



Chapter 11

Access, Traffic and Transport

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Chapter 11

11 Access, Traffic and Transport

11.1 Introduction

1. This chapter presents an assessment of the access, traffic and transport effects associated with the Proposed Development.
2. Given that the Proposed Development is an extension to the existing windfarm, a number of those areas included for assessment within this chapter cover areas previously assessed as part of the original Harestanes Windfarm application. The chapter includes:
 - a Sensitive Receptor Assessment to address the impacts of construction traffic on the pedestrian environment and other sensitive receptors;
 - a Construction Traffic Assessment in relation to the capacity and suitability of the likely construction traffic routes; and
 - a description of the site access arrangements, associated improvements and their suitability for use during the construction phase.
3. The Proposed Development comprises the erection of up to eight wind turbines, with tip heights of up to 200 metres (m); together with associated hard-standings; construction compounds; access junction and access tracks; and other related infrastructure (refer to **Chapter 4: Development Description** for further details).
4. The assessment takes account of the impact of construction vehicles related to the above infrastructure requirements; as well as abnormal load vehicles required to deliver and erect the turbine components.
5. The traffic impacts associated with the operational phase will be very low with one or two small service vehicles regularly accessing the site to carry out routine maintenance on the turbines. As this is an extension to an existing windfarm it is not considered that the operational movements would be significantly greater than already taking place for operational Harestanes Windfarm. Therefore, further assessment of the traffic impacts of the Proposed Development during the operational phase has been scoped out of this assessment.
6. The consent is being sought 'in perpetuity', i.e. with no time limit. However, should decommissioning of any of the Proposed Development be required, or part thereof, it is considered that the environmental effects of decommissioning would be similar to, or less than, those during construction; and the duration is likely to be shorter. The effects of decommissioning have therefore been scoped out of this EIA Report.

11.2 Legislation, Policy and Guidance

11.2.1 National Policy Guidelines

7. Scotland's National Planning Framework (NPF3) sets out the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole. It defines the Government's development priorities over the next 20-30 years and identifies national developments which support the development strategy. Scotland's third NPF was laid in the Scottish Parliament on 23rd June 2014.

8. Planning Advice Note (PAN) 75 – Planning for Transport (17th August 2005) aims to create a greater awareness of how linkages between planning and transport can be managed. It provides good practice guidance which planning authorities, developers and others should carry out in their policy development, proposal assessment and project delivery.
9. Onshore Wind Turbines Online Renewables Planning Advice (May 2014) - The Scottish Government introduced online renewables advice in February 2011 which has been updated several times since then. The most recent specific advice note regarding onshore wind turbines was published in May 2014. The advice note identifies the typical planning considerations in determining applications for onshore wind turbines including landscape impact, impacts on wildlife and ecology, shadow flicker, noise, ice throw, aviation, road traffic impacts, cumulative impacts and decommissioning. In terms of road traffic impacts, the guidance notes that in siting wind turbines close to major roads, pre-application discussions are advisable. This is particularly important for the movement of large components (abnormal load routing) during the construction period, periodic maintenance and for decommissioning.
10. Transport Assessment Guidance (July 2012) published by Transport Scotland also provides information relevant to the preparation of Transport Assessments for development proposals in Scotland. The guidance is intended to ensure that mechanisms are in place to specify, assess, revise, implement, monitor and review the impacts that development will have on the transport system.
11. The Institute of Environmental Management and Assessment (IEMA) Guidelines for the Environmental Assessment of Road Traffic have also been consulted to derive a suitable methodology for undertaking the assessment of the traffic generated during the construction of the Proposed Development.

11.2.2 Local Policy Guidelines

12. Dumfries and Galloway Council Local Development Plan - The Local Development Plan (LDP) was adopted by the Council on 29th September 2014 and is the established planning policy for Dumfries and Galloway. It sets out a settlement strategy and spatial framework for how the Council foresees development occurring in the forthcoming twenty-year period.
13. The LDP does not contain any specific policy guidance for windfarm developments, however it does reference a Supplementary Guidance 'Part 1 Wind Energy Development: Management Considerations'. The relevant transport element from this policy are:
 - "Where wind energy developments will involve abnormal load impact on public roads, developers and their contractors will be required, in consultation with the Council as roads authority, to produce an appropriate Traffic Management Plan. Developers will also be required to enter into a Section 75 or other legal agreement requiring any damage to the public roads to be made good at the developer's expense (the said agreement will require a 'before' and 'after' photographic survey of all public roads to be used by the developer and their contractors). Developers should also demonstrate how they have taken into consideration the impact on amenity for residents in close proximity to the transport routes used during the construction phase.";
 - "Developers should also carry out early consultation with the local roads and/or trunk roads officials and the Police in respect of abnormal load deliveries to the application site. Due to the size of the components being transported there can be issues in relation to the capacity of rural roads to cope with these loads.";
 - "The route of new access roads/tracks should be carefully selected and be as sensitive to the existing contours as is practical in relation to the use it will receive."

11.3 Consultation

14. The scope of this study has been developed in consultation with Dumfries and Galloway Council and Transport Scotland. A summary of consultation responses and corresponding actions is provided below in **Table 11.1**.

Consultee	Consultation Response	Applicant Action
Dumfries and Galloway Council	From the supplied plans and supporting information it appears that access and egress to this site is to be via the existing upgraded forest access at Burrance Bridge on the A701 Trunk Road, the agreed access for the existing Harestanes Wind Farm site. There should be no access to the windfarm construction site by any other routes.	No other access to the site is being proposed. All vehicles associated with the construction of the Proposed Development will be via the operational Harestanes Windfarm site access on the A701.
Dumfries and Galloway Council	Since access is to be via the Trunk Road network it would be appropriate that Transport Scotland be consulted regarding access considerations.	Transport Scotland have been consulted and their comments and associated responses are provided below.
Dumfries and Galloway Council	A secondary AIL access route utilising the port of Cairnryan has also been identified in the report. The access routes identified include the A77(T), A751(T), A75(T) and A714. It would appear this may have been erroneously copied from another document for a different windfarm. The Scoping Report should be updated to only reflect applicable access routes.	Transport Scotland have been consulted and their comments and associated responses are provided below.
Dumfries and Galloway Council	I am aware of historic unauthorised use of minor roads in the Beattock area during the original wind farm construction period. In order to regulate traffic movements during the whole construction period a traffic management plan (TMP) should be submitted and agreed in writing with the Council, Transport Scotland and the Police, prior to any works commencing.	A framework TMP section within the chapter has been included at this time and it would be proposed to undertake a full TMP following gaining consent and prior to any works commencing on site, which would be agreed in conjunction with the Local Authority, Transport Scotland and any other relevant consultees / stakeholders.
Dumfries and Galloway Council	There are a number of 'Core' paths including a National Cycle Route that run through or adjacent to this site. This area is widely used by walkers and by mountain bikers as one of the popular '7 Stanes' centres and there is a Café, Bike Shop and car parks at the Ae Forestry and Land Scotland offices. It would be appropriate that accommodations and mitigations be made to ensure the safety of walkers and cyclists during construction works, and such accommodations and mitigations should meet with the approval of the Councils' Access Team and the Sustainable Travel Team.	A CEMP and Access Management Plan (AMP) would be drafted by the Principal Contractor in order to ensure maintained access and safety for users of Core Path 39 (Ae Forest Large Circular), Roman and Reivers Long Distance Route, Regional Cycle Route 10 and Locharbriggs-Beattock local cycle route. The AMP would be submitted and approved by the Dumfries and Galloway Council Access Team and Sustainable Travel Team prior to the commencement of construction works. The CEMP will be based on the Outline CEMP presented in Appendix 4.1 . Section 12.6 and 12.7 of Chapter 12 provides further detail on the potential effects on these receptors and proposed mitigation measures.
Dumfries and Galloway Council	Creation of windfarm access tracks and turbine placements will likely generate accelerated timber extraction. The road network in Dumfries and Galloway has been assessed relative to use by forestry extraction vehicles by Dumfries and Galloway Council in	The Applicant agrees to undertake the timber extraction following the agreed methodology with the Local Authority and any other relevant stakeholders.

