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**Appendix 3.13a – Chapter 12 of the Clocaenog Forest Wind Farm ES**



# Chapter 12: Traffic and Transport



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## 12. Traffic and Transport

### 12.1. Introduction

- 12.1.1. This Chapter provides an evaluation of the potential environmental impacts resulting from the generated traffic, site access proposals and the movement of abnormal loads associated with the Project. It also presents the results of the routeing assessment and identifies areas where temporary mitigation works are required to facilitate the transportation of the various turbine components.
- 12.1.2. The Application Site is located on the Conwy / Denbighshire border to the east of Llyn Brenig and is accessed via the B4501 and then an unclassified road running through Clocaenog Forest.
- 12.1.3. Turbine equipment will be delivered to the Application Site by road, from Ellesmere Port Docks. Other construction materials will be sourced as locally as possible and will utilise an agreed delivery route to and from the Application Site.

### 12.2. Key Consultations

- 12.2.1. Initial consultations were held with the relevant highway authorities and the Police as part of a Route Feasibility Study, undertaken by ARUP in March 2009. These consultations were attended by representatives for RWE NRL and by Denbighshire County Council (DCC), Conwy County Borough Council (CCBC), the then Welsh Assembly Government (WAG), the North Wales Trunk Road Agency (NWTRA), the Highways Agency and North Wales Police.
- 12.2.2. Since the completion of the formal Section 42 & 47 consultation in September 2011, SKM Enviro has undertaken further consultation with the highway authorities within Wales and England to agree the scope of work informing this Chapter of the EIA. This further consultation included a meeting with NWTRA and a joint meeting with CCBC and DCC and is summarised in Table 12.1 below, with meeting minutes provided in the Consultation Report.

■ **Table 12.1 Summary of EIA Consultations - January 2012**

Consultee	Issue	Response
NWTRA	Safety of queuing vehicles on the A5	Length and safety of queues considered within the TMP
	Police escort details required	Police escort details are covered within the TMP and within Section 12.7.6 of this Chapter
	Trunk Road embargo needs to be considered	Delivery schedules which consider the embargo periods are covered within the TMP
	Mitigation works need to be reviewed	The mitigation works are covered within Section 12.7.4 of this Chapter
	Routeing for HGVs to be as agreed	HGV routeing was discussed at the meeting and is outlined in Section 12.7.7 of this Chapter
	NWTRA to review the Dry-Run report	The Dry run report was circulated at the time and is included as Annex 12.3 of the EIA.

Consultee	Issue	Response
<b>DCC and CCBC</b>	Off site mitigation to be temporary to avoid changes to B4501	The mitigation works are covered within Section 12.7.4 of this Chapter
	Works outside of the adopted highway require a separate planning application	The mitigation works outside of the public highway are covered within Section 12.7.5 of this Chapter and will be addressed in a separate planning application
	Possibly use Tir Mostyn tracks to avoid the need for widening of the B4501 if possible	This aspect is addressed in the Access Options Appraisal document included within the EIA
	Passing places for HGVs required on B4501	This aspect is covered within Section 12.7.8 of this Chapter
	Need to change priority at Bryn Glas crossroads to be agreed	This issue was discussed with DCC although, no longer forms part of the proposals
	Routeing for HGVs to be as agreed	HGV routeing was agreed at the meeting and is outlined in Section 12.7.7 of this Chapter
	Outline of Construction Traffic Management Plan required within EIA. Details to be agreed later	This aspect is covered within Section 12.7.10 of this Chapter
	Accident history to be reviewed for HGV route	This aspect is covered within Section 12.5.2 of this Chapter
	Assess impacts from construction and operational phases	These aspects are covered within Section 12.8 of this Chapter
	Other road users need to be able to pass AILs	The passing of AILs is covered within the TMP and within Section 12.7.6 of this Chapter
	Need to assess the condition of the carriageway along the proposed routes	Highway dilapidation survey is outlined in Section 12.7.10 of this Chapter
	Need to provide the public with information	Details of public consultation are covered within Section 12.7.10 of this Chapter and within the TMP

12.2.3. Further meetings and discussions have been undertaken during May 2012, with DCC, CBCC, NWTRA, the Welsh Government and North Wales Police Authority relating to the scope of the Traffic Management Plan (TMP) with the meeting notes circulated and agreed following the meeting. It was agreed that the TMP needed to cover the movement of proposed abnormal loads to the Application Site. Consultation with the Cheshire Police Authority and A1, on behalf of the Highways Agency and Cheshire West and Chester Council (CWCC) was also undertaken to encompass their opinions on the TMP and the wider traffic impacts to be covered within this Chapter of the EIA. The meeting notes are provided in the Consultation Report

12.2.4. Additional discussions have been held with the abnormal loads officers from each of the highway authorities in order to confirm the feasibility and suitability of the proposed abnormal indivisible load (AIL) route in terms of weight and height restrictions. The proposed route was found to be suitable for the anticipated AIL loads. All correspondence relating to the consultations with the abnormal loads officers is provided in the Consultation Report.



