 and 834 vehicles per day respectively. Therefore, receptors on these routes are used to experiencing heavy vehicle traffic.

9.8.13 Considering the above, it has been determined that the change in HGV traffic on concrete pouring days is of 'medium' magnitude and this occurs at receptors of 'high' sensitivity. The effect is 'moderate' in significance and therefore is significant in terms of the EIA Regulations. Mitigation measures in relation to this effect are proposed in Section 9.9.6.

9.8.14 The following sub-sections assess the predicted HGV increase during the four days of concrete pouring at traffic count locations 2 and 3 against each of the other potential effects (as defined in Paragraph 9.3.1). No further consideration is given to overall traffic increase, and traffic count location 1 (the M8 Motorway), as these fall below the 10% threshold of significance in all cases.

Hazardous Loads

9.8.15 Fuel will be regularly transported to the site over the duration of construction of the 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 in significant quantities are expected to be transported to Site.

9.8.16 The route to site is likely to experience transportation of hazardous substances already to nearby developments. Therefore, the effect of the transportation of hazardous substances will result in a 'negligible' magnitude of change on a receptor of 'high' sensitivity, as a worst case. Thus, the effect of the transportation of hazardous loads is 'minor' and not significant in terms of the EIA Regulations.

Accidents and Safety

9.8.17 For the assessment of effects on accidents and safety, the receptor is the safety of the road network. As detailed in Paragraph 9.5.14, no RTC hotspots were identified within the study area within the last 5 years. The sensitivity of the receptor to changes in accidents is 'medium'.

9.8.18 A temporary four day increase in HGV traffic flow above the threshold of significance is not sufficient to affect a change in the likelihood of accidents. As the proportion of HGVs will increase during those four days there would be a slight increase in the severity of accidents as HGVs have a higher mass. Therefore, the overall magnitude of effect is 'low'.

9.8.19 As any ALV movements will be carried out under escort and outside of peak hours, the risk of RTCs during these movements would be negligible.

9.8.20 Therefore, the effect of construction traffic on accidents and safety results in a at worst 'low' magnitude of change on a receptor of 'medium' sensitivity. Thus, the effect of increased traffic on accidents and safety is minor and not significant in terms of the EIA Regulations.

Driver Delay

9.8.21 As the total increase in traffic flow is below the threshold of significance the only possible significant effect on Driver Delay is because of the increased size, and decreased speed and manoeuvrability of HGVs on four non-consecutive days during concrete delivery.

9.8.22 The total number of additional HGV movements anticipated on these days is 160. HGVs will be spread throughout the day, with concrete being delivered at a continuous rate over a minimum 10 hour period. Therefore, the total number of additional HGV movements per hour is estimated at no more than 16, which equates to 8 additional hourly movements per direction (to and from the site).

9.8.23 Referring to the theoretical road capacities given in Table 9.7 even with the additional traffic during concrete pouring days all roads on the route to site remain well within capacity. In the worst case, peak daily traffic on the B7066 will be 8,297 vehicles per day, this route has a theoretical capacity of 38,400 vehicles per day. Given that the routes in question are located within an urban area, and have a moderate existing traffic level, referring to Table 9.2 these routes have a 'medium' sensitivity to driver delay.

9.8.24 It is acknowledged that driver delay would be experienced during peak hours and at junctions rather than on links. However, the above figures, when taken with the fact that any effects would be limited to four non-consecutive days during the 12-month construction phase and are therefore fully reversible, indicate that the magnitude of effect on driver delay is likely to be 'low'.

9.8.25 In conclusion a 'low' magnitude of change on a 'medium' sensitivity receptor indicates that the significance of effect on driver delay is at worst minor and not significant in terms of the EIA Regulations.

Pedestrian Amenity

9.8.26 Pedestrian amenity, fear and intimidation can be affected by changes to traffic flow and composition. Sensitive receptors are located on the route including receptors of high sensitivity, Greenrigg Primary School for which students are likely to cross the B718 Westcraigs Road which has no formal pedestrian crossing facilities. There are several other sensitive receptors listed in Table 9.8 which are likely to be affected.

9.8.27 HGV traffic levels are predicted to increase by 33.6% and 61.3% on the B7066 (Traffic Count 2) and on the B718 (Traffic Count 3) respectively during the four non-consecutive days of concrete pouring.

9.8.28 The B7066 has a signalised pedestrian crossing to the west of the junction with Polkemmet Road, which serves Greenrigg Primary. Therefore, the sensitivity of this receptor to changes in pedestrian amenity is 'negligible'. The B718 has no formal pedestrian crossing facilities and has a moderate traffic flow level, therefore it is considered to have 'high' sensitivity to changing pedestrian amenity.