Consultee	Consultation Response	Applicant Action
	partnership with the Forestry Industry and this is reflected in the Agreed Routes Map. All extracted timber must only travel via suitable routes identified on the Agreed Routes Map and after consultation with the Council. It would be appropriate that there should be consultation with nearby forest managers and timber hauliers through the office of the South of Scotland Timber Transport Officer to co-ordinate timber haulage operations that may use the access route(s) during the construction period to minimise the cumulative impact on communities and road users.	All timber extraction would be via the agreed timber routes within the local authority area as identified on the Timber Transport Forum.
Dumfries and Galloway Council	In the event that suitable and sufficient aggregate is not available from on-site Borrow Pits, any future submission/EIA Report/TMP should also identify worst case scenario that 100% of the aggregate required for construction shall be imported to site and identify the potential number of movements in that event so that the potential impact of importing aggregate from elsewhere via the public road network be assessed.	A worst case assessment has been undertaken, whereby all aggregate materials are imported to the site, with all construction vehicles assumed to access and exit the site via one route only. This has been done for all route options.
Dumfries and Galloway Council	The TMP should include a programme of delivery types/numbers by month, details of all proposed mitigation measures to minimise the impact on local communities and businesses, agreed and excluded access routes and details of measures that will be implemented to ensure that: <ul style="list-style-type: none"> no stacking of delivery vehicles occurs on any part of the public road network; the safety of the public using 'core' and cycle paths is maintained; and access and excluded routes should be identified and agreed for all types of vehicles and a system of visible vehicle tagging/badging employed to ensure compliance with agreed routes and driver behaviour standards which should be supported by a Driver Code of Conduct and is to be agreed in writing with the Police and the Roads Authority prior to any works commencing on site. 	A framework TMP has been included at this time and it would be proposed to undertake a full TMP following gaining consent and prior to any works commencing on site.
Dumfries and Galloway Council	There is the possibility of other unrelated windfarm projects being constructed in the vicinity concurrently with this project. Therefore, it would be appropriate that the TMP acknowledge that co-ordination phasing may be required to mitigate against the cumulative traffic impact. Prior to the submission of the TMP, all potential access routes should be assessed and where possible, collaborative work should be taken with other wind farms utilising similar routes.	A framework TMP has been included at this time and it would be proposed to undertake a full TMP following gaining planning consent and prior to any works commencing on site.
Transport Scotland	Transport Scotland would state that any proposed changes to the trunk road network must be discussed and approved (via a technical approval process) by the appropriate Area Manager as soon as practicable, and prior to the movement of any abnormal load.	A route survey has been undertaken and notes all predicted works at this time. This would be updated as and when required following the site gaining planning consent and would be undertaken in consultation with Transport Scotland.

Consultee	Consultation Response	Applicant Action
Transport Scotland	The SR states that the forthcoming EIA Report will be undertaken in line with the Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment Guide. Transport Scotland is satisfied with this approach and would ask that potential trunk road related environmental impacts such as driver delay, pedestrian amenity, severance, safety etc be considered and assessed where appropriate (i.e. where IEMA Guidelines for further assessment are breached). These specify that road links should be taken forward for further detailed assessment if: <ul style="list-style-type: none"> • traffic flows will increase by more than 30%, or • the number of Heavy Goods Vehicle (HGVs) will increase by more than 30%, or • traffic flows will increase by 10% or more in sensitive areas. 	We can confirm that the assessment has been undertaken using this methodology.
Transport Scotland	The SR states that the daily vehicle movements during the peak period of the construction phase will be assessed against the baseline traffic conditions. Any changes in traffic levels on each of the study network links during the construction phase will be assessed in terms of percentage change and compared against the maximum vehicle capacity of each link. Transport Scotland considers this methodology to be appropriate. Transport Scotland is satisfied with the proposed study area. We note that any assessment of traffic impacts associated with the operational phase of the development are to be scoped out. Transport Scotland considers this appropriate.	Comment noted.
Transport Scotland	We note that an electronic service delivery for abnormal loads (ESDAL) review is proposed to confirm the suitability of the structures on the proposed turbine component delivery route. Transport Scotland will require to be satisfied that the size of turbines proposed can negotiate the selected route and that transportation will not have any detrimental effect on structures within the trunk road route path. A full Abnormal Loads Assessment report should be provided with the EIA Report which identifies key pinch points on the trunk road network. Swept path analysis should be undertaken and details provided with regard to any required changes to street furniture or structures along the route.	A route survey has been undertaken and notes all predicted works at this time. This would be updated as and when required following the Proposed Development gaining consent and would be undertaken in consultation with Transport Scotland.

Table 11.1: Consultation Responses

11.4 Abnormal Load Access Review

11.4.1 Introduction

- This section of the chapter provides a review of the proposed access route for Abnormal Indivisible Loads (AILs), associated with transporting the wind turbine components from the Port of Entry (POE) through to the Proposed Development.

11.4.2 Port of Entry

- It is proposed that turbine components are delivered to Glasgow King George V Dock, as this is the most suitable Port of Entry (POE) to accommodate the largest abnormal load vehicles based on the site location, suitability of the road network and layout of the port (including access and egress points). The port of Cairnryan may be considered a secondary option however it has some restrictions including limited water depth and port handling facilities/component storage. Should this port be considered going forward, further route assessment would need to be undertaken.

11.4.3 Delivery Route

- Sections of the proposed abnormal load route from the POE are proven routes used to access a number of other windfarms in the area including the operational Kilgallioch Windfarm, with minimal works required to accommodate the proposed loads. The proposed abnormal load route identified is as follows:

- Glasgow KGV Docks;
- Kings Inch Drive;
- M8;
- M74/M6;
- A75;
- A701; and
- Site Road.

- Following consent and confirmation of the final turbine model to be installed on Site, a report detailing the following would be submitted for approval to Dumfries and Galloway Council, Transport Scotland and any other relevant authorities:

- Results of a test run of the proposed abnormal load route, which would be undertaken in conjunction with Dumfries and Galloway Council, Transport Scotland and Police Scotland. The test run would be undertaken using a component delivery vehicle in order to identify any areas that may require mitigation works to accommodate the proposed loads.
- Details of a programme of off-site mitigation works to include (if required) passing places, road widening, verge strengthening, associated works identified (if applicable) and restoration proposals (if applicable).

- The abnormal loads route from the POE to the proposed site access is outlined in **Figure 11.1 Proposed Abnormal Load Access Route**.

11.4.4 Site Access

- There would be a single site access junction from the A701, using the operational Harestanes Windfarm access. Due to the increase in turbine size compared to those installed at the operational Harestanes Windfarm, there would be a requirement to modify the existing junction arrangement to accommodate the larger components. As such, the modified junction would be designed and constructed to accommodate all required construction vehicle types, including abnormal loads, to the satisfaction of Dumfries and Galloway Council and Transport Scotland.

- The works associated with the upgrading of the existing access junction, access track and Proposed Development would be managed through a Construction Traffic Management Plan (CTMP) which would be a condition of any S.36 consent granted.

11.5 Assessment Methodology and Significance Criteria

11.5.1 Study Area

- The baseline review focused on the nature of the surrounding road infrastructure and the current level of traffic use and was informed by desktop studies and field surveys.

