



# Chapter 11

## Traffic and Transport

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N/A

# 11 Traffic and Transport

## 11.1 Introduction

1. This chapter considers the likely significant effects on receptors along the transport routes resulting from vehicle movements associated with the construction and operation of the Proposed Development. The specific objectives in this chapter are to:
- review the relevant policy and legislative framework;
  - describe the baseline transport conditions;
  - describe the assessment methodology and significance criteria used in undertaking the assessment;
  - describe the potential effects, including direct, indirect and cumulative effects;
  - describe the mitigation measures proposed to address likely significant effects; and
  - assess the residual effects remaining following the implementation of mitigation.
2. The Proposed Development comprises the erection of up to 13 wind turbines, with tip heights of up to 200 metres (m); including the potential for co-located technologies (e.g. Energy Storage Facility<sup>1</sup>) and other related infrastructure (refer to **Chapter 4: Development Description** of the EIAR for further details).
3. 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 wind turbine components.
4. The traffic impacts associated with the operational phase would be very low with one or two small service vehicles regularly accessing the Site to carry out routine maintenance on the wind turbines. Therefore, further assessment of the traffic impacts of the Proposed Development during the operational phase has been scoped out of this assessment.
5. 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; smaller machinery is generally used, and the duration is likely to be shorter. The effects of decommissioning have therefore been scoped out of this Environmental Impact Assessment Report (EIAR).
6. The description of other elements of infrastructure of the Proposed Development assessed in this chapter can be found on **Figure 4.1 Site Layout** and **Chapter 4: Development Description**. The traffic and transport aspects of the Site selection and design are described in full in **Chapter 3: Site Selection and Design**. **Appendix 4.1 Offsite Access Appraisal** considers the potential traffic and transport effects of the proposed offsite access route to the Site, concluding that there would be no potential significant effects likely to occur as a result of the offsite access route upgrade works and as a result, this has not been assessed further within this chapter.

## 11.2 Legislation, Policy and Guidance

### 11.2.1 Policy

7. This assessment has been carried out in accordance with the principles contained within the following documents:

- Scottish Government - National Planning Framework (NPF3) (23 June 2014);
- Scottish Government - Planning Advice Note (PAN) 75 – Planning for Transport (17 August 2005); and
- Scottish Government - Onshore Wind Turbines Online Renewables Planning Advice (May 2014).

### 11.2.2 Guidance

8. This assessment has been carried out in accordance with the principles contained within the following documents:
- Transport Scotland - Transport Assessment Guidance (July 2012);
  - Institute of Environmental Assessment (IEA) - The Guidelines for the Environmental Assessment of Road Traffic (January 1993);
  - Institution of Environmental Management and Assessment (IEMA) - Guidelines for Environmental Impact Assessment (2005); and
  - Highways England et. al. (various dates). Design Manual for Roads and Bridges.

## 11.3 Consultation

9. The scope of this assessment has been developed in consultation with South Ayrshire Council and Transport Scotland, in addition to the neighbouring Local Authorities of Dumfries and Galloway Council, East Ayrshire Council and the local community councils. A summary of consultation responses and corresponding actions is provided below in **Table 11.1**.

Consultee	Consultation Response	Applicant Action
Transport Scotland	Recommends the Traffic Scotland’s National Traffic Data System as a potential source of traffic data.	Response Noted. Independent traffic surveys have been undertaken on the proposed Study Area and would be supplemented by traffic data from the Traffic Scotland National Traffic Data System if required.  <b>Section 11.6</b> of this chapter provides further detail on the sources of baseline traffic data.
	The Applicant’s Scoping Report (SR) states that environmental impacts associated with increased traffic such as driver delay, pedestrian amenity, severance, safety etc. will be considered and assessed where appropriate (i.e. where Institute of Environmental Management and Assessment Guidelines for further assessment are breached). These specify that road Links should be taken forward for assessment if: <ul style="list-style-type: none"><li>traffic flows will increase by more than 30%, or</li><li>the number of heavy goods vehicles (HGVs) will increase by more than 30%, or</li><li>traffic flows will increase by 10% or more in sensitive areas.</li></ul>	We can confirm that the assessment included within <b>Chapter 11</b> has been undertaken using this methodology.  Given the distance to the Proposed Development from the Trunk Road network, no detailed assessment has been included at this time. Furthermore, it is considered that there are no specific sensitive receptors likely to be affected by construction traffic on the A75 given that the road is designed and constructed to accommodate the type of vehicles proposed to be used as part of the construction

<sup>1</sup> Subject to landowner agreement

Consultee	Consultation Response	Applicant Action
	Transport Scotland is satisfied with this approach but would add that potential trunk road related environmental impacts should be considered and mitigated where appropriate.	process and the existing traffic volumes are significantly below the theoretical capacity of the roads.
	We would add that Transport Scotland will require to be satisfied that the size of wind 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 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 and the relevant Local Authorities.
	A full Abnormal Loads Assessment report should, therefore, be provided with the EIAR that 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.	
	There are limitations on the size of components that Cairnryan can accommodate and, as such, consideration would be given to this during the route assessment works and as part of the Traffic and Transport chapter within the EIAR.	Response noted. It is currently proposed that wind turbine components are delivered to the King George V Dock in Glasgow.  <b>Section 11.4</b> of this chapter provides further detail on Port options and the abnormal load route.
South Ayrshire Council (Ayrshire Roads Alliance)	The proposed route to the Site for the large wind turbine components would be from the south using the A75, A714 and C1 (Referred to as the C46W in the Scoping Report) to the Site access south of Tallaminnoch. This is the only feasible route to the Site for these components, the three bridges along this section of the C1 that the loads have to cross are capable of carrying the likely axle and gross vehicle weights, but some localised road widenings may be required. It is not feasible to bring the wind turbine components to Site from the north via Straiton due to horizontal alignment issue at Tairlaw Bridge approximately three kilometres (km) north of the Site access, this may also prove an issue for any large items of plant required for the Site.  In the Scoping Report it mentions carrying out a study on the B741 between the A713 at Dalmellington and Straiton, it should be highlighted that this section of the B741 is not suitable for any construction traffic as there is a bridge with a 13 Tonne weight limit and a humpback profile near the Dalmellington end.	Response noted. Comments in relation to structural suitability and restrictions on sections of the local road network have been noted and any sections unsuitable for use either by general construction traffic or abnormal load traffic have been omitted from the assessment.  A review of the access routes for both general construction traffic and abnormal load traffic has been undertaken, including a route survey. This would be updated as and when required following the Site gaining planning consent and would be undertaken in consultation with Transport Scotland and the Local Authority.
	In terms of the base flow traffic data, the general principle presented seems reasonable – we would however insist on sight of the survey comparison and agreement on the growth factor to be applied as and when that is known. If we treat this matter almost as a scope then all parties will	Comment noted and traffic survey data was provided to South Ayrshire Council on 29 <sup>th</sup> September 2020. Further comment in this regard is included in <b>Section 11.6</b> of this chapter.

Consultee	Consultation Response	Applicant Action
	have comfort that the factor to be used is considered acceptable before you progress.	
Dumfries and Galloway Council	As the Proposed Development is located outwith the administrative area of Dumfries and Galloway Council no formal response will be issued in this instance.	Comment noted. The Applicant would continue to liaise with Dumfries and Galloway Council in respect of traffic and transport works as the Proposed Development progresses through Planning.
East Ayrshire Council	The Scoping Report indicates that access will be gained from the M74, A75 and A714, each of which is located outwith East Ayrshire. The Council advise that Ayrshire Roads Alliance, which is jointly administered by East Ayrshire Council and South Ayrshire Council, be consulted on the transportation impacts of the Proposed Development.	Ayrshire Roads Alliance has been consulted on the traffic and transportation impacts of the Proposed Development.
Crosshill, Straiton and Kirkmichael Community Council	Question 14: Do you agree with the Traffic and Transport proposed approach for baseline collection, prediction of effects and significance assessment?  11.2. Missing from the road network is the section from the B7045 at Straiton to the access road. This passes: residential properties, church, local amenities, local primary school, cemetery, stand-alone properties and farms. This is normally a quiet road with local, agricultural, forestry, visitor and tourist traffic. Any increase in traffic is noticeable and significant.  From the B7023 – B741 the route also passes a cemetery and the entrance to Blairquhan Castle.  If traffic is travelling to the Site from Ayr, Prestwick and from the north the quickest route is southbound along the A77 to Minishant, turning into the B7045, through Kirkmichael and Straiton and along the Newton Stewart Hill Road (C46W) to the Site entrance. If the Applicant anticipates vehicles using this route then it should also be assessed.  11.7. Assessment Methodology. The Applicant has listed a various category of receptors. This list should also include wedding venues and cemeteries (in sensitive locations), people with disabilities and people with pets. The local roads are also used for cycle races.	The assessment has been undertaken in line with the relevant guidance and all appropriate routes and sensitive receptors potentially affected by construction traffic have been assessed accordingly and where applicable, mitigation measures proposed. This includes but is not limited to schools, churches local amenities, residential properties etc.  <b>Section 11.2</b> of this chapter – The B7045 between Straiton and the Proposed Development access junctions has been considered within the assessment as forms part of Link 8.  The B7013 has been assessed and is covered by Link 5.  <b>Section 11.7</b> of this chapter – Those sensitive receptors deemed appropriate for inclusion within the assessment have been given due consideration and where necessary professional judgement has been applied to justify their inclusion or otherwise.  <b>Section 11.7</b> of this chapter provides further detail on the potential effects on these receptors and <b>Section 11.8</b> of this chapter presents the proposed mitigation measures.