9.8.29 The change which is above the threshold of significance is the composition of HGVs on the route, not the overall traffic level. Therefore, the potential for effect on pedestrian amenity is limited compared with a change in total traffic. The magnitude of effect is therefore considered to be 'low'. A 'low' magnitude change with a worst case 'high' sensitivity receptor results in a 'moderate' and significant effect in terms of the EIA Regulations. Mitigation measures in relation to this effect are proposed in Section 9.9.6.

Severance

9.8.30 Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. Both the B7066 and the B718 pass through Harthill where sensitive receptors have been identified and which have the potential to be affected by severance.

9.8.31 There are only four non-consecutive days during construction where the threshold of significance of 10% has been breached, and this is for HGVs only rather than total traffic. Therefore, the effect on severance is very short lived and is fully reversible. The effect on severance is therefore 'negligible', acting on a receptor of 'high' sensitivity. The resultant effect is therefore 'minor' and not significant in terms of the EIA Regulations.

Noise and Vibration

9.8.32 Assessment of noise and vibration effects as a result of offsite construction vehicle movements has been considered using the guidance contained in DMRB – LA 111 (reference in Table 9.1). In accordance with the guidance, the following points have been noted when considering the need for a quantitative assessment of offsite construction traffic noise and vibration:

- The level of detail of a noise and vibration assessment shall be proportionate to the quality of data available and the risk of likely significant effects occurring; and
- Are there any noise sensitive receptors where there would be a reasonable stakeholder expectation that a construction noise/vibration assessment would be undertaken?

9.8.33 All onsite construction noise and vibration effects and operational noise effects are considered in Chapter 7: Noise of the EIA Report.

9.8.34 Considering off-site transport related noise/vibration effects against the above bullet points, there are a number of sensitive receptors located close to the proposed general construction traffic route. However, this route is an established transport corridor, and there should be an expectation that it is used by HGV traffic. Therefore, there is no 'reasonable stakeholder expectation' that a quantitative noise/vibration assessment be undertaken for a temporary and fully reversible change in traffic flow due to the Development which is only predicted to exceed the threshold of significance on four non-consecutive days.

9.8.35 Furthermore, ground-borne vibration resulting from HGV and ALV movements is generally only likely to be significant where vehicles traverse discontinuities, such as rough surfaces (including potholes) or speed-humps. Effects from the temporary increase in traffic are therefore only likely to be experienced at receptors located next to such road defects, in which case the maintaining authority (i.e., the Council, or Transport Scotland) would be responsible for enacting repairs.

9.8.36 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. Due to the short-term and temporary nature of these increases in traffic movements, the effect of noise and vibration upon sensitive receptors along the route is considered to result in a 'negligible' magnitude of change on a receptor of 'high' sensitivity, as a worst case. Thus, the effect of increased in traffic movement on noise and vibration is minor and not significant in terms of the EIA Regulations.

9.9 Assessment of Cumulative Effects

9.9.1 Cumulative traffic effects can only occur where the construction phase of a nearby development, which shares a common route to site for construction traffic, overlaps with that of the Development.

9.9.2 A review of Developments within the vicinity of the site was undertaken,

9.9.3 Table 9.23 9.23 below summarises the findings of these and identifies which Developments have the potential to cause cumulative effects.

Table 9.23 - Cumulative Effects - Site Review

Site	Planning Ref.	Comments
Southrigg II Wind Farm – 17/01478/FUL	Approved	One turbine site, general construction traffic will use the B7066 and B718 approach routes, common with the Development. ALV traffic will approach from the east through Armadale.
Brownhill Farm Wind Farm - 20/00504/FUL	Approved	Two turbine site which is likely to gain access using the B7066 in common with the Development.
Dewshill Wind Farm	Proposed – In planning	Four turbine development. Would use a short section of the B7066 in common with the potential quarry route of the Development.