11.5.2 Desk Study

23. The desk study included reviews and identification of the following:

- Personal Injury Accident data;
- Road capacity;
- Traffic count data;
- Sensitive locations;
- Any other traffic sensitive receptors in the area (core paths, routes, communities, etc.);
- Ordnance Survey (OS) plans;
- Potential origin locations of construction staff and supply locations for construction materials to inform extent of local area road network to be included in the assessment; and
- Constraints to the movement of AILs through a Route Survey including swept path assessments.

11.5.3 Field Survey

24. Field surveys were also undertaken and comprised:

- A site visit to the site to review the potential access routes and potential constraints.

11.5.4 Impact Assessment Methodology

25. The methodology adopted in this assessment involved the following key stages:

- Determine baselines;
- Review development for impacts;
- Evaluate significance of effects on receptors;
- Identify mitigation; and
- Assess residual effects.

11.5.5 Sensitivity / Importance / Value

26. The IEMA ‘Guidelines for Environmental Impact Assessment’ (2005) notes that separate ‘Guidelines for the Environmental Assessment of Road Traffic’ (1993) document should be used to characterise the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. The guidelines intend to complement professional judgement and the experience of trained assessors.
27. In terms of traffic and transport impacts, the receptors are the users of the roads within the study area and the locations through which those roads pass.
28. The IEMA Guidelines includes guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for users based on the characteristics of roads and locations. This is summarised in **Table 11.2**.

Receptor	Sensitivity			
	High	Medium	Low	Negligible
Users of Roads	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures.	Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures.	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures.	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic and suitable for Abnormal Loads and new strategic trunk road junctions capable of accommodating Abnormal Loads.

Receptor	Sensitivity			
	High	Medium	Low	Negligible
Users/Residents of Locations	Where a location is a large rural settlement containing a high number of community and public services and facilities	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services	Where a location is a small rural settlement, few community or public facilities or services	Where a location includes individual dwellings or scattered settlements with no facilities

Table 11.2: Classification of Receptor Sensitivity

29. Where a road passes through a location, users are considered subject to the highest level of sensitivity defined by either the road or location characteristics.

11.5.6 Magnitude of Impact

30. The IEMA guidance indicates that the following criteria should be adopted to identify whether links on a network should be subject to detailed assessment:
- include traffic links where either traffic flows would increase by more than 30% or the number of HGV movements would increase by more than 30% as a result of the Proposed Development; and
 - include any other specifically sensitive location affected by traffic increases of at least 10%.
31. The following receptors including groups and special interests have been assessed for each route section within the agreed study network (see **Figure 11.2 Proposed Construction Access Routes**) in line with the IEA guidance to determine the sensitivity of receptors:
- people at home;
 - people at work;
 - sensitive locations – including hospitals, schools, places of worship and historical buildings;
 - people walking;
 - people cycling;
 - recreational and shopping areas;
 - ecological / nature conservation sites; and
 - tourist / visitor attractions.

32. The sensitivity level of receptors on each route section has been assessed using the following scale, and has been determined by the number of receptors present and proximity / level of interaction between the receptors and traffic flows:

- major sensitivity;
- moderate sensitivity;
- minor sensitivity;
- negligible sensitivity; and
- no receptors identified.

33. The traffic-related impacts set out in the IEA guidance are outlined below:

- Environmental Impacts Considered in Traffic and Transport:
 - Severance;
 - Driver Delay;
 - Pedestrian Delay;
 - Pedestrian Amenity;
 - Fear and Intimidation; and
 - Accidents and Safety.

34. A number of potential impacts fall outside the scope of this chapter and are discussed and assessed in detail within relevant chapters of the EIA Report:

- Environmental Impacts Considered in other EIA Report Chapters:
 - Noise;
 - Vibration;
 - Visual Effects;
 - Air Pollution;
 - Dust and Dirt;
 - Ecological Effects; and
 - Heritage and Conservation.

35. The evaluation methodologies for each of the six traffic related impacts are discussed individually in turn.

Severance

36. Severance is described by the IEMA Guidelines as: “the perceived division that can occur within a community when it becomes separated by a major traffic artery...it may result from difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself” (IEMA, 1993).

37. The following levels of change in traffic flow have been considered when assessing severity of severance:

- Less than 30% increase in traffic equates to a negligible change in severance;
- 30% increase in traffic equates to a small change in severance;
- 60% increase in traffic equates to a medium change in severance; and
- 90% increase in traffic equates to a large change in severance.

38. In order to determine the magnitude of any change in severance a range of relevant factors need to be considered, including:

- road conditions;
- traffic flows; and
- level of pedestrian activity.

Driver Delay

39. The IEMA guidance states that driver delay is only likely to be significant when traffic on the network surrounding the site is already at, or close to, the capacity of the system. Therefore, capacity assessments should be conducted on route sections that require detailed assessment to ensure that there are no existing or predicted future capacity issues.

Pedestrian Delay

40. Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general, increases in traffic levels are likely to lead to greater increases in delay. However, delays will also depend upon the general level of pedestrian activity, visibility and general physical condition of the road.

41. The IEMA guidance does not support the use of threshold assessments to quantify the magnitude of impacts due to changes in delay. Therefore, the magnitude of this impact should be determined using professional judgement based on the predicted increase in traffic levels and the predicted level of pedestrian activity on route sections subject to detailed assessment.

Pedestrian Amenity

42. Pedestrian amenity describes the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width / separation from traffic.

43. The IEMA guidance considers that a suitable threshold for assessing the magnitude of the impact of traffic flow increase on pedestrian amenity is a 100% increase in traffic levels. Therefore, the magnitude of impact in pedestrian

amenity should be determined based on the level of increase in traffic flows on a particular route section and the level of pedestrian activity on that route section.

Fear and Intimidation

44. The level of fear and intimidation experienced by pedestrians is dependent on the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths. Whilst danger is recognised as an important environmental impact, the IEMA guidance confirms that there are no commonly agreed thresholds for estimating fear and intimidation caused by traffic. Therefore, the magnitude of impact should be determined by a qualitative assessment of the range of factors discussed above.

Accidents and Safety

45. The IEMA guidance recommends that at locations where high levels of Personal Injury Accidents (PIAs) are recorded, accident statistics should be used to provide an estimate of the existing route section/s accident rate. The Proposed Development traffic can then be used to undertake a statistical assessment of the likely increase in accident rates based on the increase in vehicle-kilometres.

11.5.7 Requirements for Mitigation

46. Where potential adverse effects are identified, the Applicant will implement mitigation measures to reduce or remove these effects.

47. It would be the responsibility of the Applicant, in conjunction with the Principle Contractor, to prepare a CTMP, which would be agreed in advance with the relevant road authorities prior to commencement of work on site. The preparation of the CTMP would set out in full the mitigation measures which would be implemented during construction. Until the contractor for the construction period is appointed, it is not possible to finalise the CTMP and for this reason it is common for such documents to be secured by an appropriate planning condition.

11.5.8 Assessment of Residual Effects

48. The assessment of residual effects has been undertaken following a similar methodology as for the potential effects but taking into consideration the implementation of the proposed mitigation measures.

11.5.9 Assessment of Cumulative Effects

49. The assessment of cumulative effects has been undertaken in a similar manner to that of the potential effects but takes into consideration other consented or ‘in planning’ developments. Proposed Developments currently in the scoping stages of planning have not been considered.

11.5.10 Limitations to Assessment

50. The contractors and suppliers for the Proposed Development have not yet been selected and so it is not possible to confirm with certainty which routes would be used by development traffic, and how much traffic would utilise each route. Therefore, worst case assumptions of assigning all construction traffic to each route have been made, including the assumption that all construction materials would be imported to the site. In practice, the construction traffic levels on each route option would be significantly lower than assessed in this chapter, given that a number of route options are available, and it is expected that on-site borrow pits would be used to source materials in relation to the construction works.