Consultee	Consultation Response	Applicant Action
Dailly Community Council	<p>There is lack of clarity regarding proposed routes. Many locals are inconvenienced, having to reverse significant distances on narrow country roads. There is more traffic and travelling at much greater speeds. The increase in litter due to windfarm traffic is significant.</p> <p>No real comment as it is not clear whether Dailly will be part of the route or not. If it is, then more assessment will have to take place.</p> <p>11.5 (250) Do not agree that operational traffic flow should be scoped-out. We have had experience of increased traffic flow as a result of operational issues.</p> <p>As stated the assessment has only been desk-study. More information has to be made available to consultees on the actual route. Depending on the amount of material/assets that must be moved, any assessment will be flawed.</p>	<p>The agreed Study Area can be seen on <b>Figure 11.2 General Construction Access Routes and Study Area Link Sections</b>, which highlights all potential access routes that would likely be used to access the Proposed Development.</p> <p>The proposed Study Area includes the settlement of Dailly.</p> <p>The requirement to assess the operational impact of the Proposed Development has been scoped out with the Local Authority. The traffic impacts associated with the operational phase would be very low with one or two small service vehicles regularly accessing the Site to carry out routine maintenance. By undertaking a worst case assessment as detailed within <b>Section 11.7</b> of this chapter for the construction phase, an assessment for the far less onerous operational impact has in effect been undertaken.</p> <p>The assessment has been undertaken in line with the relevant guidance and all appropriate routes and sensitive receptors potentially affected by construction traffic has been assessed accordingly and where applicable mitigation measures proposed.</p> <p>All works have been undertaken as per the agreed scope with the Local Authority. This has been informed by both a desk based exercise and site visit as highlighted in <b>Paragraph 11.5.3</b>.</p> <p>The impact of construction traffic is temporary and would be appropriately mitigated to minimise the impact on existing road users. Increases in litter is not considered potentially significant in terms of the EIA Regulations and as a result has not been assessed within the EIAR.</p> <p>All applicable sensitive receptors on the agreed Study Area have been considered within <b>Section</b></p>

Consultee	Consultation Response	Applicant Action
		<b>11.5</b> of this chapter and <b>Section 11.8</b> of this chapter presents the proposed mitigation measures.

Table 11.1 Consultation Responses

## 11.4 Abnormal Load Access Review

### 11.4.1 Introduction

10. This section provides a review of the proposed access route for abnormal loads, associated with transporting the wind turbine components from the Port of Entry (POE) through to the Proposed Development.

### 11.4.2 Port of Entry

11. It is proposed that wind 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 be undertaken.

### 11.4.3 Delivery Route

12. With regards to abnormal load movements, associated with the movement of wind turbine components to the Proposed Development, it is currently proposed that these would be transported to the Site via the following route:
- Kings Inch Drive;
  - M8;
  - M74/M6;
  - A75;
  - U52W;
  - A714; and
  - the C46W to the proposed Site access junctions.
13. **Appendix 4.1 Offsite Access Appraisal** considers the potential effects of the potential upgrade works along the proposed offsite access route to the Site, required to accommodate the abnormal load movements associated with the construction of the Proposed Development. The appraisal concludes that there would be no potential significant effects likely to occur as a result of any of the offsite access route upgrade works that may be required.
14. Following consent and confirmation of the final wind turbine model to be installed onsite, a report detailing the following would be submitted for approval to South Ayrshire Council (as part of the Ayrshire Roads Alliance), Dumfries and Galloway Council and Transport Scotland:
- detailed route survey report and swept path analysis based on the final wind turbine model;
  - results of a test run of the proposed abnormal load route, which would be undertaken in conjunction with South Ayrshire Council, 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; and
  - details of a programme of offsite mitigation works to include (if required) passing places, road widening, verge strengthening, associated works identified (if applicable) and restoration proposals (if applicable).

15. The abnormal loads route from the POE to the proposed Site access (see below) is outlined in **Figure 11.1 Proposed Abnormal Load Access Route**.

#### 11.4.4 Site Access

16. There would be a maximum of two Site access junctions from the C46W, both locations are currently used to provide access the Site for timber extraction and other forestry land management works. The works associated with the construction of the access junctions, access track and Proposed Development would be carefully managed through a Construction Traffic Management Plan (CTMP) which would likely be a condition of Planning.
17. **Figure 4.2a Indicative Site Access (South)** and **4.2b Indicative Site Access (North)** show an indicative layout, including swept path assessment for the southern and northern access junctions respectively. The specific details for both junction options including requirements in relation to junction visibility, construction detail and operation during the construction phase would be agreed with the Local Authority post consent, which would likely be a condition of Planning.

## 11.5 Assessment Methodology and Significance Criteria

### 11.5.1 Study Area

18. 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/data collection.
19. 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 (**Figure 11.2 General Construction Access Routes and Study Area Link Sections**). These have then been used to determine the Study Area and Link sections, which have been agreed with South Ayrshire Council through the scoping exercise. The following road sections would form the Study Area:
- U52W – between the A75 and A714 at Newton Stewart;
  - A714 – between the A75 and the C46W at Bargrennan;
  - B741 – between the A77 and the B741 at Dailly;
  - B741 – between the B741 at Dailly and B7045 at Straiton;
  - B7023/Dalhowan Street – between the A77 and the B741;
  - B7045 – between the A77 and C46W at Straiton;
  - A714 – between Pinwherry and the C46W at Bargrennan; and
  - C46W.
20. The Study areas identified above primarily relates to general construction traffic, albeit the abnormal load delivery route highlighted in **Section 11.4.3** of this chapter is included within these road sections/links.

### 11.5.2 Desk Study

21. The desk study included reviews and identification of the following:
- relevant transport planning policy;
  - accident 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 Abnormal Indivisible Loads (AILs) through a Route Survey including swept path assessments.

### 11.5.3 Field Survey

22. Field surveys were also undertaken and comprised:

- a site visit to the Site to review the potential access routes for both general construction traffic and abnormal loads, assessing potential constraints and sensitive receptors; and
- collection of traffic flow and speed data.

### 11.5.4 Impact Assessment Methodology

23. 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

24. 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 (offsite effects) and the assessment of significance of major new developments. The guidelines intend to complement professional judgement and the experience of trained assessors.
25. 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.

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** below.

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.
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

26. 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

27. 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%.
28. The following receptors including groups and special interests have been assessed for each route section within the agreed Study Area (see **Figure 11.2 General Construction Access Routes and Study Area Link Sections**) in line with the IEMA 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.
29. 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.

30. The traffic-related impacts set out in the IEMA guidance are outlined below. A number of the impacts fall out with the scope of this chapter and are discussed and assessed in detail within relevant chapters of the EIAR:

- environmental impacts considered in Traffic and Transport:
  - severance;
  - driver delay;
  - pedestrian delay;
  - pedestrian amenity;
  - fear and intimidation; and
  - accidents and safety.
- environmental impacts considered in other EIAR chapters:
  - noise;
  - vibration;
  - visual effects;
  - air pollution;
  - dust and dirt;
  - ecological effects; and
  - heritage and conservation.

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

#### Severance

32. 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).
33. 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.
34. 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

35. 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

36. Changes in the volume, composition or speed of traffic may affect the ability of people to cross the road. In general, increases in traffic levels are likely to lead to greater increases in delay. However, delays would also depend upon the general level of pedestrian activity, visibility and general physical condition of the road.
37. 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

38. 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.
39. 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

40. 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

41. 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 if deemed necessary based on the existing accident characteristics.

11.5.7 Requirements for Mitigation

42. Where potential adverse effects are identified, the Applicant would implement mitigation measures to reduce or remove these effects.
43. It would be the responsibility of the Applicant, in conjunction with the Contractor, to prepare a CTMP, which would be agreed in advance with the relevant road authorities prior to commencement of work onsite. 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

44. 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

45. 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, other than those developments located in such close proximity that it was deemed prudent to give early consideration to any potential cumulative effects.

11.5.10 Limitations to Assessment

46. 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 as provided in **Section 11.6** of this chapter would be significantly lower than assessed in this chapter, given that a number of route options are available, and it is expected that onsite borrow pits would be used to source materials in relation to the construction works.