12.2.5. Information related to the abnormal loads route was passed to the North Wales and the Cheshire Police Authorities. In both instances the proposed AIL route as well as the delivery schedule and frequency of movements was agreed. Correspondence with each of the Police Authorities is provided in the Consultation Report.

### **12.3. Policy**

12.3.1. The following provides a summary of relevant planning policy guidance in relation to the traffic and transport impacts associated with the Project.

#### **12.3.1. Policy Context**

12.3.1.1. The following documents were reviewed in order to provide context for the assessment:

- Overarching National Policy Statement for Energy (EN-1);
- National Policy Statement for Renewable Energy Infrastructure (EN-3);
- Planning Policy Wales Chapter 8 (PPW 8) - Transport (5<sup>th</sup> Edition 2012);
- Technical Advice Note 18 (TAN18) – Transport (2007);
- Conwy Unitary Development Plan (UDP); and
- Denbighshire County Council, Unitary Development Plan (UDP), July 2002.

#### **12.3.2. National Policy**

12.3.2.1. The following section is an expansion of the Policy review outlined within Chapter 4 (Planning and Energy Policy), and specifically focuses on local and national policy related to Traffic and Transport.

##### **12.3.2.2. Overarching National Policy Statement for Energy (EN-1)**

12.3.2.3. EN-1 sets out the national policy for energy infrastructure, which encompasses onshore wind farms generating more than 50MW. With regard to the assessment of impacts from traffic and transport, EN-1 states that:

12.3.2.4. *"If a project is likely to have significant transport implications, the applicants ES ..... should include a transport assessment.....Applicants should consult the Highways Agency and Highway Authorities as appropriate on the assessment and mitigation."*

12.3.2.5. Detailed consultation has been undertaken with the NWTRA, Welsh Government, the relevant Police Authorities, A1 on behalf of the Highways Agency, CWCC, DCC and CCBC to agree the transport assessment requirements as part of the ES and to discuss the principles and approach to the identification of off-site mitigation works.

##### **12.3.2.6. National Policy Statement for Renewable Energy Infrastructure (EN-3)**

12.3.2.7. EN-3 contains policies specifically relating to renewable energy infrastructure and it is designed to read in conjunction with EN-1. With regard to the traffic and transport impacts, EN-3 states that:

12.3.2.8. *"... Public perception of the construction phase of an onshore wind farm will derive mainly from the effects of traffic movements..... The applicant should have assessed the various potential routes to the site for delivery of materials and components where the*

*source of the materials is known at the time of the application, and selected the route that is considered to be the most appropriate.... The applicant should assess whether the access roads are suitable for the transportation of components which will include whether they are sufficiently wide for the rotor blades, or bridges sufficiently strong for the heavier components to be transported to the site. Any sections of the route which will require modification to allow for the transportation of components to site should be identified and potential effects assessed as part of the ES.....Where a cumulative impact is likely then a cumulative transport assessment should form part of the EIA .....*

12.3.2.9. The routing of vehicles to the site has been discussed and agreed with NWTRA, DCC and CCBC. The results of the routing assessment, together with details of the identified temporary mitigation works, are presented later in this Chapter. This Chapter also presents the results of the cumulative impact assessment given the presence of a number of similar wind farm developments in the surrounding area.

#### 12.3.2.10. **Planning Policy Wales Chapter 8 (PPW8)**

12.3.2.11. PPW8 provides guidance on the integration of land use, planning and transport matters to promote more sustainable transport choices for people and freight, thus reducing the need to travel, particularly by private transport. Although there are no policies of direct relevance to the Project PPW8 highlights the preference for sustainable modes of freight transport where possible such as rail, water or pipeline. Given the remote nature of the Project, these modes of transport are not available, with the exception of wind turbine components which will arrive via the nearest suitably sized sea port to avoid excessive travel on the strategic highway network.