11.5.11 Significance of Effect

51. To determine the overall significance of effects, the results from the receptor sensitivity and magnitude of change assessments are correlated and classified using a scale set out in Highways England (various dates): Design Manual for Roads and Bridges (DMRB), Table 2.4 of Volume 11, Section 2, Part 5 and summarised in **Table 11.3**.

52. The DMRB defines the potential changes in effect as follows:

- Large: These effects are considered to be material in the decision-making process;
- Moderate: These effects may be important but are not likely to be material factors in decision making. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a receptor;

- Slight: These effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in improving the subsequent design of the project; and
- Neutral: No effects or those that are imperceptible.

Receptor Sensitivity	Magnitude of Change			
	Major	Moderate	Minor	Negligible
High	Large	Large/Moderate	Moderate/Slight	Slight
Medium	Large/Moderate	Moderate	Slight	Slight/Neutral
Low	Moderate/Slight	Slight	Slight	Slight/Neutral
Negligible	Slight	Slight	Slight/Neutral	Neutral

Table 11.3: Significance of Effects Matrix

53. In terms of the EIA Regulations, effects would be considered of significance where they are assessed to be large or moderate. Where an effect could be one of Large/Moderate or Moderate/Slight, professional judgement would be used to determine which option should be applicable.

11.6 Baseline Conditions

54. The Proposed Development would be accessed directly from the A701 via the operational Harestanes Windfarm access where some junction works would be needed due to the increase in turbine size from those installed at the operational Harestanes Windfarm.
55. At this stage of the planning process, a Principal Contractor for the Site has not been identified, and information relating to the origins of general construction traffic trips is not available. As such, it has been necessary to make assumptions relating to the routing of construction traffic.
56. A number of potential access routes for general construction traffic were identified based on the locations they are likely to originate from and studies undertaken for other windfarm developments in the area. These have then been used to determine the study area as shown in **Figure 11.2 Proposed Construction Access Routes** and agreed with Dumfries and Galloway Council through the scoping exercise, and defined as:
- A75(T) – between the junction with the A76 and the A709; and
 - A701(T) – between the junctions with the A75(T) and the A74(M).
57. Based on the above, these routes have been broken down into link sections for assessment chapter, and are as follows:
- Link 1: A75 between A76 Roundabout and A701 Roundabout;
 - Link 2: A75 between A709 Roundabout and A701 Roundabout;
 - Link 3: A701 between A75 Roundabout and the Site Access; and
 - Link 4: A701 between M74 Junction 15 and the Site Access.
58. Effects associated with traffic generated by the Proposed Development would be most pronounced in close proximity to the site access. As vehicles travel away from the Proposed Development, they would disperse across the wider road network, thus diluting any potential effects. It is therefore expected that the effects relating to traffic and transport are unlikely to be significant beyond the study area identified above.
59. Traffic count data for the roads within the study network has been obtained from the Department for Transport's (DfT) website. This data was provided as two-way Average Annual Daily Traffic (AADT) flows, by vehicle type including HGVs. A summary of the two-way AADT flows on the surveyed route sections, based on the most recently

available 2019 traffic data, is presented in **Table 11.4**, while the locations of the traffic count sites are shown in **Figure 11.3 Traffic Count Locations**.

Count Site / Link No.	Study Network Route Section	Existing two-way AADT Flows	
		HGV	Total
80290 / Link 1	A75 between A76 Roundabout and A701 Roundabout	2,319	24,879
80289 / Link 2	A75 between A709 Roundabout and A701 Roundabout	2,014	16,472
80359 / Link 3	A701 between A75 Roundabout and the Site Access	632	6,154
788 / Link 4	A701 between M74 Junction 15 and the Site Access	609	4,883

Table 11.4: Existing two-way AADT Flows (2019)

11.6.1 Accident Review

60. Personal Injury Accident (PIA) data for the three year period covering 2017 to 2019 was obtained from the online resource crashmap.co.uk which uses data collected by the police about road traffic crashes occurring on British roads where someone is injured. Accident data for the above links and the associated junctions have been reviewed and are summarised in **Table 11.5**.

Link No.	Study Network Route Section	Severity		
		Slight	Serious	Fatal
Link 1	A75 between A76 Roundabout and A701 Roundabout	7	-	-
Link 2	A75 between A709 Roundabout and A701 Roundabout	5	-	1
Link 3	A701 between A75 Roundabout and the Site Access	9	6	1
Link 4	A701 between M74 Junction 15 and the Site Access	5	3	-
Summary		26	9	2

Table 11.5: PIA Data Summary

61. Looking at each link in detail, a more comprehensive review of each accident has been provided, to determine any trends in the accident types, for example types of vehicles, age of casualties etc. **Table 11.6** provides a summary of each link.

	Location (OS Grid)	Severity	Type	Cause	No. Casualties	Age of Casualty
Link 1	A75 / A76 Roundabout (296284 577243)	Slight	Car only (x2)	Driver error	1	25-34
	A75 / A76 Roundabout (296283 577240)	Slight	Car only (x2)	Driver error	1	35-44
	A75 / A76 Roundabout (296277 577241)	Sight	Car and Light Goods Vehicle (LGV)	Driver error	1	45-54
	A75 / A76 Roundabout (296283 577240)	Slight	Car and LGV	Driver error	1	21-25
	A75 (296890 577560)	Slight	Car (x3)	Driver error	1	21-25

	Location (OS Grid)	Severity	Type	Cause	No. Casualties	Age of Casualty
	A75 (296895 577567)	Slight	Car (x4)	Driver error	3	26-35 (x2) 56-65
	A75 (297814 578236)	Slight	Car (x2)	Driver error	1	46-55
Link 2	A75 (299474 577390)	Fatal	Car (x2) and HGV	Driver error	1	66-75
	A75 (299410 577423)	Slight	Car (x3) and HGV	Driver error	3	36-45 56-65 66-75
	A75 (299053 577606)	Slight	Car (x2)	Driver error	1	21-25
	A75 (298728 577775)	Slight	Car and LGV	Driver error	2	25-34 35-44
	A75 (298622 577828)	Slight	HGV and LGV (x2)	Driver error	1	36-45
	A75 (298606 577845)	Slight	Car (x3)	Driver error	4	16-20 (x2) 26-35 56-65
Link 3	A701 (298494 578313)	Serious	Car and Motorcycle	Driver error	1	36-45
	A701 (298569 578405)	Slight	Car (x4)	Driver error	1	36-45
	A701 (298777 578795)	Slight	Car (x2)	Driver error	1	46-55
	A701 (299252 579745)	Serious	Car (x4)	Driver error	2	6-10 Over 75
	A701 (299710 581718)	Slight	Car	Driver error	1	16-20
	A701 (299729 581907)	Fatal	HGV and LGV	Driver error	1	56-65
	A701 (300381 583183)	Slight	Car	Driver error	1	36-45
	A701 (300578 583621)	Slight	Car (x2)	Driver error	1	46-55
	A701 (300488 585104)	Slight	Car (x2)	Driver error	1	55-64
	A701 (300517 585606)	Slight	Car and HGV	Driver error	2	16-20 21-25
	A701 (301115 586732)	Serious	Car and LGV (x2)	Driver error	2	46-55 36-45
	A701 (301712 587484)	Slight	Car and HGV	Driver error	1	21-25
	A701 (302012 587993)	Serious	Car (x2)	Driver error	3	21-25 26-35 36-45
	A701 (302009 587994)	Serious	LGV and motorcycle	Driver error	2	46-55 (x2)