11.5.11 Significance of Effect

47. 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**.
48. 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

49. In terms of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 – The EIA Regulations, effects would be considered Significant 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

50. The Proposed Development would be accessed directly from up to two existing forestry access junctions on the C46W, along the eastern boundary of the Site, which are proposed to be upgraded as part of the Proposed Development.
51. 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 is not available. As such, it has been necessary to make assumptions relating to the routing of construction traffic.
52. 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 as highlighted in **Section 11.5** of this chapter and shown on (**Figure 11.2 General Construction Access Routes and Study Area Link Sections**). These routes have been broken down into Link sections for assessment within this chapter and are provided below. Note each route option is typically made up of a number of Links within the Study Area:
- Link 1: U52W between the A75 and A714 at Newton Stewart;
  - Link 2: A714 – between the A75 and the C46W at Bargrennan;
  - Link 3: B741 – between the A77 and the B741 at Dailly;
  - Link 4: B741 – between the B741 at Dailly and B7045 at Straiton;
  - Link 5: B7023/Dalhowan Street – between the A77 and the B741;
  - Link 6: B7045 – between the A77 and C46W at Straiton;
  - Link 7: A714 – between Pinwherry and the C46W at Bargrennan; and
  - Link 8: C46W for its entirety (where the proposed Site accesses will be located).
53. **Figure 11.2 General Construction Access Routes and Study Area Link Sections** shows the location of each of the Links within the Study Area and how they relate to construction access route options.
54. Effects associated with traffic generated by the Proposed Development would be most pronounced in close proximity to the Site access junctions and on those sections of the routes where 100% of traffic would use, for example the C46W. 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.
55. Traffic count data for the roads within the Study Area has been obtained from independent traffic surveys undertaken on the agreed Study Area in 2019 and 2020. 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, is presented in **Table 11.4**, while the locations of the traffic count sites are shown in **Figure 11.3 Traffic Count Locations**.
56. In order to ensure the traffic levels had returned to pre-COVID-19 levels, additional traffic surveys were undertaken within the Study Area, to allow for a comparison between available 2019 data and 2020 data. The 2019 survey information was undertaken for the neighbouring Clauchrie Windfarm project, also being developed by the Applicant. The comparison between the 2019 and 2020 data showed that traffic levels had returned to pre-COVID-19 levels, with the five-day mean actually increasing slightly. The traffic survey data was provided to South Ayrshire Council (Ayrshire Roads Alliance) who confirmed their agreement to its use within the assessment.

Link No.	Study Area Route Section	Existing two-way AADT Flows	
		HGV	Total
Link 1	U52W between the A75 and A714 at Newton Stewart	48	794
Link 2	A714 between the A75 and the C46W at Bargrennan	40	908
Link 3	B741 between the A77 and the B741 at Dailly	2	204
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	5	394
Link 5	B7023/Dalhowan Street between the A77 and the B741	23	2,106
Link 6	B7045 between the A77 and C46W at Straiton	14	539
Link 7	A714 between Pinwherry and the C46W at Bargrennan	30	839
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	8	228

Table 11.4 Existing Two-Way AADT Flows (2019 & 2020)

## 11.6.1 Speed Data

57. The ATC sites used to provide traffic volume data were also used to collect speed statistics. The two-way five-day average and 85th percentile speeds observed at the count locations are summarised below in **Table 11.5**. All speeds are presented in miles per hour (MPH).

Link No.	Study Area Route Section	Mean Speed	85% Tile Speed	Speed Limit
Link 1	U52W between the A75 and A714 at Newton Stewart	48.65	57.65	60
Link 2	A714 between the A75 and the C46W at Bargrennan	33.10	38.80	60
Link 3	B741 between the A77 and the B741 at Dailly	47.00	56.10	60
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	46.60	58.10	60
Link 5	B7023/Dalhowan Street between the A77 and the B741	44.60	53.10	60
Link 6	B7045 between the A77 and C46W at Straiton	42.50	50.60	60
Link 7	A714 between Pinwherry and the C46W at Bargrennan	24.45	29.50	30
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	34.30	40.90	60

Table 11.5 Speed Summary (Weekday Average Two-Way Flows)

58. The speed survey data indicates that there is compliance with current speed limits within the Study Area.

### 11.6.2 Accident Review

59. Personal Injury Accident (PIA) data for the three-year period covering 2018 to 2020 was obtained from the online resource [crashmap.co.uk](https://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 11.6**.

Link No.	Study Area Route Section	Severity		
		Slight	Serious	Fatal
Link 1	U52W between the A75 and A714 at Newton Stewart	1	-	-
Link 2	A714 between the A75 and the C46W at Bargrennan	1	1	1
Link 3	B741 between the A77 and the B741 at Dailly	-	-	-
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	-	1	-
Link 5	B7023/Dalhowan Street between the A77 and the B741	-	1	1
Link 6	B7045 between the A77 and C46W at Straiton	3	-	-
Link 7	A714 between Pinwherry and the C46W at Bargrennan	-	-	-
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	1	-	-
<b>Summary</b>		<b>6 (55%)</b>	<b>3 (27%)</b>	<b>2 (18%)</b>

Table 11.6 PIA Data Summary

60. 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 11.7** provides a summary of each Link.

Link No.	Location (OS Grid)	Severity	Type	Cause	No. Casualties	Age of Casualty
Link 1	240247 564761	Slight	Car x2	Driver error – vehicle turning in to oncoming traffic	1	56-65
Link 2	239090 567015	Slight	HGV & Bus	Driver error – vehicle collision, while passing	1	21-25
	237810 570691	Fatal	Car	Driver error – car left road and struck tree	1	66-76
	235532 574700	Serious	Car & Motorcycle	Driver error – vehicle collision on bend	1	46-55

Link No.	Location (OS Grid)	Severity	Type	Cause	No. Casualties	Age of Casualty
Link 4	230925 605008	Serious	LGV	Driver error – vehicle struck bridge parapet wall on bend	1	26-35
Link 5	230604 609649	Serious	Car x2 & Bus x2	Driver error – vehicle (car) striking parked vehicles while passing	2	16-20 16-20
	231722 608780	Fatal	Car & Bus	Driver error – head on collision on bend	1	21-25
Link 6	232776 609321	Serious	Car & Motorcycle	Driver error – collision caused by vehicle stopping	1	21-25
	233346 608829	Slight	Car	Driver error – vehicle collision on bend	1	16-20
	234174 608802	Slight	HGV	Driver error – vehicle left carriageway on bend striking wall/fence	1	56-65
	236247 585501	Slight	Car x2	Driver error – vehicle collision	5	21-25 36-45 46-55 11-15 11-15

Table 11.7 Link PIA Data Summary

61. There was a total of 11 recorded PIA within the Study Area. The statistics indicate that the majority of accidents were either Slight (55%) or Serious (27%), with the majority involving cars and only a small number (2) involving HGV's. Of the two fatal accidents, one involved a car and occurred solely as a result of driver error with the vehicle leaving the carriageway and striking a tree, while the second involved a head on collision between a bus and car, occurring on a bend and as such would likely have been a result of driver error.

### 11.6.3 Cycle and Pedestrian Network

62. There is one core path which crosses the C46W within the South Ayrshire Council area, between the two proposed access junctions and again further north in the vicinity of Straiton. The location of this can be seen in **Figure 12.1 of Chapter 12 Socio-economics, Tourism and Recreation** of the EIAR. Out with this, there are no further core paths recorded by South Ayrshire Council or Dumfries and Galloway Council in close proximity to the proposed Site accesses. The C46W does not have any pedestrian or cyclist infrastructure near the Site access junction locations and as such, active travel activity is considered to be low at this location.
63. Pedestrian facilities in the vicinity of the proposed Site accesses are limited, reflecting the rural nature of the road network at this location. There are however various walking routes in the area for example Scottish Hill Tracks which cross the C46W and the Carrick Forest Drive in close proximity to the C46W. As such consideration should be given to pedestrians at these locations. In addition, there is a segregated footpath

- at the southern extents of the C46W running along the eastern side of the carriageway, linking the Glentrool Camping and Caravan Park with the House O'Hill Hotel. Pedestrians using this path are required to cross the road at either end of the path to access these locations.
64. The proposed access route (both abnormal load and general construction) using the C46W falls within the Galloway Forest Park and as such is used by people accessing the various walking, cycling, mountain biking and wildlife experiences in the area. There are a number of promoted walking and cycling routes throughout the Galloway Forest Park, with the majority of promoted routes in the southern extent of the park. There is however limited pedestrian and cycle infrastructure on the C46W, however cognisance should be given to the provision of parking facilities on the route where people using the park may begin their journeys / recreational pursuits. There are currently parking facilities at the Bell Memorial Car Park and Forest Drive Car Park, which are either accessed directly from the C46W or in close proximity.
65. A review of the Sustrans cycle network plan of the United Kingdom indicates that National Cycle Network Route 7 follows the C46W from approximately 2.3km north of the Bargrennan Bridge to the junction at the Bell Memorial Car Park, a distance of approximately 13km. The route is an on-road route and is signposted at its southern end at the Glentrool junction and at its northern end at the car park where it diverts off the C46W towards Barr and Crosshill. In addition to the section which follows the C46W, there is a short section of the National Cycle Network Route 7 on the B7023 to the north of Crosshill. The on-road route, which forms part of one of the proposed access routes for both general construction traffic and abnormal load traffic is approximately 620 metres (m) at this location.
66. The 'Ayrshire Alps', which are a series of cycle routes in the Ayrshire area, which look to borrow the best ideas from the world's most iconic cycle route and replicate these using local routes currently follow a number of routes in the area. A route known as the 'Tairlaw Summit' follows the C46W from the Bell Memorial Car Park to Tairlaw at the Water of Girvan for a distance of approximately 15km.
67. The C46W also forms part of The National Byway, which is essentially a promoted leisure route for cycling. The National Byway Trust is a registered charity and plays a major role in the development of the UK Governments National Cycle Strategy.
68. The Southern Upland Way is located approximately 25km to the south in close proximity to Bargrennan Bridge, however given the distance from the Proposed Development coupled with the make-up of the road at this location i.e. a good standard A-class road, it is no considered necessary to include this with the assessment.