#### 12.3.2.12. **Technical Advice Note 18 (TAN18)**

12.3.2.13. This technical advice note has been produced as a supplement to PPW8. TAN18 is detailed and topic specific guidance. Specific policies include Policy 9.18 which states:

12.3.2.14. *“The extra trips generated by a proposed development may bring forward the need for transport improvements in the vicinity of the scheme, and beyond.”*

12.3.2.15. It is noted within Annex D of TAN18, that the assessment of the traffic impact should lead to a point where the proposals can:

12.3.2.16. *“Mitigate negative transport impacts through the design process and secured through planning conditions or obligations;”*

12.3.2.17. The Project complies with national policy in that it seeks to mitigate any significant impact related to freight transport. Although freight access by other means is not feasible, the Project seeks to minimise the impacts of the generated HGV traffic by utilising the strategic highway network and utilising local sources of aggregate.

#### 12.3.2.18. **Welsh Government Recommendation**

12.3.2.19. A letter was issued by the Welsh Government's Chief Planner/Deputy Director to all Chief Planning Officers in Wales on 1<sup>st</sup> April 2009. This letter outlines the requirement to include the full transportation issues arising from a wind farm development within the Environmental Impact Assessment, especially in relation to required highway works along the proposed transport route, so that the full impact of the development can be assessed.



12.3.2.20. Further to the above letter, an open letter was issued on the 24<sup>th</sup> April 2012 by the Welsh Government Development Control Officer. This letter outlines a recommendation to planning authorities that planning permission for any wind farm development is not determined until a Traffic Management Plan has been agreed with all relevant highway authorities. Copies of each letter are included within Annex 12.8.

### **12.3.3. Local Policy**

12.3.3.1. The Application Site extends into both the Conwy and Denbighshire administrative areas. Relevant planning policy for both areas is shown below.

#### **12.3.3.2. Conwy Unitary Development Plan (CUDP)**

12.3.3.3. The CUDP is a statutory document that sets out the council's planning policies that will be used to guide development, conservation, regeneration and environmental improvement activity.

12.3.3.4. The policies typically align to national standards set out in PPW8. Policy TR16 states:

12.3.3.5. *"Development Proposals Must Ensure That:*

- 1) *Access to the highway network is provided to the appropriate standard;*
- 2) *The effects of the development on the highway network in terms of traffic and road safety for road users and pedestrians are acceptable; and*
- 3) *The environmental impact arising as a consequence of accessing and servicing the development is minimised."*

12.3.3.6. Denbighshire County Council, Unitary Development Plan (DUDP)

12.3.3.7. At the time of writing, the LDP examination process is still underway and the Inspectors requested that further consultation be held and therefore the DUDP remains the adopted policy for the County. Transport is considered an integral part of the DUDP due to the need to integrate transport planning with land use. The policies within the DUDP that are directly applicable to transport are as follows:

12.3.3.8. TRA 6 – Impact of New Development on Traffic Flows. This policy states:

12.3.3.9. *"Development will be permitted, subject to the other plan policies, provided that:*

- I. The proposal does not unacceptably affect the safe and free flow of traffic; and*
- II. The capacity of and traffic conditions on the surrounding road network are satisfactory."*

12.3.3.10. From the mitigation measures outlined later within this Chapter, it is felt that the Project accords with these aspects of the local policies for both planning authorities.

## 12.4. Methodology

- 12.4.1. The environmental impact of the traffic generated by the Project has been assessed with reference to the 'Guidelines for the Environmental Assessment of Road Traffic'<sup>1</sup> (EART), published by the Institute of Environmental Assessment (IEA).
- 12.4.2. In accordance with this guidance, impacts including: traffic generation, severance, driver delay, pedestrian amenity, fear and intimidation, accidents and road safety, associated with the Project have been assessed.
- 12.4.3. Potential impacts relating to noise, vibration and visual impact as a result of the generated traffic are discussed in Chapters 11 (Noise) and Chapter 5 (Landscape and Visual) respectively within this EIA.
- 12.4.4. An assessment of the likely environmental impacts as a result of the development generated traffic during pre-development tree clearance and during the construction, operation and decommissioning phases has been undertaken. However, operational traffic flows are typically insignificant when compared to background traffic flows on the network of interest. Furthermore, traffic generated as a result of decommissioning is anticipated to be significantly less than during the construction phase. As such, it is the environmental impacts as a result of traffic generated during the construction phase of the Project that form the focus of this assessment.
- 12.4.5. For evaluation purposes, the scale of the environmental impacts associated with the generated traffic will be categorised as outlined within Table 12.2.