	Location (OS Grid)	Severity	Type	Cause	No. Casualties	Age of Casualty
	A701 (302693 588617)	Serious	Car (x3)	Driver error	1	56-65
	A701 (303035 589017)	Slight	Car	Driver error	2	21-25 36-45
Link 4	A701 (303754 589724)	Slight	Car (x2) and HGV	Driver error	1	45-54
	A701 (305060 590748)	Slight	Car (x2) and LGV	Driver error	2	36-45 Over 75
	A701 (305069 590750)	Slight	Car	Driver error	2	26-35 36-45
	A701 (305635 591494)	Serious	Car	Driver error	1	16-24
	A701 (307124 594145)	Slight	Car (x2)	Driver error	1	56-65
	A701 (307863 598114)	Serious	Car	Driver error	1	46-55
	A701 (308345 599172)	Slight	Car and LGV	Driver error	1	26-35
	A701 (308354 599190)	Serious	Car and LGV	Driver error	4	16-20 21-25 46-65 56-65

Table 11.6: Link PIA Data Summary

62. The statistics indicate that the majority of accidents (70%) are "Slight" in nature and that there are a limited number of HGV incidents that occurred on the proposed access routes, however, there have been two fatal accidents occurring which did involve HGV's.

11.6.2 Cycle and Pedestrian Network

63. There are no Core Paths recorded by Dumfries and Galloway Council in close proximity to the proposed site access. The A701 does not have any pedestrian or cyclist infrastructure near the site access junction and as such, active travel activity is considered to be very low at this location.

64. Pedestrian facilities in the vicinity of the proposed site access are limited, reflecting the rural nature of the road network at this area. The majority of facilities are limited to the southern section of the A701 (Link 3).

65. A review of the Sustrans cycle network plan of the United Kingdom indicates that there are no on-road National Cycle Routes on the proposed access routes. Regional Cycle Network Route 10 passes in close proximity to the A701, however this is segregated and crossing locations are grade separated.

11.6.3 Future Year Baseline

66. Construction of the project could commence during 2022 if consent is granted and is anticipated to take up to 12 months.

67. To assess the likely effects during the construction phase, base year traffic flows were determined by applying a National Road Traffic Forecast (NRTF) low growth factor to the surveyed traffic flows.

68. The NRTF low growth factor for 2019 to 2022 is 1.022. These factors were applied to the 2019 survey data to estimate the 2022 Base traffic flows shown in **Table 11.7** below.

Count Site / Link No.	Study Network Route Section	Existing two-way AADT Flows	
		HGV	Total
80290 / Link 1	A75 between A76 Roundabout and A701 Roundabout	2,369	25,418
80289 / Link 2	A75 between A709 Roundabout and A701 Roundabout	2,058	16,829
80359 / Link 3	A701 between A75 Roundabout and the Site Access	646	6,287
788 / Link 4	A701 between M74 Junction 15 and the Site Access	622	4,989

Table 11.7: Baseline two-way AADT Flows (2022)

11.6.4 Identified Receptors on Study Network

69. Based on the classifications set out in **Table 11.2** the following receptors have been identified and sensitivity classified as follows:

- Users of A75 (Link 1 and Link 2): Low / Negligible sensitivity;
- Users of A701 (Link 3): Low sensitivity;
- Users of A701 (Link 4): Low sensitivity;
- Users/Residents of Locations along A75 (Link 1 and Link 2): Low / Negligible sensitivity;
- Users/Residents of Locations along A701 (Link 3): Medium sensitivity; and
- Users/Residents of Locations along A701 (Link 4): Low sensitivity

70. These classifications are then used throughout the following assessment.

11.6.5 Cumulative Windfarm Developments

71. It is noted that there are a number of proposed, consented and operational windfarm developments located within 30km of the Proposed Development. Any sites that are currently in operation would generate minimal LGV/car movements associated with routine maintenance.

72. Of the other developments within the 30km radius of the Site, it is considered unlikely that any of these would share the same access route as the Proposed Development. It is acknowledged that there may be some overlap on sections of the proposed access routes, however this would be appropriately managed and if required co-ordination of high traffic generating site activities may be required to mitigate against potential cumulative traffic impacts. This would be undertaken as part of the TMP and would include all applicable routes and would be done collaboratively with other windfarms in the area.

11.7 Potential Effects

73. The assessment of the potential effects was undertaken assuming a worst-case scenario of the construction phase taking a maximum of twelve months.

74. The construction phase includes all activities prior to the operation of the Proposed Development, i.e. up to the point at which all turbines begin generating electricity.

11.7.1 Predicted Traffic Generation

75. This section provides a predicted assessment of the level of effects caused by vehicles during the construction phase of the Proposed Development on existing traffic.

76. The following calculation factors have been used to derive the construction traffic estimates:

- the number of turbines is eight;
- the construction phase is predicted to last for twelve months;
- the construction site would operate seven days per week (07:00 to 19:00 Monday to Friday and 07:00 to 16:00 on Weekends, or as agreed with Dumfries and Galloway Council's Environmental Health Officer); and
- the site access track length is approximately 7,500m (including new and upgraded wind farm and forestry access track).

77. Concrete will arrive on-site pre-mixed from an external concrete batching plant. The location of the external supplier is unknown at this time but is expected to originate from local suppliers. As such it has been necessary to make assumptions as to the routing of this traffic. It should however be noted that on-site concrete batching will be considered, and as such the assessment undertaken in relation to the construction traffic generation is considered a worst case assessment.

78. In addition to the above, there is expected to be a limited amount of timber extraction associated with the construction of the Proposed Development. It is expected that the number associated with this would be in line with existing extraction and forest management. This would occur at the start of the construction period, for approximately two months, running concurrently with track construction and upgrades. All timber extraction would be via the agreed timber routes within the local authority area as identified on the Timber Transport Forum.

79. The level of effects of construction traffic have been calculated under a worst case scenario:

- All stone sourced from an off-site quarry (location unknown at this time but would be sourced as far as practicable from a local supplier).

80. It should be noted that in practice, the construction traffic levels would be significantly lower than that assessed, as it is expected that on-site borrow pits would be used to source materials.

81. The predicted number of loads and total trips required for each activity associated with the construction of the Proposed Development are shown in **Table 11.8**.

82. The majority of the car or van vehicle movements would be made by construction staff travelling to and from the Site. The highest number of HGV movements would be made by vehicles transporting stone for the construction of the access tracks and associated areas. The Proposed Development will utilise the compound area constructed as part of the operational Harestanes Windfarm. **Table 11.8** sets out the predicted number of loads and total trips required for each activity associated with the construction of the Proposed Development under each scenario.

Item	Total Movements (Arrivals & Departures)
Site Mobilisation	200
Timber Felling	2,080
Track and Hardstanding Construction	5,868
Drainage	20
Transformers / substation / control building	72
Turbine base steelwork	128
Turbine base concrete works	2,136
Cabling incl. trench fill	160
Cabling (sub-station to grid connection) incl. trench fill	28
Cranes	8

Item	Total Movements (Arrivals & Departures)
Misc. (incl. skips, met mast, slit traps)	672
Turbine Components	204
Finishing Activities / Commissioning and Testing	120
Light Goods Vehicle (LGV) movements (general construction)	12,600
Additional LGV movement (during concrete pouring / building)	500
LGV movements (component escort)	204
Total HGV	11,682
Total Car / LGV	13,304
Total	24,986

Table 11.8: Predicted Traffic Generation During Construction

83. The predicted typical monthly HGV and LGV arrival and departure movements are shown in **Table 11.9**, with the average daily movements for each month shown in **Table 11.10**.
84. The turbine foundation construction vehicle estimates have been based on off-site concrete batching. For the purposes of this assessment, it is assumed that concrete would be imported from ready mix facilities situated in the Dumfries locale and that 6m³ capacity trucks would be used for delivery. The concrete pouring for each foundation would be undertaken on a single day. Therefore, all concrete loads for each individual turbine foundation have been assigned to single day, eight days in total.
85. The concrete transport movements associated with the concrete pouring for the turbine foundations, occurring on eight days in total over the course of three months.