11.6.4 Trends and Future Baseline

69. Construction of the Proposed Development could commence during 2024 if consent is granted and is anticipated to take around 22 months. It is currently proposed to begin construction in October 2024.
70. To assess the likely effects during the construction phase, base year traffic flows for traffic data undertaken in 2019 and 2020 were determined by applying a National Road Traffic Forecast (NRTF) low growth factor to the surveyed traffic flows, as agreed with South Ayrshire Council.
71. The NRTF low growth factor for 2019 to 2024 is 1.033 and for 2020 to 2024 is 1.024. These factors were applied to both the relevant survey years to estimate the 2024 base traffic flows shown in **Table 11.8**.

Link No.	Study Area Route Section	Two-way AADT Flows		
		HGV	Non-HGV	Total
Link 1	U52W between the A75 and A714 at Newton Stewart	50	771	820
Link 2	A714 between the A75 and the C46W at Bargrennan	41	897	938
Link 3	B741 between the A77 and the B741 at Dailly	2	207	209
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	5	398	403
Link 5	B7023/Dalhowan Street between the A77 and the B741	24	2,133	2,156
Link 6	B7045 between the A77 and C46W at Straiton	14	538	552
Link 7	A714 between Pinwherry and the C46W at Bargrennan	31	836	867
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	8	225	234

Table 11.8 Baseline Two-Way AADT Flows (2024)

11.6.5 Identified Receptors on Study Network

72. Based on the classifications set out in **Table 11.2** the following receptors have been identified and sensitivity classified as follows for the eight Links within the Study Area:
- Link 1: U52W between the A75 and A714 at Newton Stewart – Road Users and Users/Residents of Locations (**Negligible Sensitivity**);
  - Link 2: A714 – between the A75 and the C46W at Bargrennan – Road Users and Users/Residents of Locations (**Negligible Sensitivity**);
  - Link 3: B741 – between the A77 and the B741 at Dailly – Road Users and Users/Residents of Locations (**Medium Sensitivity**);
  - Link 4: B741 – between the B741 at Dailly and B7045 at Straiton – Road Users and Users/Residents of Locations (**Medium Sensitivity**);
  - Link 5: B7023/Dalhowan Street – between the A77 and the B741 – Road Users and Users/Residents of Locations (**Medium Sensitivity**);
  - Link 6: B7045 – between the A77 and C46W at Straiton – Road Users and Users/Residents of Locations (**Medium Sensitivity**);
  - Link 7: A714 – between Pinwherry and the C46W at Bargrennan – Road Users (**Low/Medium Sensitivity**); and
  - Link 8: C46W for its entirety (where the proposed Site accesses will be located) – Road Users and Users/Residents of Locations (**Medium Sensitivity**).
73. These classifications are then used throughout the following assessment.



## 11.7 Potential Effects

74. In order to ensure a robust assessment of the potential effects of the construction of the Proposed Development has been considered, a worst-case assessment has been undertaken for this chapter. When predicting the traffic generation for the Proposed Development, there are a number of factors to be considered, for example use of onsite borrow pits, onsite concrete batching, onsite track/hardstanding construction methods etc. Outwith timber felling, importing stone/aggregate materials and concrete typically accounts for the highest number of HGV trips on a typical windfarm development. As such, developers typically look to utilise onsite materials and construction methods where practicable to minimise the number of HGV's and resultant impact on the local road network.
75. As detailed in **Chapter 4: Development Description, Section 4.2.12 Borrow Pits** of the EIAR, it is considered that up to four borrow pit locations have been identified on the Site, containing an estimated 339,266m<sup>3</sup> of material. This material would be used to source aggregates for use in the construction for roads (both new tracks and upgrades to all existing forestry tracks i.e. a worst case scenario), hardstandings and foundations. It is considered that this is sufficient to provide the required material for use in the construction activities. Current estimates suggest that in the order of 143,549m<sup>3</sup> of material is required for onsite construction activities and it is therefore considered highly likely that the majority of stone and aggregate material can be sourced onsite. Future detailed site investigations, which would be undertaken prior to construction work commencing, would be undertaken to confirm the ground conditions, rock type, rock characteristics and suitability, as well as potential volumes to be extracted.
76. With regards to concrete, when importing this to any windfarm site, it is typically imported over a condensed timeframe and therefore can generate a higher number of HGV trips on the local road network, for example during concrete pours for wind turbine foundations. It is however proposed to implement an onsite concrete batching plant, to further reduce the number of HGV trips generated. The plant would be used for onsite activities, including construction of the wind turbine and substation foundations, and would be located within the temporary construction compound. The concrete batching plant would comprise aggregate and cement hoppers, water bowsers/tanks, a mixer and control station.
77. Notwithstanding the above measures, which will be implemented on the Proposed Development to reduce the number of HGV trips on the local road network, a worst-case assessment has been undertaken in relation to sourcing of construction materials. Although this scenario is highly unlikely to occur, it has been carried out to ensure a robust assessment has been undertaken, and that those resultant mitigation measures proposed would be more than adequate to mitigate the potential impact of the 'likely' scenario as detailed above. When predicting the traffic generation during the construction phase for the Proposed Development as part of a worst-case (highly unlikely to occur) scenario, it has been assumed that all materials would be sourced offsite and transported to the Site. This includes all stone/aggregates and concrete required for onsite construction works.
78. The assessment below on the potential effects of the construction of the Proposed Development has been undertaken to demonstrate the potential impact on the Study Area during this scenario and to provide mitigation measures in this regard. For the purposes of the assessment, the construction phase includes all activities prior to the operation of the Proposed Development, i.e. up to the point at which the wind turbines begin generating electricity.

### 11.7.1 Predicted Traffic Generation

79. 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 during a worst case (unlikely to occur) scenario.

80. The following calculation factors have been used to derive the construction traffic estimates:
  - the number of wind turbines is 13;
  - the construction phase is predicted to last for 22 months;
  - normal construction hours would be between 07:00 and 19:00 Monday to Friday and 07:00 to 13:00 on weekends, or as agreed with the South Ayrshire Council's Environmental Health Officer;
  - the Site access track length is approximately 15.5kmm (including new access track and upgraded forestry track);
  - in the order of 143,549m<sup>3</sup> of material is required for onsite activities; and
  - timber felling will take place for 19 months and will include approximately 220 Hectares (Ha) of trees to be removed.
81. As detailed above, for the purposes of the assessment, it has been assumed that all concrete will arrive onsite pre-mixed from an external concrete batching plant, to ensure a worst case assessment. 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.
82. In addition to the above, there will be a requirement for timber felling and extraction associated with the construction of the Proposed Development. It is currently estimated that there will be in the order of 220 Ha of timber to be extracted from the Site. This is expected to occur for 19 of the 22-month construction programme, with approximately 50 Ha felled during the first six months, with a further 150 Ha felled over the subsequent thirteen months.
83. Current estimates suggest in the order of 350 tonnes (t) of commercial grade timber per Ha on average will be felled and extracted from the Site. For the purposes of the assessment undertaken for this chapter, it has been assumed that all timber extracted would be done using a dedicated timber articulated lorry, which has a payload capacity of approximately 25t. All timber extracted from the Site would be done so making use of the agreed timber extraction routes in the area and undertaken in full consultation with the relevant Local Authorities.
84. The level of effects of construction traffic have been calculated under a worst case scenario, namely:
  - all stone sourced from an offsite quarry (location unknown at this time but would be sourced as much as practicable from a local supplier);
  - all concrete works associated with the wind turbine foundations would be sourced offsite;
  - all felled timber would be transported offsite; and
  - all construction traffic has been assigned to each of the proposed access routes, i.e. 100% of all construction vehicles have been applied to Route 1/Link 1 and then to each of the subsequent route options.
85. As previously advised, each route option is typically made up of a number of Links within the Study Area.
86. The predicted number of loads and total trips required for each activity associated with the construction of the Proposed Development are shown in **Table 11.9**.
87. 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 compound areas. **Table 11.9** sets out the predicted number of loads and total trips required for each activity associated with the construction of the Proposed Development under the worst case scenario.



Task	Total Movements (Arrivals & Departures)	Duration (months)
Site establishment and compound	1,344	3
Forestry felling (initial felling)	1,404	6
Forestry felling (subsequent felling)	4,602	13
Access track and crane hardstanding construction	17,172	11
Wind turbine foundations	3,682	7
Substation Compound and electrical works	2,730	15
Onsite cabling	1,144	11
Wind turbine delivery and erection	438	3
Cranes	16	4
Misc. (incl. skips, slit traps etc.)	1,232	22
Finishing activities (commissioning and testing/Site Reinstatement)	120	5
LGV movements (general construction)	23,100	22
Additional LGV movement (during concrete pouring/building)	1,750	4
LGV movements (component escort)	294	3
Total HGV	33,884	-
Total Car/LGV	25,144	-
<b>Total</b>	<b>59,028</b>	<b>-</b>

Table 11.9 Predicted Traffic Generation During Construction

88. The predicted typical monthly HGV and LGV arrival and departure movements are shown in **Table 11.10**, with the average daily movements for each month shown in **Table 11.11**.
89. The wind turbine foundation construction vehicle estimates have been based on offsite concrete batching. For the purposes of this assessment, it is assumed that concrete would be imported from ready mix facilities situated in the locale and that 6m<sup>3</sup> capacity trucks would be used for delivery. The concrete pouring for each foundation would be undertaken on a single day.