### ■ Table 12.2 Traffic Assessment Significance Criteria

Significance Rating	Description of Significance
Major	Where the impact leads to serious and lasting disruption (e.g. a 90% increase in baseline traffic) and permanent mitigation measures are required.
Moderate	Where the impact is of a temporary nature, leading to disruption (e.g. a 60% increase in baseline traffic) and short term mitigation measures are required.
Slight	Where the impact exceeds industry standard design thresholds, or a traffic increase of above 30%, but does not lead to disruption. No mitigation measures are required.
Insignificant	No perceivable impact. No mitigation measures are required.
Positive	Where the Project result in an improvement to current conditions.

- 12.4.6. Where the route assessments have identified that third party land is required to accommodate highway works to facilitate the manoeuvres of the AILs, separate planning applications are being submitted for each area of works since associated works required by the Project are not covered by the DCO application and hence this EIA.

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<sup>1</sup> Various Authors. 1992. Guidelines for the Environmental Assessment of Road Traffic. Institute of Environmental Assessment.

## **12.5. Baseline Conditions and Receptors**

### **12.5.1 Local and Strategic Highway Network**

- 12.5.1.1. The Application Site is located within the Clocaenog Forest which lies to the east of Llyn Brenig. The highway network providing access to the Application Site includes the A5, A543, A544, A548 and A55. The Application Site will be accessed from the A543 via the B4501 and then via unclassified roads leading through to the forest. Figure 12.1 shows the Application Site location with respect to the local and strategic highway network.
- 12.5.1.2. The A543 is single carriageway road that runs north–south linking the town of Denbigh in the north with the A5 at Pentrefoelas in the south. The A543 links into the A544 at Bylchau. The A543 is a local authority maintained road which is administered by both CCBC to the south (of The Sportsman’s Arms) and DCC to the north.
- 12.5.1.3. The A5 is a single carriageway trunk road that runs east–west linking the town of Llangollen in the east with the towns of Betws-y-Coed and Bangor in the west. The A5 continues east past Llangollen and joins the A483 near Chirk, approximately 30 km east of the Application Site.
- 12.5.1.4. The A483 is a dual carriageway trunk road that runs north–south and links southern and central Wales to northern England via the A55 Chester Southerly Bypass and central England via the A5 at Oswestry.
- 12.5.1.5. Both the A5 and A483 are maintained by the NWTRA.
- 12.5.1.6. The B4501 is a local authority maintained road that runs north-south from Cerrigydrudion in the south to the A543 to the north. There is also an additional spur north of Llyn Brenig that runs east-west to Denbigh. The road is single carriageway between Cerrigydrudion and its junction with A543 and until its junction with an unclassified road which accesses the east side of Llyn Brenig. East of this point, the B4501 becomes a single track road until it reaches the town of Denbigh. The road is administered by both CCBC to the south (of Llyn Brenig visitor centre) and DCC to the north and east, although the section proposed for access to the Application Site lies entirely within DCC’s administrative boundary.
- 12.5.1.7. There are numerous locally maintained unclassified and unnamed roads that pass through Clocaenog Forest as well as numerous private tracks which are owned and maintained by FCW.
- 12.5.1.8. Peak hour two-way traffic flows for the local highway network were obtained from available automatic traffic count site (ATC) data, as part of the initial feasibility study. It was subsequently agreed with DCC and CCBC, during the scoping discussions, that this background data, although obtained from counts in 2007 and 2008, is acceptable in order to compare the relative increases associated with the addition of construction traffic across the network of interest. The 2007/2008 ATC data is summarised in Table 12.3.
- 12.5.1.9. The NWTRA has noted that the likely volumes of development generated traffic are not considered to be significant with respect to the background traffic flows on the A5 and A55 trunk roads. No assessment of the environmental impacts is therefore required for these links.

■ **Table 12.3 2007/8 Background Peak Hour and Daily Traffic flows (two-way)**

Road Name	AM Peak	PM Peak	24hr Weekday Average Flows
A543 (at Bylchau)	84	97	1003
A544 (south of Llanfair Talhaiarn)	195	196	2029
B4501 (at Cerrigydrudion)	124	100	1189