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Site Mobilisation	100	100										
Timber Felling	1,040	1,040										
Track, Compound & Hardstanding Construction	978	978	978	978	978	978						
Drainage		4	4	4	4	4						
Transformers / substation / control building					36	36						
Turbine base steelwork			32	32	32	32						
Turbine base concrete works			534	534	534	534						
Cabling incl. trench fill					80	80						

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Cabling (sub-station to grid connection) incl. trench fill					14	14						
Cranes							4		4			
Misc. (incl. skips, met mast, silt traps)	56	56	56	56	56	56	56	56	56	56	56	56
Turbine components							102	102				
Finishing Activities / Commissioning and Testing												120
LGV movements (general construction)	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
Additional LGV movement (during concrete pouring / building)								250	250			
LGV movements (component escort)							102	102				
Total HGV Movements	2,174	2,178	1,604	1,604	1,734	1,734	162	158	60	56	56	176
Total Car /LGV Movements	1,050	1,050	1,050	1,050	1,050	1,050	1,402	1,402	1,050	1,050	1,050	1,050
Total Vehicle Movements	3,224	3,228	2,654	2,654	2,784	2,784	1,564	1,560	1,110	1,106	1,106	1,226

Table 11.9: Total Monthly Arrival and Departure Movements

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Total HGV Movements	78	78	58	58	62	62	6	6	4	2	2	8
Total Car /LGV Movements	38	38	38	38	38	38	52	52	38	38	38	38
Total Vehicle Movements	116	116	96	96	100	100	58	58	42	40	40	46

Table 11.10: Average Daily Arrival and Departure Movements

11.7.2 Abnormal Loads

86. The proposed POE at King George V Docks in Glasgow has ample adequate facilities for accommodating the proposed loads and sections of the access route from the dock to the A701 have been the subject of upgrade works for other windfarm developments in the area, including the Kilgallioch Windfarm.
87. As previously advised, access from King George V docks would be via the M8, M74/M6, A75 and A701. Loads would undertake a U-turn manoeuvre at Carlisle at M6 Junction 42 or Junction 44 to allow direct access onto the A75.

88. If consented, the Applicant would engage in detailed discussions with the turbine suppliers, haulage contractors, Transport Scotland, Police Scotland and the relevant roads authorities in regard to an agreed POE strategy and AIL delivery route.

11.7.3 Comparing Construction Traffic against Baseline Conditions

89. The estimated Baseline for the year of construction, plus Construction Traffic flows and percentage impact for the study network are shown in **Table 11.11**. The results for each route section represent the worst case with all construction traffic using each route option; i.e. 100% of general construction traffic using Route 1, 100% of general construction traffic using Route 2 etc. In practice it is expected that several route options would be used.

Count Site/ Link No.	Study Network Link Section	Scenario	Average Two-Way Traffic Flows		
			HGV	Non-HGV	Total
80290 / Link 1	A75 between A76 Roundabout and A701 Roundabout	Baseline	2,369	23,049	25,418
		Baseline + Construction Traffic	2,447	23,087	25,534
		% Impact	3.3%	0.2%	0.5%
80289 / Link 2	A75 between A709 Roundabout and A701 Roundabout	Baseline	2,058	14,771	16,829
		Baseline + Construction Traffic	2,136	14,809	16,945
		% Impact	3.8%	0.3%	0.7%
80359 / Link 3	A701 between A75 Roundabout and the Site Access	Baseline	646	5,641	6,287
		Baseline + Construction Traffic	724	5,679	6,403
		% Impact	12.1%	0.7%	1.8%
788 / Link 4	A701 between M74 Junction 15 and the Site Access	Baseline	622	4,367	4,989
		Baseline + Construction Traffic	700	4,405	5,105
		% Impact	12.5%	0.9%	2.3%

Table 11.11: Proposed Development Construction Traffic Impact Assessment Results

91. With regards to the worst affected links, HGV traffic would increase by 12.1% on Link 3 on the A701 to the south of the site access junction and by 12.5% on Link 4 on the A701 to the north of the proposed access junction. Based on the proposed construction programme, during the worst month in relation to HGV trips (month one and month two), there is predicted to be 78 HGV movements per day (39 inbound and 39 outbound). This represents approximately 7 HGV movements per hour over the course of a typical working day on site.
92. Rule 1 of the IEMA Guidelines (see **Table 11.11**), the impact would not exceed 30% increases in either HGV traffic or total traffic movements on any of the links assessed and as such no detailed assessment is required. Nevertheless, a short summary has been provided below in relation to the other traffic related impacts.
93. Due to the temporary increase in additional vehicle movements predicted during the construction period, a capacity assessment has been undertaken to determine the effects of the increased traffic on the capacity.
94. Theoretical road capacities have been calculated from the Design Manual for Road and Bridges (DMRB), Volume 13, Section 1, Part 5: Speeds on Links (The Highways Agency 2002). The theoretical road capacity equates to the maximum traffic volumes which a road is able to accommodate. Above this level, traffic conditions would become unstable and queuing along the road section would occur.
95. Capacity assessments have been conducted under the worst case construction traffic levels that occur, the results of which can be seen in **Table 11.12**.

Count Site/ Link No.	Study Network Link Section	Average Two-Way Traffic Flows				% Spare Road Capacity
		Theoretical Road Capacity (12 hour period)	Total Base Traffic Flows	Base + Construction Traffic Flows	Spare Road Capacity	
80290 / Link 1	A75 between A76 Roundabout and A701 Roundabout	57,600	25,418	25,534	32,066	55.7%
80289 / Link 2	A75 between A709 Roundabout and A701 Roundabout	57,600	16,829	16,945	40,655	70.6%
80359 / Link 3	A701 between A75 Roundabout and the Site Access	57,600	6,287	6,403	51,197	88.9%
788 / Link 4	A701 between M74 Junction 15 and the Site Access	57,600	4,989	5,105	52,495	91.1%

Table 11.12: Proposed Development Spare Road Capacity

97. The results above show that with the addition of the worst case construction traffic levels, i.e. all construction vehicles using only one route to access the Site, there would be significant spare capacity on all of the links. As such, it is considered that the temporary increase in traffic during the worst case scenario would not have a significant impact on road capacity, on the study network.

11.7.4 Severance

98. The predicted change in severance on the links has been evaluated based on the percentage increase in total traffic levels expected during the construction phase, in line with IEA guidance. The significance of the predicted change in severance has been determined based on factors including the road conditions, traffic flows and level of pedestrian activity etc.

99. HGV flows would increase on all of the links assessed, with Links 3 and 4 displaying the highest increase with an increase of 12.1% and 12.5% respectively, the actual numbers are considered to be low and well within daily variations of traffic levels. There are limited pedestrian facilities on the majority of the links, while Link 3 has facilities in place, which include dedicated pedestrian crossing points both signal controlled and un-controlled. The sensitivity of receptors to changes in fear severance is Low and the magnitude of change is predicted to be Minor. It is therefore considered that the change in severance on Link 3 is considered to be of **Slight Adverse** significance.