Activity	Month																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Site establishment and compound	448	448	448																			
Forestry felling (initial felling)	234	234	234	234	234	234																
Forestry felling (subsequent felling)							354	354	354	354	354	354	354	354	354	354	354	354	354			
Access track, drainage and crane hardstanding construction	1,564	1,564	1,564	1,564	1,564	1,564	1,564	1,556	1,556	1,556	1,556											
Substation compound and electrical works				182	182	182	182	182	182	182	182	182	182	182	182	182	182	182				
Turbine base steelwork				30	30	30	30	30	30	30												
Turbine base concrete works				496	496	496	496	496	496	496												
Cabling incl. trench fill							98	98	98	98	98	98	98	98	98	98	98					
Cabling (sub-station to grid connection) incl. trench fill							6	6	6	6	6	6	6	6	6	6	6					
Cranes												8						8				
Misc. (incl. skips, slit traps)	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Turbine components													146	146	146							
Finishing activities																		24	24	24	24	24
LGV movements (general construction)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
Additional LGV movement (during concrete pouring/building)				250	250	250	250	250	250	250												
LGV movements (component escort)													98	98	98							
Total Vehicle Movements	3,352	3,352	3,352	3,862	3,862	3,862	4,086	4,078	4,078	4,078	3,302	1,754	1,990	1,990	1,990	1,746	1,746	1,674	1,484	1,130	1,130	1,130

Table 11.10 Total Monthly Arrival and Departure Movements

Activity	Month																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total HGV movements	84	84	84	92	92	92	104	100	100	100	82	26	32	32	32	26	26	24	16	4	4	4
Total car/LGV movements	38	38	38	48	28	48	48	48	48	48	38	38	42	42	42	38	38	38	38	38	38	38
Total Vehicle Movements	122	122	122	140	140	140	152	148	148	148	120	64	74	74	74	64	64	62	54	42	42	42

Table 11.11 Average Daily Arrival and Departure Movement

90. From **Table 11.10** above, it can be seen that the predicted worst month in terms of construction movements would be month seven when it is predicted that a total of 4,086 vehicle movements would be generated. This would comprise 2,786 HGV's and 1,300 car/LGV's. **Table 11.11** shows that in terms of average daily movements, this would equate to 104 HGV's and 48 car/LGV's. Note a vehicle movement accounts for a vehicle movement to and from the Site.

#### 11.7.2 Abnormal Loads

91. The route assessment was based upon the parameters of the Vestas V150 wind turbine. The worst case loads were used in the assessment, with a 74m long by 4.03m wide turbine blade and a 33.88m long by 4.5m wide turbine tower section being assessed.
92. 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.
93. As previously advised, access from King George V docks would be via the following:
- Kings Inch Drive;
  - M8;
  - M74/M6;
  - A75;
  - U52W;
  - A714; and
  - The C46W to the proposed Site access junctions.
94. If consented, The Applicant would engage in detailed discussions with the wind 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

95. The estimated Baseline plus Construction Traffic flows and percentage impact for the Study Area are shown in **Table 11.12**. The results for each Link 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, this would not occur, with a number of route options being used, with materials, equipment, staff etc. coming from various locations.

Link No.	Study Area Link Section	Scenario	Average Two-Way Traffic Flows		
			HGV	Non-HGV	Total
Link 1	U52W between the A75 and A714 at Newton Stewart	Baseline	50	770	820
		Baseline + Construction Traffic	154	818	972
		% Impact	208%	6%	19%
Link 2	A714 between the A75 and the C46W at Bargrennan	Baseline	41	897	938
		Baseline + Construction Traffic	145	945	1,090
		% Impact	254%	5%	16%
Link 3	B741 between the A77 and the B741 at Dailly	Baseline	2	207	209
		Baseline + Construction Traffic	106	255	361
		% Impact	5,200%	23%	73%
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	Baseline	5	398	403
		Baseline + Construction Traffic	109	446	555
		% Impact	2,080%	12%	38%
Link 5	B7023/Dalhowan Street between the A77 and the B741	Baseline	24	2132	2156
		Baseline + Construction Traffic	128	2,180	2,308
		% Impact	433%	2%	7%
Link 6	B7045 between the A77 and C46W at Straiton	Baseline	14	538	552
		Baseline + Construction Traffic	118	586	704
		% Impact	743%	9%	28%
Link 7	A714 between Pinwherry and the C46W at Bargrennan	Baseline	31	836	867
		Baseline + Construction Traffic	135	884	1,019
		% Impact	335%	6%	18%
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	Baseline	8	226	234
		Baseline + Construction Traffic	112	274	386
		% Impact	1,300%	21%	65%

Table 11.12 Proposed Development Construction Traffic Impact Assessment Results

96. With regards to Rule 1 of the IEMA Guidelines (see **Table 11.12**), the impact would exceed 30% increases in HGV traffic on all of the Links assessed and as such detailed assessment is required for all Links when assuming a worst case scenario, however a review of the existing baseline flows illustrates that this increase is a result of the existing low levels of HGV traffic within the Study Area.

#### 11.7.4 Capacity

97. From **Table 11.12** it can be seen that there are large percentage increases in the number of HGV movements on all Links during the construction of the Proposed Development, with increase ranging from 208% on Link 1 to 5,200% on Link 3. Whilst these increases are statistically significant, it is generally caused by the low level of existing HGV flows on the Links.

98. For example, Link 8 is not the worst in terms of percentage increase, however it is where the Site access junctions would be located and would therefore be subject to all vehicular movements associated with the construction of the Proposed Development. Link 8 during the worst month (month seven), would see an additional 104 HGV journeys per day (52 Inbound and 52 Outbound). This represents approximately nine HGV movements per hour over the course of a typical working day onsite, or one HGV approximately every seven minutes. This is not considered to be significant in operational terms of this or any of the other Links in the Study Area.
99. 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 of the Study Area.
100. Theoretical road capacities have been calculated from the 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.
101. Capacity assessments have been conducted under the worst case construction traffic levels that occur, the results of which can be seen in **Table 11.13**.

Link No.	Study Area 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	
Link 1	U52W between the A75 and A714 at Newton Stewart	43,200	820	972	42,228	97.8%
Link 2	A714 between the A75 and the C46W at Bargrennan	43,200	938	1,090	42,110	97.5%
Link 3	B741 between the A77 and the B741 at Dailly	43,200	209	361	42,839	99.2%
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	43,200	403	555	42,645	98.7%
Link 5	B7023/Dalhowan Street between the A77 and the B741	43,200	2,156	2,308	40,892	94.7%
Link 6	B7045 between the A77 and C46W at Straiton	43,200	552	704	42,496	98.4%
Link 7	A714 between Pinwherry and the C46W at Bargrennan	43,200	867	1,019	42,181	97.6%
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	38,400	234	386	38,014	99.0%

Table 11.13 Proposed Development Spare Road Capacity

102. The results above show that with the addition of the worst case construction traffic levels, i.e. all construction vehicles utilising only one route to access the Site, there would still 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 result in a change in the impacts on road capacity, on the Study Area.

#### 11.7.5 Severance

103. 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 IEMA 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. **Table 11.14** provides a summary of the Proposed Development Severance on the road network, based on the anticipated levels of construction trips associated with the construction phase.



Link No.	Study Area Link Section	% Total Traffic Increase	Sensitivity of Receptor to Change	Magnitude of Impact	Significance of Impact	Comment
Link 1	U52W between the A75 and A714 at Newton Stewart	19%	Negligible	Minor	Slight / Neutral	There are no pedestrian facilities of note at this location, as such there is unlikely to be a high demand to cross this Link.
Link 2	A714 between the A75 and the C46W at Bargrennan	16%	Negligible	Minor	Slight / Neutral	There are no pedestrian facilities of note at this location, other than the Southern Upland Way, located in the vicinity of the Bargrennan Bridge. Based on the road at this location, i.e. a good standard A-class road, it is considered that the increase on traffic at this location is not significant given the available spare capacity. Furthermore, the road at this location is suitable for accommodating HGV traffic.
Link 3	B741 between the A77 and the B741 at Dailly	73%	Medium	Moderate	Moderate	There are no pedestrian facilities of note for the majority of this Link until it reaches the settlement of Dailly at its eastern extents. Here there are facilities including footways serving a range of local facilities including shops, education, recreation, places of worship, public transport provision (bus stops) and residential areas. Whilst the percentage increase in total construction traffic is statistically significant on the Link, this is due to the existing low
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	38%	Medium	Moderate	Moderate	Similar to Link 3, there are no pedestrian facilities of note for the majority of this Link until it reaches the settlement of Straiton at its eastern extents. Here there are facilities including footways serving a range of local facilities including shops, recreation, education, places of worship and residential areas. Whilst the percentage increase in total construction traffic is statistically significant on the Link, this is due to the existing low traffic flows.
Link 5	B7023/Dalhowan Street between the A77 and the B741	7%	Medium	Minor	Slight	Similar to Link 3, there are no pedestrian facilities of note for the majority of this Link except for its northern extents in Maybole and within the settlement of Crosshill. Here there are facilities including footways serving a range of local facilities including shops, recreation, education, places of worship, public transport provision (bus stops) and residential areas.
Link 6	B7045 between the A77 and C46W at Straiton	28%	Medium	Minor	Slight	Similar to Link 3, there are no pedestrian facilities of note for the majority of this Link until it reaches the settlement of Kirkmichael. Here there are facilities including footways serving a range of local facilities including shops, recreation, education, places of worship and residential areas, including stand-alone properties. Whilst the percentage increase in total construction traffic is statistically significant on the Link, this is due to the existing low traffic flows.
Link 7	A714 between Pinwherry and the C46W at Bargrennan	18%	Low / Medium	Minor	Slight	Similar to Link 3, there are no pedestrian facilities of note for the majority of this Link until it reaches the settlements of Pinwherry and Barrhill. Here there are facilities including footways serving a range of local facilities including shops, recreation, education, places of worship and residential areas. Whilst the percentage increase in total construction traffic is statistically significant on the Link, this is due to the existing low traffic flows.