## 12.5.2 Road Safety and Accident Analysis

- 12.5.2.1. The personal injury accident (PIA) records have been obtained from CCBC and DCC for the proposed civil / mechanical construction works traffic route shown in Figure 12.2, for the five year period from January 2006 to December 2011, inclusive. This agreed route will accommodate the majority of the anticipated civil / mechanical construction works traffic, given the assumption to be discussed later, that no stone will be sourced on-site, to ensure a robust assessment. The full PIA records are included in Annex 12.1.
- 12.5.2.2. A total of 38 PIAs were recorded during the five year period, 25 of which resulted in slight injuries, 12 resulted in serious injuries and one resulted in a fatality. The locations of these accidents are shown in Figure 12.3.
- 12.5.2.3. The PIA that resulted in a fatality occurred on the A543 and involved a vehicle losing control and colliding with two oncoming vehicles. All three of the vehicles were cars. The PIA occurred on a Saturday evening with dry road conditions with fog/mist. No additional factors or special conditions were identified.
- 12.5.2.4. Of the PIAs that resulted in serious injuries, six involved motorcycles. Three of these involved a single motorcycle losing control and veering off the road. Two involved motorcycles crossing the carriageway into the path of oncoming cars and the other involved a car emerging from a junction into the path of a motorcycle. Of the other PIAs resulting in serious injuries, two involved a car crossing into the path of oncoming cars, two involved single cars losing control and veering off the road, one PIA involved a car pulling out of a junction into the path of another vehicle and one involved a car knocking over a pedestrian walking along the main road. None of the PIAs that resulted in serious injuries involved HGVs.
- 12.5.2.5. As shown in Figure 12.3, the PIAs resulting in slight injuries occurred at various locations along the B5381, A548 and A544. A cluster can be identified at the junction of the B5381 / A548, of which five were typical junction incidents and four were related to excessive speed/inappropriate driving.
- 12.5.2.6. Of the PIAs resulting in slight injuries, eight involved a single car losing control with no other vehicles involved. Four involved motorcycles, two of which lost control and the others involved cars and motorcycles colliding. One involved a cyclist colliding with a car at a junction along the A544 and one involved a light goods vehicle losing control and veering off the road into an adjoining field. The remaining PIAs resulting in slight injuries involved either cars colliding on a bend, colliding whilst overtaking or rear shunts.

- 12.5.2.7. From the above, it can be concluded that the most significant causation factor is vehicles, specifically motorcycles, losing control in isolated events. A cluster of accidents has been identified at the B5381 / A548 junction although five of the PIAs are typical junction type incidents, which is not considered significant over the five year period.
- 12.5.2.8. Of the PIAs recorded in the five year period, only one involved a large vehicle and this accident was the result of the driver losing control with no other vehicles involved. As there is no further history of PIAs resulting from large vehicles using the highway network of interest, it can be concluded that no mitigation measures are required from a safety perspective to accommodate the proposed increase in HGV deliveries along the agreed route for civil / mechanical construction works traffic.

## **12.6. Likely Traffic Generation over the Life of the Project**

- 12.6.1. The following section provides an indication of the likely volumes and types of traffic generated over the life of the Project.

### **12.6.1 Pre-development Tree Clearance**

- 12.6.1.1. An assessment of the likely timber volumes associated with the proposed pre-development tree clearance has been undertaken. This has identified that pre-development tree clearance will yield 32,020 cubic metres of timber to be exported.
- 12.6.1.2. Although timber from various areas within the forest will be from different species and have varying densities as a result of its size and age, a generic timber density in line with Sitka Spruce of 0.92 tonnes per m<sup>3</sup> for all products has been assumed within the calculations. This equates to a total of 29,500 tonnes of timber to be exported as a result of the pre-development tree clearance.
- 12.6.1.3. The felled timber will be transported using standard articulated timber wagons with a carrying capacity of 25 tonnes per vehicle. Given the quantity of timber to be exported, this equates to 1,180 loads (2,360 HGV trips), to be exported over a 12 month pre-development tree clearance schedule.
- 12.6.1.4. In reality, several factors such as weather and the market value of timber will mean that timber export is not equally distributed over the anticipated pre-development tree clearance schedule. Timber is likely to be stored on the roadside in stacks for collection as required. In order to assess a worst case scenario and allowing for this staged export of timber, a condensed pre-development tree clearance period of 4 months has been considered. This scenario would result in up to 590 HGV trips per month over the timber export periods. This would result in an average of 30 HGV trips per day which is equivalent to less than 3 HGV trips per hour. In order to ascertain a worst case scenario, this assessment assumes that all timber is exported equally over a 12 hour working day although in reality forestry activities may operate for longer periods.
- 12.6.1.5. Timber will be exported from the Application Site via the existing timber haulage route to the south of the forest and on to the B5105 and on to the existing distribution centres. It is anticipated that the majority of smaller trees cleared for construction will be mulched and dispersed on site. Any stored timber will likely be exported prior to the main construction phase commencing. Furthermore, FCW will cease normal tree clearance operations for the duration of the construction period.