11.7.5 Driver Delay

100. Minimal driver delay would be expected when vehicles are accessing the Site. The IEA guidance states that driver delay is only likely to be significant when traffic on the network surrounding the Proposed Development is already at, or close to, the capacity of the system. As established in **Table 11.12** there are no links on the proposed access routes that are close to capacity, with significant spare capacity available and therefore the change in driver delay is considered to be adverse effect, of **Slight/Neutral** significance.

11.7.6 Pedestrian Delay and Amenity

101. In the immediate vicinity of the Site, and on significant sections of the proposed access routes there are limited pedestrian facilities and as such the number of pedestrians is expected to be Low. There are however facilities in the Locharbriggs and Heathhall areas to the south on the A701 (Link 3) and as such the sensitivity to pedestrian delay and amenity is considered to be Medium at this location.

102. During the busiest day for HGV traffic, there would be in the order of 78 two-way HGV trips per day, which equates to 7 HGV movements per hour. Based on the above the increase in the severity of pedestrian delay is predicted to

be Negligible. It is considered that the effect of the construction traffic on pedestrian delay and amenity within the study network is adverse, of **Slight/Neutral** significance.

11.7.7 Fear and Intimidation

103. Construction traffic would be routed primarily via A-class and motorway roads, which are designed to accommodate HGV's and construction traffic, similar to those likely to be used during the construction period. Furthermore, as can be seen from **Table 11.7** that there are already high number of HGV's using the routes proposed to access the Proposed Development and as such, it is considered that they are suitable for accommodating the proposed level of construction trips.
104. Based on the above, it is considered that due to the low numbers of receptors on the proposed access routes and the composition of the other sections of the route in terms of the type of traffic they already accommodate, the sensitivity of receptors to changes in fear and intimidation is Low and the magnitude of change is predicted to be Negligible. Therefore, there is likely to be an adverse effect of **Slight/Neutral** significance.

11.7.8 Accidents and Safety

105. A review of the existing accident characteristics of the access routes was undertaken in **Section 11.6.1** above. The last five year PIA data was reviewed, which indicate that the majority of accidents (70%) were "Slight" in nature and that there are a limited number of HGV incidents that occurred on the proposed access routes, however, there have been two fatal accidents occurring which did involve HGV's.
106. Nevertheless, the increase in HGV traffic, in particular around the site access junction may have an impact on safety due to driver frustration and an increase in turning movements on and off the A701.
107. Therefore, based on the above assessment and level of existing traffic, the sensitivity of receptors to changes in road safety conditions would be Low to Medium and the magnitude of change would be Moderate. Therefore, there is predicted to be an adverse effect in respect of accidents and safety of **Moderate** significance.

11.7.9 Limits to the Assessment

108. The assessment has been based on an assumed construction programme for the Proposed Development, working on a worst case scenario where all stone and concrete would be sourced off site. It is however expected, that on-site borrow pits would be used to source construction materials and on-site concrete batching would be used where practicable. Therefore it is expected that alterations to the programme / construction methodology would in all likelihood decrease traffic flows per day / month.
109. The assessment has been based on average daily traffic flows within the peak month of site deliveries to provide a worst case assessment scenario. There may be localised peaks with construction days where flows can be higher for a specific hour, such as a shift change on site. Furthermore, for the purposes of the assessment it has been assumed that all construction trips would use the same route to access the Proposed Development Site, when in fact there are a number of route choices available.

11.8 Mitigation Measures

11.8.1 Physical Measures to Design Out Adverse Effects

110. The assessment has assumed the use of ready mix concrete delivered in separate cement mixer vehicles in order to assess the worst case scenario. This proposal is considered to be robust in reviewing the potential traffic impact associated with the Proposed Development and could be reduced by the provision of an onsite batching plant within the construction site.
111. The number of HGV movements would be reduced with an onsite batching plant as bulk deliveries of cement can be made via a 20 tonne powder tanker and aggregate can be delivered via a 35 tonne tipper HGV.
112. The Applicant may consider the use of an onsite batching plant during the construction phase, to help reduce HGV numbers on the proposed access routes.

113. Use of on-site borrow pits would further reduce the number of HGV trips associated with the construction of the Proposed Development. It is expected that a significant proportion of the required materials would in fact be sourced on site, thus further reducing the required number of HGV movements.
114. Advance warning signs and clear visibility splays would be used at the site access to help advise road users of the increased numbers of turning traffic at the site access junction.

11.8.2 General Construction Traffic

115. A CTMP would be prepared and agreed with the Dumfries and Galloway Council and Transport Scotland prior to construction works commencing on site. The CTMP would be developed using experience gathered during the construction of recent projects in the Local Authority area and the operational Harestanes Windfarm. The following measures could be included within CTMP during the construction phase:
- All materials delivery lorries (dry materials) would be sheeted to reduce dust and stop spillage on public roads;
 - Specific training, audit and disciplinary measures would be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
 - Appropriate traffic management measures would also be put in place at the Site access junction to advise drivers to slow down and be aware of turning traffic;
 - Directional signage could be provided to enforce delivery routes;
 - Requirement for all drivers to attend an induction to include a safety briefing, the need for appropriate care and speed control, particularly in sensitive areas, identification of specific sensitive areas, identification of the specified route, and the requirement not to deviate from the specified route; and
 - A Travel Plan to encourage lift sharing /crew bus access to site for construction staff.

11.8.3 Abnormal Indivisible Loads

116. With regards to abnormal indivisible load movements, a number of the necessary works identified are similar to those already in place for previous windfarm developments. These have been improved or altered, to suit the proposed larger turbine loads and would be made permanent with the agreement of the road authorities. In general, it is considered that these can be delivered without significant civil engineering works or disruption to existing road users.
117. The existing Site access junction off the A701 would be widened on its north eastern side to accommodate the proposed abnormal loads. From this point onwards, loads would proceed to the turbine locations using existing upgraded and new access tracks.
118. An agreed access strategy for turbine loads would be confirmed post consent once the turbine supplier and the turbine details have been confirmed. This would include a further route assessment and trial run of the confirmed component dimensions and vehicle set up, following confirmation of the appointed haulage contractor.
119. A police escort would be required to facilitate the delivery of the predicted loads. The police escort would be supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advance escort would warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy would remain in radio contact.
120. The abnormal loads convoys would be no more than three AILs long, or as advised by the police, to permit safe transit along the delivery route and to allow overtaking opportunities for following traffic where it is safe to do so.
121. The times in which the convoys would travel would be agreed with Police Scotland who have sole discretion on when loads can be moved.

11.8.1 Framework Traffic Management Plan

122. This section introduces a number of traffic management measures that could help reduce the effects of construction traffic on the surrounding road network. These measures are currently presented as indicative and would be confirmed with the relevant local and trunk road authorities and police closer to the time of works commencing on site.

123. All deliveries would be undertaken at appropriate times (to be discussed and agreed with the relevant roads authorities and police) with the aim to minimise the effect on the local road network. It is likely that the convoys associated with the movement of AILs would travel in the early morning periods, before peak times while general construction traffic would generally avoid the morning and evening peak periods.

Component and Transport Details

124. Traffic to the Site during construction will fall into two categories, namely:

- General construction traffic; and
- AILs – vehicles used for the transport of the largest turbine components.

Potential Route Conflict Areas

125. The majority of potential conflicts between construction traffic and other road users would occur with AIL traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.

126. Potential conflicts between AIL turbine loads and other road users can occur at a variety of locations and circumstances. These conflicts would be managed by the appointed haulage contractors escort vehicles, with assistance from Police escorts as and when required. The main potential conflicts are likely to occur at the following locations:

- In rural areas where the loads may straddle the centre line of the road, where fast moving oncoming traffic may be encountered etc.;
- Where traffic turns at a road junction, requiring other traffic to be held back on other approach arms; and
- Locations where high speeds of general traffic are predicted.