Link No.	Study Area Link Section	% Total Traffic Increase	Sensitivity of Receptor to Change	Magnitude of Impact	Significance of Impact	Comment
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	65%	Medium	Minor	Slight	<p>There are minimal pedestrian facilities of note at this location, particularly through the southern sections of the link, however there is a segregated footpath running along the eastern side of the carriageway, linking the Glentrool Camping and Caravan Park with the House O'Hill Hotel. Pedestrian using this path are required to cross the road at either end of the path to access these locations.</p> <p>There is a core path which crosses the C46W in the vicinity of the proposed site access junctions, while at its northern extents in Straiton (as highlighted in Link 4), there are a number of facilities including shops, recreation, education, places of worship, a cemetery and residential areas.</p> <p>There are various walking routes in the area for example Scottish Hill Tracks which cross the C46W and as such consideration should be given to pedestrians at these locations. In addition as previously noted, the C46W falls within the Galloway Forest Park and as such is used by people accessing the various walking, cycling, mountain biking and wildlife experiences in the area. There are a number of promoted walking and cycling routes throughout the Galloway Forest Park, including the Carrick Forest Drive with the majority of promoted routes in the southern extent of the park. There is however limited pedestrian and cycle infrastructure specifically on the C46W, however there is likely to be people using the parking facilities at the Bell Memorial Car Park and Forest Drive Car Park for example before walking or cycling to use the various waking routes.</p> <p>National Cycle Network Route 7 follows the C46W through the southern part of the Link and the whole C46W forms part of a National Byway Route and as such there will likely be an increased level of cyclist activity. Although HGV's regularly use this route in relation to timber extraction in the area, consideration should be given to this when implementing mitigation measures for those people likely to be more affected by increased levels of HGV traffic.</p> <p>A route known as the 'Tairlaw Summit', which is part of the Ayrshire Alps follows the C46W from the Bell Memorial Car Park to Tairlaw at the Water of Girvan for a distance of approximately 15km.</p> <p>For the majority of this Link, there is unlikely to be a high demand to cross this Link. Again, whilst the percentage increase in total construction traffic is statistically significant, this is due to the existing low traffic flows.</p>

Table 11.14 Proposed Development Severance

104. As can be seen from Table 11.14, there are limited pedestrian facilities on the majority of the Links, out with the local settlements, which include pedestrian footways. The sensitivity of receptors to changes in severance is Negligible to Medium and the magnitude of change is predicted to be Minor to Moderate. It is therefore considered that the change in severance is considered to be of Slight/Neutral to Moderate significance.

#### 11.7.6 Driver Delay

105. Minimal driver delay would be expected when vehicles are accessing the Site. The IEMA 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 11.13** there are no Links on the proposed access routes that are close to capacity, and all have significant spare capacity available. It is acknowledged that the C46W (Link 8) is a single carriageway rural road with varying widths throughout and cannot accommodate two-way vehicle flows at all locations, there are however passing places in place on the road, which are for the most part inter-visible. The existing passing place provision has been upgraded over recent years as part of the C46W improvement works associated with timber extraction in the area.
106. Based on the above, the change in driver delay is considered to be adverse, of **Slight/Neutral** significance.

#### 11.7.7 Pedestrian Delay

107. 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 relatively Low. There are however facilities in the local settlements identified in **Table 11.15** and these do fall within areas where the increase in total traffic flows is above 30%, and as such would be typically considered Major. It should however be noted that the large percentage increase is due to the existing low levels of traffic using these Links, and the delay to pedestrians would be unlikely to be materially affected by the additional trips associated with the construction of the Proposed Development.
108. The maximum number of additional vehicles (HGV and cars/LGV) during construction would be approximately thirteen vehicles per hour over a 12-hour period. Therefore, the sensitivity of receptors to changes in severance is considered to be Medium and the magnitude of change is predicted to be Minor. It is considered that the effect of the construction traffic on pedestrian delay and amenity within the Study Area is adverse, of **Slight** significance.

#### 11.7.8 Pedestrian Amenity

109. The IEMA guidance considers that a suitable threshold for assessing the significance of traffic flow increase on pedestrian amenity is a 100% increase in traffic levels. Based on the increase in traffic flows shown in **Table 11.13** there are no Links where the increase in total traffic flows is 100% or more. The largest increases are on Link 3 at 73% and Link 8 at 65%. As such the magnitude of change is predicted to be Moderate.
110. Link 3 as highlighted in **Table 11.15** has limited pedestrian facilities and as such the number of pedestrians is expected to be relatively Low. There are however facilities in the local settlement of Dailly, and as such the sensitivity to pedestrian amenity is considered to be Medium at this location.
111. Link 8 has minimal pedestrian facilities of note for the majority of its length, except for its northern extents where there are a number of facilities including shops, recreation, education, places of worship, a cemetery and residential areas in the vicinity of Straiton. In addition, there is a core path that crosses the C46W in the vicinity of the proposed Site access junctions. Taking the whole link, into consideration, the sensitivity to pedestrian amenity is considered to be Medium at this location.

112. Therefore, based on the above the increase in the severity of pedestrian amenity is predicted to be Low to Medium. It is considered that the effect of the construction traffic on pedestrian delay and amenity within the Study Area is adverse, of **Moderate** significance.

#### 11.7.9 Fear and Intimidation

113. Construction traffic would be routed via a mixture of A, B and C class roads in the vicinity of the Proposed Development. Sections of the proposed access routes, making use of A class roads for example are designed to accommodate construction traffic of the type likely to be used in the construction of the Proposed Development. Furthermore, a number of the roads on the access routes form part of the agreed route network used for the extraction of timber in the area. The Agreed Timber Route Map<sup>2</sup> has been developed by the timber transport groups at Local Authority level and categorise the roads leading to forest areas in terms of their capacity to sustain the likely level of timber haulage. The routes are categorised in to four groups, namely; 'Agreed Routes', 'Consultation Routes', 'Severely Restricted Routes' and 'Excluded Routes'.
114. **Table 11.15** below shows the various Links within the agreed Study Area and the classification of them based on the Timber Transport Forum.

Link No.	Study Area Route Section	Road Classification
Link 1	U52W between the A75 and A714 at Newton Stewart	Agreed Route
Link 2	A714 between the A75 and the C46W at Bargrennan	No Classification
Link 3	B741 between the A77 and the B741 at Dailly	Agreed Route
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	Consultation Route
Link 5	B7023/Dalhowan Street between the A77 and the B741	Consultation Route
Link 6	B7045 between the A77 and C46W at Straiton	Consultation Route
Link 7	A714 between Pinwherry and the C46W at Bargrennan	Agreed Route
Link 8	C46W for its entirety (where the proposed Site accesses will be located)	Consultation Route

Table 11.15 Timber Transport Forum Road Classification

115. Of the routes proposed to be utilised during the construction of the Proposed Development, Link 1, 3 and 7 are 'Agreed Routes', which are categorised as routes used for timber haulage without restriction as regulated by the Road Traffic Act 1988. A-roads are classified as Agreed Routes by default unless covered by one of the other road classifications. Those Links classed as 'Consultation Routes' are categorised as a route which is key to timber extraction, but which are not up to 'Agreed Route' standard. Consultation with Local Authority is required, and it may be necessary to agree limits of timing, allowable tonnage etc. before the route can be used. B-roads are classified as 'Consultation Routes' by default unless covered by one of the other classifications.
116. The C46W which would provide access to the Proposed Development has been subject to upgrading works, including sections of resurfacing, carriageway widening, widening on bends and improved passing place provision as a result of its use for timber extraction and during times of felling can be subject to relatively high levels of HGV traffic.

<sup>2</sup> The Timber Transport Forum - <https://timbertransportforum.org.uk/maps/agreed-routes>

117. The above further demonstrates that the proposed access routes are of the standard suitable to accommodate the type of vehicles used in the construction of the Proposed Development. It is acknowledged that the traffic surveys undertaken as part of this study did not record significant numbers of HGV traffic, hence the statistically high increase in HGV traffic when adding the construction trips, however the routes are nevertheless considered suitable for accommodating HGV and general construction traffic.
118. It should be noted that a section of the C46W forms part of the National Cycle Network Route 7 and includes one of the Ayrshire Alps routes known as the Tairlaw Summit and as such there may be an increased level of cyclist activity through this section, including general recreational cycling and also organised events or gatherings. Although HGV's regularly use this route in relation to timber extraction in the area, consideration should be given to this when implementing mitigation measures to reduce fear and intimidation of road users and those likely to be more affected by increased levels of HGV traffic. This could include for example liaison with local cycling groups to ensure that there are no conflicts with local cycling events in the area.
119. 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 can already accommodate, the sensitivity of receptors to changes in fear and intimidation would be Low, however when taking cognisance of the potential level of cyclists on the C46W it would be Medium. The magnitude of change is predicted to be Minor and therefore, there is likely to be an adverse effect of **Slight** significance.