12.6.1.6. It is acknowledged that there is a potential requirement to enable pre-development tree clearance or the export of usable timber to overlap the commencement of the wider construction process, specifically for distinctly separate areas within the site. However, given the different access strategies adopted no cumulative impacts are anticipated between timber haulage vehicles and civil / mechanical construction works traffic.

## **12.6.2. Construction Phase**

12.6.2.1. 32 turbines are proposed across the Application Site. Each turbine will require three blades, four tower sections and one nacelle. In total, eight components will be transported as AILs due to their length, width or weight respectively. A further 4 standard HGVs will be required for each turbine to transport the base rings, hubs and ancillary equipment resulting in up to 12 deliveries per turbine. Once the turbine components are off loaded, the AIL transporters can be retracted for the return journey. A further AIL will be required to deliver the main transformer to the Application Site. Unlike the turbine component delivery vehicles, this trailer is not retractable and will therefore still be classified as an AIL for its return journey, albeit with a significantly reduced gross weight.

12.6.2.2. The erection of the turbines will require two cranes, one large crane with a lifting capacity in the order of 500 – 1,000 tonnes and one smaller crane with a lifting capacity of approximately 300 tonnes. Each crane will be de-rigged for transportation on public roads but both will be classed as an AIL movement due to their weight. In total, up to 40 trips (i.e. 20 deliveries) will be required to deliver the associated crane rigging and a further 40 trips required for collection after all turbines have been erected.

12.6.2.3. Each turbine foundation will require approximately 64 concrete deliveries (128 HGV trips). The concrete for each foundation will be poured over the course of a single day. In total, there will be 4096 HGV trips over 32 non-consecutive days during an 18 month period. Site wide, there is also a requirement for 75 deliveries (150 HGV trips) of steel for foundation reinforcement. Other site deliveries will be significantly reduced on those days when foundations are being poured to minimise the cumulative traffic impacts on the highway network and to ensure the reliability and therefore quality of delivered concrete.

12.6.2.4. In addition to the concrete for the turbine foundations, an extra 84 concrete deliveries (168 HGV trips) will be required over a 5 month period for the construction of the sub-station, control building and meteorological mast.

12.6.2.5. There will be a network of approximately 13.4km of new tracks and spurs and approximately 24.2 km of existing forestry tracks and public roads within the Application Site boundary that will be upgraded. These tracks and roads will allow construction vehicles to access each turbine location and will also be used for service access during the operational phase.

12.6.2.6. Both the new and upgraded tracks will be constructed from stone aggregate to a finished minimum width of 5 m with some widening on bends and an average construction depth of 500 mm dependant on ground conditions.

12.6.2.7. Stone will be delivered by standard 10 m tippers with an assumed nominal load capacity in the order of 20 tonnes. Overall, it is expected that up to 3,993 stone deliveries (7,986 HGV trips) will be required for the track and road upgrades and a further 5,159 stone deliveries (10,318 HGV trips) for the construction of new tracks. Track construction is scheduled for 18 months which, along with the delivery of the associated geo-membrane,



bedding materials and drainage equipment, will result in an average of 1020 HGV trips per month.