Advance Warning Signs

127. Advance warning signs could be installed on the approaches to the affected road network, subject to the agreement of the road authorities.

128. The signage would assist in helping improve driver information and allow other road users to consider alternative routes or times for their journey (if applicable).

129. The location and numbers of signs would be agreed post consent and would form part of the wider Traffic Management proposals for the project.

Public Information

130. Information on the turbine convoys would be provided to local media outlets to help assist the public. These could include:

- Local Newspapers;
- Community Councils; and
- Dumfries and Galloway Council website.

131. Information would relate to expected vehicle movements from the POE through to the site access junction. This would assist residents becoming aware of the convoy movements and may help reduce any potential conflicts.

Escort Procedures

132. Abnormal loads would be escorted in accordance with 'Code of Practice: Lighting and Marking for Abnormal Load Self Escorting Vehicles Incorporating Operating Guidance'. The escorting would be undertaken by the appointed haulage contractor with the assistance of Police Scotland.

133. All abnormal load convoys would include a minimum of two escort vehicles. The first escort has a dual function, to give oncoming drivers advance warning and also to assess the route ahead of the lorry and trailer. The second escort takes up the rear and contains the steersman who is in radio contact with the driver advising him if he needs

to activate the trailer steering controls in his cab. This second escort would also advise the lorry driver if there is any traffic attempting to overtake.

134. There are parts of the route where the escort vehicles would be required to advise traffic to temporarily stop (with the assistance of Police Scotland), to allow for the safe passage of loads. This would be required at locations where the carriageway narrows and at locations where there are significant changes in the horizontal alignment of the carriageway. The procedure for this is as follows:

- The first escort vehicle would ensure, with police assistance where required, that live traffic is stopped before the convoy is permitted to continue through the potential hazard. The convoy may not proceed without verbal confirmation from the lead escort vehicle. Where police assistance is required, the Transport Co-ordinator / Lead Driver would co-ordinate this with the police prior to the movement of any loads; and
- Should any rogue live traffic start to move, the lead escort vehicle would immediately order the convoy to stop. The second escort vehicle would then deal with the rogue live traffic, ensuring safe passage past the convoy, before the convoy can proceed, subject to confirmation from the lead escort.

Convoy Management

135. To address any concerns expressed by the local community, it is proposed that a detailed convoy management plan is developed with Dumfries and Galloway Council and Transport Scotland. This would include measures to provide hold points for convoys to ensure that inconvenience to other road users can be minimised. Hold point locations along the delivery route may include the following locations where traffic can overtake loads under police control. These would use existing road space, rather than new construction:

- An overtaking / passing area to pass convoys on the dual carriageway section of the A75 at Gretna; and
- An overtaking / passing area to pass convoys on the dual carriageway section of the A75 at Collin.

136. The potential for using these areas would be developed in detail with Police Scotland and the roads authorities and a detailed convoy management plan would be established prior to the movement of any loads.

Other General Measures

137. A Traffic Management Plan could also include:

- Procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates and agreeing;
- A review of clear heights with utility providers along the route;
- Ensure that any vegetation along the route is cut back to provide a clear running channel; Confirm that there are no roadworks or closures that could affect the loads;
- Communication protocols and lay over areas to allow overtaking;
- Discussion with Transport Scotland on the potential for using the existing Variable Message Signage (VMS) network to provide additional information to users of the A75 and M74; and
- A communication dialogue between the various stakeholders.

138. Site direction signage could also be provided to direct construction traffic to the Proposed Development Site and to ensure that traffic remains on approved routes and would not operate on minor road links that have not been assessed. The Balance of Plant (BoP) contract would specify the routes that suppliers must take during construction activities. This would be enforced by the site agent.

139. Any street furniture that is removed on a temporary basis to enable AIL movements would be fully reinstated following the delivery period.

140. An inspection of any traffic management measures and road signage around the site access junction would be undertaken by the site manager on a regular basis. During the access junction construction works, there would be a daily road inspection and the public road would be kept clear of debris and mud. A road sweeper would be employed as and when required to remove any debris from the public road network in the vicinity of the site access junction.

11.9 Residual Effects

141. This section considers the assessment of traffic impacts following the incorporation of the identified mitigation measures. An evaluation of the potential effects of the increase in traffic on the study area roads used for construction traffic was undertaken. The summary of this assessment is provided in **Table 11.13**.
142. The traffic effects are temporary in nature and confined to the construction period only, which is expected to last no more than 12 months. No long lasting detrimental transport or access issues are associated with the Proposed Development.

Description of Effect	Pre-mitigation Effect		Mitigation Measure	Residual Effect	
	Magnitude	Significance		Magnitude	Significance
During Construction					
Road Capacity	Minor	Slight	None Required	Minor	Slight
Severance	Minor	Slight	None Required	Minor	Slight
Driver Delay	Minor	Slight/Neutral	Convoy management, driver information on construction traffic routes and times and consideration to be given to use of on-site borrow pits and on-site concrete batching to reduce HGV trips. This would form part of the CTMP	Minor	Slight/Neutral
Pedestrian Delay	Negligible	Slight/Neutral	None Required	Negligible	Slight/Neutral
Pedestrian Amenity	Negligible	Slight/Neutral	None Required	Negligible	Slight/Neutral
Fear and Intimidation	Negligible	Slight/Neutral	None Required	Negligible	Slight/Neutral
Accidents and Safety	Moderate	Moderate	In relation to general construction traffic it is proposed that signage directing site operatives on the surrounding road network, including advising on advisory speed limits and where applicable the potential for interaction with vulnerable road users will be installed on the local road network. Signage will also be installed advising members of the public of an increase in HGV's operating in the area, in particular on the road network in the immediate vicinity of the proposed site access junction, where there will be an increase in HGV's entering and leaving the Proposed Development.	Minor	Slight

Description of Effect	Pre-mitigation Effect		Mitigation Measure	Residual Effect	
	Magnitude	Significance		Magnitude	Significance
			With regards to abnormal indivisible loads associated with the delivery of wind turbine components, convoy management, driver information on proposed access routes and formal escort procedures will be implemented to manage the movement of loads. All of the above measures would form part of the CTMP.		

Table 11.13: Summary of Residual Effects

11.10 Cumulative Effects

143. As previously advised, there are a number of planned and operational windfarm developments located within 30km of the Proposed Development. Those sites already operational would generate minimal LGV movements associated with routine maintenance.
144. On review of those sites within 30km, it is considered that the planned windfarm developments, either consented or currently going through planning are of sufficient distance from the Proposed Development that any common routes used by construction vehicles are of a sufficient distance that construction traffic would be diluted across the network. Furthermore, it is considered that if the construction phase of this development coincides with any other developments in the locale, construction traffic movements associated with the Proposed Development would be appropriately managed to ensure that the developments result in no significant (moderate or greater) detriment to existing conditions. No significant cumulative effects are predicted.

11.11 Summary

145. The Proposed Development would lead to increased traffic volumes on a number of roads in the vicinity of the site during the construction phase. These would be of a temporary nature only.
146. An assessment of the potential effect using IEMA guidelines has been undertaken. This determined that prior to the implementation of mitigation, a Moderate adverse effect could be expected on road safety on the A701 relating to the temporary increase in HGV traffic operating on the route. All other indicators indicated a Slight/Neutral effect on receptors within the study area.
147. A range of mitigation measures are proposed, including the implementation of a Construction Traffic Management Plan which would be agreed in advance with Dumfries and Galloway Council. The proposed mitigation would reduce the effects of abnormal loads and general construction traffic on the study network to Slight or Negligible Adverse significance; the effects would be temporary and reversible.

11.12 References

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