#### 11.7.10 Accidents and Safety

120. A review of the existing accident characteristics of the access routes was undertaken in Section 11.6.2 of this chapter. The last three-year PIA data was reviewed, which indicates that the majority of accidents were either Slight (55%) or Serious (27%), with the majority involving cars and only a small number (2) involving HGV's. Of the two fatal accidents, one involved a car and occurred solely as a result of driver error with the vehicle leaving the carriageway and striking a tree, while the second involved a head on collision between a bus and car, occurring on a bend and as such would likely have been a result of driver error.
121. Based on the information available, it is considered that there are no specific road safety issues within the Study Area that currently require to be addressed or would be exacerbated by the construction of the Proposed Development. The PIA data indicates that the majority of accidents were solely as the result of driver error, with people not driving to the road and weather conditions.
122. Nevertheless, the increase in HGV traffic, in particular around the Site access junctions and on sections of the route where there are limited opportunities to pass, for example at locations where the carriageway width is reduced, may have an impact on safety due to driver frustration and an increase in turning movements on and off the C46W and vehicles entering and exiting passing places.
123. Furthermore, there are sections of the C46W and B7023 that form part of the National Cycle Network Route 7 and as such there may be an increased level of cyclist activity and this would need to be taken cognisance of when implementing mitigation measures to address any potential issues around the safety of existing road users, particularly vulnerable ones. It should be noted that of the PIA's recorded within the last three-year period, there were no records of any accidents involving cyclists.
124. Therefore, based on the above assessment, level of existing traffic and taking account of potential vulnerable road users on sections of the proposed access routes, the sensitivity of receptors to changes in road safety conditions would be Medium and the magnitude of change would be Moderate. Therefore, there is predicted to be an adverse change in accidents and safety effects of **Moderate** significance.

#### 11.7.11 Limits to the Assessment

125. The assessment has been based upon an assumed construction programme for the Proposed Development, working on a worst case scenario where all stone/materials and concrete would be sourced offsite. Alterations to the programme or construction methodology may increase or decrease traffic flows per day/month.

126. This assessment has been based on average daily traffic flows within the peak month (month seven) 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 onsite. Furthermore, for the purposes of the assessment it has been assumed that all construction trips would utilise the same route to access the Proposed Development, when in fact there are a number of route choices available, which would result in construction trips being further diluted across the network, reducing the potential impact on any one location.

## 11.8 Mitigation Measures

### 11.8.1 Physical Measures to Design Out Issues

127. 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. As previously advised, it is proposed to utilise onsite concrete batching facilities, thus reducing the number of HGV movements to and from the Site.
128. Use of onsite borrow pits would further reduce the number of HGV trips associated with the construction of the Proposed Development. It is expected that the majority of the required materials would in fact be sourced onsite, thus further reducing the required number of HGV movements.
129. Design of the Site access junctions will be undertaken in a manner to ensure the appropriate junction radii and road widths are utilised to ensure safe operation of the junctions for site staff, allowing construction vehicles to enter and exit the Site in a safe and convenient manner. Advance warning signs and clear visibility splays would also be used to help advise road users of the increased numbers of turning traffic at the Site access junctions and to provide enhanced visibility.

### 11.8.2 Good Construction Practices and General Construction Traffic

130. The Applicant is committed to ensuring that the impact of the Proposed Development is kept to a minimum by employing good construction practices during the construction period. As such, a reputable construction Principal Contractor (PC) would be procured, with an Environmental Policy and good environmental track record. This would be established through assessment of environmental performance as part of the PC procurement exercise.
131. Prior to the commencement of any onsite activities, a detailed CTMP would be prepared and agreed with South Ayrshire Council, Dumfries and Galloway Council and Transport Scotland prior to construction works commencing onsite. The CTMP would be developed using experience gathered during the construction of recent projects in the Local Authority area and would include a number of measures to reduce the effects of the construction of the Proposed Development on local receptors and communities, including the effects from wind turbine deliveries (abnormal loads).
132. The following details and measures could be included within CTMP:
- details of any required temporary widening and other road improvement measures, together with detailed consideration of vehicle swept paths, loadings, structural assessments (where required), temporary street furniture removal details;
  - 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 junctions to advise drivers to slow down and be aware of turning traffic;
  - A Traffic Control system would be implemented that may include the following:



- all onsite deliveries and collections will be co-ordinated through the Site Management Team and movements on to and offsite would be tracked by the Site Security Team;
- where possible, no daytime or overnight parking of site or construction vehicles (site employees or visitors) outside of any predetermined temporary construction compounds or work sites will be allowed;
- restrictions on speed limits for site operatives/delivery drivers on the proposed access routes; and
- 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;
- regular tool-box talks with site operatives to remind them of their obligations in terms of good construction practices, advising that this would apply to onsite activities and when travelling to and from the Site;
- a Travel Plan to encourage lift sharing/crew bus access to Site for construction staff;
- a road condition survey (including assessment of existing structures as appropriate) prior to the construction period and a similar assessment following completion of the works;
- accurate directions are given to delivery drivers to ensure that they are able to efficiently locate site entrances to avoid impacting local residents, this may include the use of pre-prepared instructions/maps, grid references or other tools such as 'what3words';
- adequate traffic management and banksmen would be deployed for the movement of HGVs and abnormal loads; and
- HGV loads would be maximised to ensure that part load deliveries would be minimised.

### 11.8.3 Abnormal Loads (AILs)

133. As previously advised, the route assessment was based upon the parameters of the Vestas V150 wind turbine. The worst case, loads were used in the assessment, with a 74m long by 4.03m wide turbine blade and a 33.88m long by 4.5m wide turbine tower section being assessed.
134. A number of the necessary works identified on the Trunk Road network are similar to those already in place for previous windfarm developments. These have been improved or altered, to suit the proposed larger wind 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.
135. There would be a requirement for additional mitigation measures on the latter sections of the proposed access route, namely the C46W. This may include carriageway widening, carriageway regrading and creation of vehicle over-run areas. These would be undertaken in full consultation with both South Ayrshire Council and Dumfries and Galloway Council, with the works carried out where practicable to avoid any unnecessary disruption to existing road users. All works in relation to mitigation measures required to accommodate the abnormal load movements would be undertaken with the appropriate traffic management measures, implemented by a suitably qualified traffic management contractor and in agreement with the Local Authority.
136. The proposed access junctions off the C46W would make use of existing forestry access locations, however these would require to be upgraded to accommodate both the abnormal loads and general construction traffic. From this point onwards, loads would proceed to the wind turbine locations using existing upgraded forestry tracks and new access tracks constructed to the selected wind turbine manufacturers transportation guidelines.
137. An agreed access strategy including any necessary mitigation works on the proposed access route for wind turbine loads would be confirmed post consent once the wind turbine supplier and the wind turbine details had 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.
138. A police escort would be required to facilitate the delivery of the predicted loads. The police escort would be further 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 at all times where possible.

139. 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 limited overtaking opportunities for following traffic where it is safe to do so.
140. 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

141. 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 to be confirmed with the relevant local and trunk road authorities and police closer to the time of works commencing onsite.
142. 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

143. Traffic to the Site during construction would fall into two categories, namely:
- general construction traffic; and
  - AILs – vehicles used for the transport of the largest wind turbine components.

### Potential Route Conflict Areas

144. 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.
145. Potential conflicts between AIL wind turbine loads and other road users can occur at a variety of locations and circumstances particularly in more rural locations on single track roads. The main potential conflicts are likely to occur at the following locations:
- in rural areas on single carriageway roads, 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

146. Advance warning signs could be installed on the approaches to the affected road network, subject to the agreement of the road authorities.
147. 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).
148. The location and numbers of signs would be agreed post consent and would form part of the wider traffic management proposals for the Proposed Development.

## Public Information

149. Information on the wind turbine convoys would be provided to local media outlets to help assist the public. These could include:
- local newspapers;
  - Community Councils;
  - South Ayrshire Council website;
  - Dumfries and Galloway Council website; and
  - The Ayrshire Roads Alliance website.
150. Information would relate to expected vehicle movements from the POE through to the Site access junctions. This would assist residents becoming aware of the convoy movements and may help reduce any potential conflicts.

## Escort Procedures

151. 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.
152. 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.
153. 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.
154. The abnormal load convoy 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 limited overtaking opportunities for following traffic where it is safe to do so.
155. The times in which the convoys would travel would need to be agreed with Police Scotland who have primary authority on when loads can be moved.

## Convoy Management

156. To address any concerns expressed by the local community, it is proposed that a detailed convoy management plan is developed with South Ayrshire Council, 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. Please note that these are proposed areas and 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;
- an overtaking/passing area to pass convoys on the dual carriageway section of the A75 at Collin; and
- an overtaking/passing area to pass convoys on the dual carriageway section of the A75 at Nunland (west of Dumfries).

157. 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

158. 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;
  - a communication dialogue between the various stakeholders; and
  - ongoing communication with local Community Councils and other local organisations to avoid potential issues around regular community events.
159. Site direction signage could also be provided to direct construction traffic to the Proposed Development 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.
160. Temporary speed restrictions in place in the vicinity of the Proposed Development for site operatives and delivery vehicles only. This would be primarily on those sections of the proposed access routes where there could be interaction with vulnerable road users or through areas of increased pedestrian activity.
161. Any street furniture that is removed on a temporary basis to enable AIL movements would be fully reinstated following the delivery period.
162. 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 junctions.

# 11.9 Residual Effects

163. 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 11.16**.
164. The traffic effects are temporary in nature and confined to the construction period only, which is expected to last no more than 22 months. No long lasting detrimental transport or access issues are associated with the Proposed Development.