Site	Planning Ref.	Comments
Drumelzie Wind Farm - LIVE/0154/FUL/15	Granted Permission	One turbine development north of Blackridge. Stone for access and hardstandings will be won from on-site borrow pits. Likely to use B718 and B7066 routes for other HGV deliveries.
Woodend Windfarm	Proposed - In Planning	Four turbine development north of Blackridge. Likely to use B718 and B7066 routes.
West Benhar Wind Farm - 13/01377/FUL	Under Construction	Eight turbine site which is undergoing repowering. This development is currently under construction and will be finished by the commencement of construction of the Development. **Has not been considered further in this assessment.**
Longhill Burn Wind Farm	Under Construction	Eight turbine site which is currently under construction and due to be finished in 2022. **Has not been considered further in this assessment.**

9.9.4 To provide a realistic appraisal of the worst case potential cumulative effects the following assumptions have been made:

- Traffic will be managed to ensure that concrete pouring days with nearby wind farms do not coincide, this will reduce the peak traffic experienced in the cumulative case and will be secured through the Construction Traffic Management Plan (CTMP); and
- The peak construction traffic, outwith concrete pouring, will be considered.

9.9.5 Where known, the assessed peak traffic flow levels for each development have been taken from their respective EIA Reports or Transport Statements. Where this information was not available the peak traffic has been estimated by taking a pro-rata traffic level using the Development as the baseline and the number of turbines as the multiplier.

9.9.6 Table 9.24 indicates the daily peak traffic flow level used in the cumulative assessment, notes have been provided as to how the figures has been ascertained.

Table 9.24 - Cumulative Daily Peak Traffic

Site	Total	HGV	Notes
Torrance II Extension	101	41	Defined within this EIA Report
Southrigg II Wind Farm	24	4	Derived from EIA Report total HGV traffic. Staff traffic levels have been estimated.
Brownhill Farm Wind Farm	35	20	Estimated as detailed traffic numbers are not given within EIA Report.

Site	Total	HGV	Notes
Dewshill Wind Farm	50	26	Derived from EIA Report, assumed that aggregate delivery constitutes peak ex. Concrete.
Drumelzie Wind Farm	20	10	Derived from EIA Report. Concrete delivery has been considered as no aggregates will be delivered.
Woodend Windfarm	70	40	EIA Report not yet submitted, therefore figures estimated.
Total	**300**	**141**	**N/A**

9.9.7 As shown in Table 9.24 above the peak cumulative daily traffic is anticipated to be 300 vehicle movements with 141 HGV movements. As not all traffic will use all routes within the study the peak traffic increase was not applied to all traffic count locations. Traffic Counts 1 and 2 will experience all cumulative traffic, Traffic Count 3 will experience traffic only from the Development, Southrigg II, Drumelzie and Woodend Windfarms.

9.9.8 Table 9.25 below indicates the predicted percentage increase in traffic during the cumulative case.

Table 9.25 - Cumulative Traffic Impact

Ref.	Total Traffic				HGV Traffic			
	2024 Baseline	CT*	Baseline + Development	Increase (%)	2024 Baseline	CT*	Baseline + Development	Increase (%)
1	55,589	300	56,050	0.8%	7356	141	7538	2.5%
2	8,017	300	8,483	5.8%	834	141	975	16.9%
3	3,941	215	4,162	5.6%	457	95	556	21.8%

*CT – Peak daily cumulative traffic increase.

9.9.9 As shown in Table 9.25 above, the peak increase in total daily traffic in the worst-case cumulative case is 5.8% at reference location 3 on the B718, this is below the 10% threshold of significance and is therefore negligible.

9.9.10 The increase in HGV traffic is 21.8% at Traffic Count 3 on the B718 and is 16.9% at Traffic Count 2 on the B7066. This is above the 10% threshold of significance and therefore warrants further assessment. The following sub-sections detail the further assessment which has been undertaken for the potential cumulative effects.

Traffic Generation

9.9.11 Similarly, to the conclusion of paragraph 9.8.13 it is concluded that the magnitude of change as a result of the 21.8% increase in HGV traffic is 'medium' on a receptor of 'high' sensitivity therefore the significance of the effect is 'moderate' and is significant in terms of the EIA Regulations.

9.9.12 Mitigation measures in relation to this effect are provided in Section 9.10 of this EIA Report.

Hazardous Loads

9.9.13 Reference should be made to the Hazardous Loads section detailed in Paragraphs 9.8.15 and 9.8.16. No further assessment of these is warranted.

Accidents and Safety

9.9.14 Reference should be made to the Accidents and Safety assessment made in Section 9.8. As no trends or hotspots were identified no further assessment is warranted.

Driver Delay

9.9.15 Reference should be made to the Driver Delay assessment contained in Section 9.8. The increase in total traffic is predicted to remain below the threshold of significance at all locations, it is only HGV traffic which will increase above threshold. As demonstrated, the roads will remain significantly below their theoretical capacity and the change in HGV traffic is insufficient to materially alter driver delay.

9.9.16 In conclusion the effect on driver delay remains at worst minor and not significant in terms of the EIA Regulations.