- 12.6.2.8. Stone deliveries will also be required for the crane pads and associated hard standing areas. Each hard standing measures 50 m x 25 m and will be constructed at each turbine location over an 18 month period. A total of 2000 stone deliveries (4,000 HGV trips) will be required, which equates to an average of 222 HGV trips per month.
- 12.6.2.9. Further stone deliveries will be required for two temporary construction compounds measuring 50 m x 50 m each, hardstandings for two met masts measuring 30 m x 30 m each and hard standing for a substation compound measuring 68 m x 60m. A total of 419 stone deliveries and 172 deliveries for building materials (1182 HGV trips) will be required assuming a typical construction depth of 500 mm and the same stone density and tipper capacity as outlined above. A permanent Application Site general compound measuring 50 m x 50 m will also be constructed which will require a further 250 stone deliveries (500 HGV trips).
- 12.6.2.10. It is likely that aggregate will be sourced on-site from borrow pits. However, for the purposes of assessing a worst case scenario with respect to the likely traffic generation, it has been assumed that all stone aggregate is to be imported from local quarries. Given this worst case scenario, the stone aggregate imported during the peak month of construction will require 1,315 HGV trips which equates to less than six HGV trips (three arrivals and three departures) per hour.
- 12.6.2.11. There will also be a requirement for approximately 50 km of electrical cabling to be installed over a 10 month period. This will require up to 51 deliveries (102 HGV trips) to deliver the cable drums. This assumes that empty cable drums will be collected as new ones are delivered.
- 12.6.2.12. The cables will be laid in bedding sand. Overall 1,128 sand deliveries (2,256 HGV trips) are required assuming a material density of 2 tonnes per cubic metre and a nominal HGV load capacity in the order of 20 tonnes. Overall this equates to 236 HGV trips per month related to cable installation.
- 12.6.2.13. Temporary buildings will be established during the construction phase providing office accommodation as well as kitchen and wash room facilities. These will be installed within the first two months of the construction period and removed during the last month of construction.
- 12.6.2.14. Approximately 13 general construction vehicles will be delivered to the site including tracked excavators, dump trucks and other earth moving and lifting equipment. The majority of these vehicles will remain on-site for the duration of the construction phase although each is likely to be delivered on a low loader which will not remain on-site. In all 26 HGV trips have been anticipated during the first month with a further 26 HGV trips during the last month of the construction period.
- 12.6.2.15. An allowance for fuel deliveries of 2 tankers per week for the entire construction period (384 HGV trips) has been assumed. The construction period is expected to last 24 months including commissioning of the turbines and restoration of the agreed off-site works to their original state prior to construction commencing.
- 12.6.2.16. The construction site will operate on a single day-shift system, Monday to Friday, between 0700 to 1900 hours and on Saturday, between 0700 to 1300 hours. HGV

deliveries are expected to occur during Monday to Friday only, with no significant deliveries anticipated on Saturdays. It has therefore been assumed that HGVs will operate 20 days per month (5 days per week) for the duration of the construction period and that daily HGV movements will be distributed evenly across the 12 hr working day.

- 12.6.2.17. Construction staff will arrive at the Application Site during 0600 to 0700 hours and leave the Application Site during 1900 to 2000 hours, Monday to Friday (1300 to 1400 hours on Saturday). It is anticipated that there will be a total of 150 staff employed during the peak construction period, however, given the phasing of the construction disciplines, it has been assumed that there will be a maximum of 70 staff on-site at any one time. The majority of staff will be transported to the Application Site via minibus with occupancy of up to five persons per minibus with appropriate collection points to be agreed. It is also noted that specialist contractors may need to travel to the Application Site in their own vehicle.
- 12.6.2.18. For the purposes of the assessment it is assumed that, in total, up to 66 staff will arrive via minibus and four staff will travel in single occupancy private vehicles, giving a total of 18 inbound trips in the AM and 18 outbound trips in the PM.
- 12.6.2.19. Based on the assumptions given above, Annex 12.2 contains a table summarising the anticipated programme of works and the anticipated two way trips for AILs, civil / mechanical construction works traffic and construction staff traffic for the Project throughout its 24 month construction period.
- 12.6.2.20. From the information in Annex 12.2, it can be seen that the largest volume of HGVs is expected during month 16 with a total of 1,671 general HGV trips. Given a typical month of 20 working days, this equates to an average of 84 HGV trips per day, mainly due to stone aggregate deliveries which is equivalent to less than four inbound HGV trips and four outbound HGV trips per hour.
- 12.6.2.21. The requirement for 128 HGV trips throughout a 12 hour day for the pouring of each turbine foundation equates to less than six inbound HGV trips and six outbound HGV trips per hour with a scheduled frequency of approximately two pours per month.

### **12.6.3. Operational Phase**

- 12.6.3.1. Operational and maintenance traffic generated by the wind farm generally relates to the following activities:
  - Turbine maintenance and inspection;
  - Access track maintenance;
  - Substation Maintenance and inspection; and
  - Snow clearance.
- 12.6.3.2. During normal operation the wind farm will be unattended, with operation and monitoring activities being carried out in a central control room with the aid of remotely connected equipment. However, regular site visits will be necessary to carry out routine inspection and preventative maintenance. An LGV or 4x4 vehicle will be required for such inspections and in the event of any breakdown.
- 12.6.3.3. On rare occasions mobile cranes may be required, should a major component fail. In this instance, larger vehicles may also be required to deliver replacement turbine



components. Some off-site mitigation works, as identified later in this Chapter, may need to be re-installed to facilitate the delivery of the largest components. Where mitigation works are identified, these will be undertaken in accordance with the same requirements as outlined for the initial component deliveries.