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Construction Period					
Road Capacity	Slight	Neutral	None Required	Slight/Neutral	Neutral
Severance	Slight/Neutral to Moderate	Adverse	Traffic management measures included as part of the CTMP (as identified in <b>Section 11.8</b> of this chapter), for example speed restrictions for site operative on the surrounding road network, in particular those locations passing through local settlements where there are likely to be increase pedestrians and vulnerable road users.	Slight/Neutral	Adverse
Driver Delay	Slight/Neutral to Moderate	Adverse	Convoy management, driver information on construction traffic routes and times, use of onsite borrow pits and onsite concrete batching to reduce HGV trips.  Traffic management measures included as part of the CTMP (as identified in <b>Section 11.8</b> of this chapter), for example speed restrictions for site operative on the surrounding road network, in particular those locations passing through local settlements where there are likely to be increase pedestrians and vulnerable road users.	Slight/Neutral	Adverse
Pedestrian Delay	Slight/Neutral	Neutral	None Required	Slight/Neutral	Neutral
Pedestrian Amenity	Moderate	Neutral	Convoy management, driver information on construction traffic routes and times, use of onsite borrow pits and onsite concrete batching to reduce HGV trips. This would form part of the CTMP (as identified in <b>Section 11.8</b> of this chapter).  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	Slight	Neutral

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
			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 junctions, where there will be an increase in HGV's entering and leaving the Proposed Development.		
Fear and Intimidation	Slight	Neutral	None Required	Slight	Neutral
Accidents and Safety	Moderate	Adverse	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 junctions, where there will be an increase in HGV's entering and leaving the Proposed Development. 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	Slight	Adverse



Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
			(as identified in <b>Section 11.8</b> of this chapter).		

Table 11.16 Proposed Development Summary of Effects

## 11.10 Cumulative Effects

165. 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.
166. 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 construction traffic would be diluted across the road network on any common routes used by construction vehicles. Furthermore, it is considered that if the construction phase of the Proposed 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) impact to existing conditions.
167. Notwithstanding the above, given that sections of the proposed access routes would potentially share common sections of access routes, a sensitivity assessment has been undertaken. Although not classed as committed developments (i.e. sites that have planning permission secured) three of the neighbouring developments likely to use sections of the proposed access routes are as follows:
- Arecleoch Windfarm Extension, proposed by the Applicant (granted planning permission in November 2021 following the cumulative sites cut-off date set within the Proposed Development EIAR but prior to submission of the S36 Application);
  - Kilgallioch Windfarm Extension, proposed by the Applicant;
  - Clauchrie Windfarm proposed by the Applicant; and
  - Craiginmoddie Windfarm proposed by Energiekontor.
168. As previously discussed, there are a number of available access routes available to Carrick Windfarm and it is considered that a number of routes would be utilised, thus diluting the effect on any one Link. Reference has been made to **Chapter 11: Traffic and Transportation** of the submitted Craiginmoddie Windfarm EIAR and information in relation to the predicted traffic generation of the proposed development has been applied to the relevant links within the Carrick Windfarm Study Area. It should be noted however, that a number of routes within the Craiginmoddie Windfarm submission were excluded from their assessment due to insufficient data, and as such the necessary data was not available for inclusion within the cumulative assessment. Those affected Links have therefore been excluded from the Proposed Development cumulative assessment at this time.
169. Knockcronal Windfarm is also located immediately to the north of the Proposed Development and is currently going through scoping (ECU00002181). Information relating to construction trips is not currently available, however information on potential construction routes has been provided. A number of routes, primarily to the north in the vicinity of Straiton could be utilised by both sites, however in the absence of detailed construction trip rate information, it has not been possible to include Knockcronal within the cumulative assessment at this time.

170. Based on the above, and to inform the planning authorities of possible issues if the Proposed Development and the four identified developments were consented concurrently, a combined sensitivity review has been undertaken.
171. In order to provide some context to the four identified developments and the traffic generation during their respective construction periods, a summary is provided below follows:
- Arecleoch Windfarm Extension, proposed by the Applicant:
    - number of wind turbines is 13;
    - all materials sourced offsite, including concrete; and
    - much of the onsite access track network is in place.
  - Kilgallioch Windfarm Extension, proposed by the Applicant:
    - number of wind turbines is 11 (reduced to 9 following the cumulative sites cut-off date set within the Proposed Development EIAR but prior to submission of the S36 Application;
    - all materials sourced offsite, including concrete; and
    - much of the onsite access track network is in place.
  - Clauchrie Windfarm proposed by the Applicant:
    - number of wind turbines is 18; and
    - all materials sourced onsite, including concrete.
  - Craiginmoddie Windfarm proposed by EnergieKontor:
    - no LGV/car information was available;
    - number of wind turbines is 14; and
    - all materials sourced offsite, including concrete.
172. The peak traffic flows for the four developments were obtained from their respective planning application documents (see **Table 11.17**) and then compared to the future baseline year. Note only those sections of the proposed common route have been included and those routes where detailed construction trip information was available.



Link No.	Study Area Route Section	Proposed Development Non-HGV	Proposed Development HGV	Clauchrie WF Non-HGV	Clauchrie WF HGV	Arecleoch WF Ext Non-HGV	Arecleoch WF Ext HGV	Kilgallioch WF Ext Non-HGV	Kilgallioch WF Ext HGV	Craiginmoddie WF Non-HGV	Craiginmoddie WF HGV	Total Non-HGV	Total HGV
Link 1	U52W between the A75 and A714 at Newton Stewart	48	104	24	52	20	19	24	40	0	93	116	308
Link 2	A714 between the A75 and the C46W at Bargrennan	48	104	24	52	20	19	24	40	0	93	116	308
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	48	104	0	0	0	0	0	0	0	93	48	197
Link 7	A714 between Pinwherry and the C46W at Bargrennan	48	104	24	2	0	0	24	2	0	93	96	201

Table 11.17 Cumulative Developments Sensitivity Review Peak Traffic Summary

Link No.	Study Area Route Section	Car & LGV	HGV	Total	Theoretical Road Capacity	Spare Road Capacity	% Spare Road Capacity
Link 1	U52W between the A75 and A714 at Newton Stewart	886	358	1244	43,200	41,956	97.1%
Link 2	A714 between the A75 and the C46W at Bargrennan	1013	349	1362	43,200	41,838	96.8%
Link 4	B741 between the B741 at Dailly and B7045 at Straiton	274	205	479	43,200	42,721	98.9%
Link 7	A714 between Pinwherry and the C46W at Bargrennan	932	232	1164	43,200	42,036	97.3%

Table 11.18 Combined Cumulative Developments Sensitivity Review Traffic Impact Summary

173. The combined traffic flows for all five developments namely Carrick Windfarm, Clauchrie Windfarm, Arecleoch Windfarm Extension, Kilgallioch Windfarm Extension and Craiginmoddie Windfarm (**Table 11.18**), show a marginal increase in both Car / LGV traffic and HGV traffic on the assessed route sections from that shown in **Table 11.13**. As with the previous capacity assessment undertaken, the results above show that with the addition of the worst case construction traffic levels, i.e. all construction vehicles utilising only one route to access the Site for the Proposed Development and all of the other four developments running at the same time, there would be significant spare capacity on all of the route sections assessed. As such, it is considered that the temporary increase in traffic during the worst case scenario would not result in a change in the impacts on road capacity within the Study Area.
174. Furthermore, any effect of all five developments being constructed at the same time would be mitigated through the use of an overarching Traffic Management and Monitoring Plan for all four developments and by introducing a phased delivery plan, which would be agreed with the Local Authority, Transport Scotland and Police Scotland.
175. It should also be noted that it is not predicted that the potential traffic flow increases would occur in the Study Area for the following reasons:
- it is highly unlikely that the peak traffic conditions for each development would occur at the same time due to differences in construction programmes, material supplies and developer resources;
  - worst case assessments have been undertaken on a number of the developments, whereby all materials would be sourced offsite, when in fact, this scenario is highly unlikely to occur; and
  - all abnormal load deliveries cannot occur at four separate developments on the same day due to restrictions on the numbers of loads moving on the network at the same time as set by Police Scotland.
176. It is also considered that the above would apply to those other developments in the wider area and that they are of a sufficient distance from the Proposed Development that construction traffic would be diluted across the road network on any common routes used by construction vehicles. It is considered that if the construction phase of the Proposed 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

177. 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.
178. An assessment of the potential effect using IEMA guidelines has been undertaken. This determined that prior to the implementation of mitigation, a Moderate impact could be expected in relation to Severance, Pedestrian Amenity and Accidents and Safety for sections of the proposed access routes. All other indicators indicated a Slight/Neutral effect on receptors within the Study Area.
179. A range of mitigation measures are proposed, including the implementation of a CTMP which would be agreed in advance with South Ayrshire Council, Dumfries and Galloway Council and Transport Scotland. The proposed mitigation would reduce the effects of abnormal loads and general construction traffic on the Study Area to Slight or Negligible Adverse levels; the effects would be temporary and reversible.
180. No significant residual effects are anticipated in respect of traffic and transport matters and the traffic impacts associated with the operational phase would be very low with one or two small service vehicles regularly accessing the Site to carry out routine maintenance on the wind turbines.

## 11.12 References

Department for Transport (2002). Design Manual for Road and Bridges, Volume 13, Section 1, Part 5: Speeds on Links.

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