Pedestrian Amenity

9.9.17 Reference should be made to the Pedestrian Amenity assessment contained within Section 9.8. The effect of the cumulative impact is to increase the duration of effects from 4 non-consecutive days to a period of several months, in the case that the peak periods of construction overlap.

9.9.18 It should be noted that the likelihood of the peak periods of construction overlapping for each of the assessed cumulative developments is low, therefore it is likely that the threshold of significance won't be exceeded in practice except during the four non-consecutive days of concrete delivery, as previously concluded.

9.9.19 The magnitude of change remains 'low' as the percentage increase in HGV traffic of 21.8% does not exceed the previously predicted increase of 61.3%. Therefore, acting on a receptor of 'high' significance results in a 'moderate' and significant effect in terms of the EIA Regulations. Mitigation is proposed within Section 9.10.

Severance

9.9.20 Similarly, to the conclusion of the assessment contained in Section 9.8 the effects on severance are short lived and fully reversible. Due to the cumulative case there is the potential for such effects to occur for a longer period of time (several months). However, it remains unlikely that the peak periods of construction of all developments will occur simultaneously, therefore the likelihood of the threshold of significance being exceeded is low and if it is exceeded it will be for a short duration.

9.9.21 It is therefore concluded that the effect on severance during the cumulative scenario remains 'negligible' and is acting on a receptor of 'high' sensitivity,

therefore the significance of effect is 'minor' and not significant in terms of the EIA Regulations.

Noise and Vibration

9.9.22 Reference should be made to the Noise and Vibration assessment contained in Section 9.8. No further assessment is warranted in relation to cumulative effects.

9.10 Mitigation Measures

9.10.1 To summarise the conclusion of Sections 9.8 and 9.9 potentially significant effects have been identified in the following cases:

- Traffic Generation – 'Moderate' effect due to HGV traffic increase on the B7066 and B718 in both the cumulative case and on four non-consecutive days of concrete pouring; and
- Pedestrian Amenity – 'Moderate' effect on the B7066 only during the cumulative case due to HGV increase and on four non-consecutive days of concrete pouring.

9.10.2 To mitigate against both above significant effects the Applicant will submit a Construction Traffic Management Plan (CTMP) prior to the commencement of construction of the Development. This should be secured through an appropriately worded condition of consent.

9.10.3 The CTMP will detail traffic management measures which address the above significant effects. The following proposals are suggested areas which should be considered within the CTMP:

- Notification of stakeholders and identified receptors as to the timing and duration of any above threshold construction traffic increases;
- Confirmation of the proportion of construction vehicles using each route following agreement as to the source of both aggregates and concrete;
- Identification of which sites are likely to give rise to cumulative impacts considering the latest information at the time prior to construction; and
- Measures to mitigate the impact on pedestrian amenity on the B7066, particularly considering pupils of Greenrigg Primary School. Consideration should be given to traffic management during increased traffic days (i.e., temporary 20mph speed restriction, crossing patrol or temporary signalised pedestrian crossing).

9.11 Residual Effects

9.11.1 Section 9.10 has given an overview of the proposed mitigation measures which are to be detailed in the CTMP. If the mitigation measures are implemented as described, then the residual effects in relation to Traffic Generation and Pedestrian Amenity will be reduced to a 'negligible' magnitude which will result in a 'minor' and not significant effect in terms of the EIA Regulations.

9.12 Summary

9.12.1 Chapter 9 of the EIA Report has assessed the impact of the Development on the Traffic & Transportation resource within the area surrounding the site. This has included an assessment of the impact of increased traffic during construction of the Development on roads within the local area, focussing on those roads which form the Abnormal Load Route, General Construction Traffic Route and Potential Route from Quarry.

9.12.2 A detailed overview of the predicted increase in traffic during the construction phase was undertaken, this identified the peak month of construction as Month 4 and predicted that total traffic would increase by 101 vehicle movements per day during this month which includes 41 HGV movements. A further 119 daily HGV movements will occur on four non-consecutive days when concrete is delivered.

9.12.3 Further assessment of cumulative effects was undertaken which indicated that if the peak construction period of all nearby developments was to coincide the resultant daily traffic increase would be 300 vehicle movements, including 141 HGVs.

9.12.4 Two 'moderate' and significant effects were identified, these were as a result of the predicted increase in HGVs on the B7066 and B718 during concrete delivery and during the cumulative scenario. Mitigation measures were proposed, which primarily consists of a CTMP. If these mitigation measures are implemented, then the residual effect is reduced to 'minor' and not significant in all cases.