#### **12.6.4. Decommissioning Phase**

12.6.4.1. The proposed lifetime of the wind farm is 25 years. At the end of that time the Application Site will be decommissioned. All above ground infrastructure, including turbines, transformers, buildings (e.g. control building) and monitoring masts, will be removed from the Application Site. Underground cables will be cut back and left buried as the trenches are likely to be re-vegetated. The access tracks will be left in place and concrete foundations will remain in situ, excluding the top 1 m which will be removed.

12.6.4.2. Given the fact that the access tracks will not be removed, the vehicle movements generated during decommissioning will be significantly lower than those expected during construction. Additionally, turbine components will be broken down before removal to avoid the need for ALL vehicle movements.

### **12.7. Routeing Assessment**

#### **12.7.1 Abnormal Indivisible Load Routeing Assessment**

12.7.1.1. As stated, a Route Feasibility Study was undertaken by ARUP in March 2009 to assess various routeing options for ALL movements from Ellesmere Port Docks to the Application Site.

12.7.1.2. The ARUP report outlines previous route studies and details the likely vehicle specifications identified to deliver the turbine components to the Application Site. The ALL assessment identifies three potential routes and assesses each with regard to identified constraint points along with their potential to be overcome. The three identified routes are as follows:

- Route A: M53 – A55 – A483 – A5 – A543 – B4501 – unclassified roads;
- Route B: M53 – A55 – A483 – A5 – B4501 – unclassified roads; and
- Route C: M53 – A55 – B5381 – A548 – A544 – A543 – B4501 – unclassified roads.

12.7.1.3. The routes were assessed with a turbine blade length of 45 m, a nacelle load width of 5 m and a generic tower section using swept path analysis. The assessment considered each vehicle, given the various requirements specific to each. In consultation undertaken by both ARUP and SKM Enviros, DCC suggested that the route should pass through the existing Tir Mostyn site tracks in order to avoid additional widening works along the B4501 and unclassified roads into the forest. However, on-going discussion between RWE NRL, the land owners and site operators of the existing Tir Mostyn wind farm, and the consented Brenig wind farm, have not yet concluded whether the use of this route by RWE NRL is possible. Therefore, the most appropriate route is currently via the B4501 to just beyond the B5435, before turning onto the unclassified road which passes into the forest adjacent to the southern boundary of the Tir Mostyn wind farm.

12.7.1.4. An Access Route Options Appraisal has been produced which outlines, in closer detail, the access studies previously undertaken by RWE NRL with regard to assessment of the suitability for use by the proposed ALL vehicles (see Annex 2.2).

## 12.7.2 Proposed AIL Route

12.7.2.1. The Route Feasibility Study identified that the most suitable route for the AIL vehicles from Ellesmere Port Docks is Route A, which has been adopted as the preferred route. Figure 12.4 shows the preferred route which is outlined as follows:

- Ellesmere Port Docks to Junction 9 of the M53;
- M53 and A55 to the south of Chester as far as its junction with A483;
- A483 past Wrexham as far as its junction with the A5 at Halton Roundabout;
- West along the A5 to the junction with A543 east of Pentrefoelas;
- A543 to the junction of B4501 at Llyn Bran;
- B4501 to just beyond the crossroads with the B5435 at the Bryn Glas Depot; and then
- Continue along the unclassified road leading into Clocaenog Forest, from where existing forestry tracks will be utilised to access each turbine location.

12.7.2.2. It should be noted that an embargo is in place on the Welsh trunk road network to prohibit the movement of AIL loads during peak holiday seasons. The embargo dates are published by NWTRA annually and vary dependent on school holidays and recognised peak tourism periods. Although it is possible to lift the embargo for some vehicles travelling outside the normal peak times, it is assumed for assessment purposes that the embargo remains in force. It should be noted that if the turbine deliveries were exempt from the embargo, it may be possible to provide a reduction in the turbine delivery schedule.

12.7.2.3. Consultation with each of the respective abnormal load teams for CWCC, A-One on behalf of the Highways Agency, NWTRA, CCBC and DCC has been undertaken. Each authority has confirmed that the movement of the proposed loads is acceptable with respect to the weight and height of each load and that no structures will be adversely affected. RWE NRL will reconfirm with each abnormal loads team once exact vehicle details and axle weights can be established and once transport dates are clarified, as per standard procedure for the movement of abnormal loads on the public highway.

## 12.7.3 Further Assessment of the Proposed AIL Route

12.7.3.1. In addition to the Route Feasibility Study, a dry run to confirm the suitability of the proposed AIL route was undertaken by Collett Transport in July 2011. The dry run utilised a template vehicle as a practical method of identifying the suitability of the route and assessed the section of route between the junction of the A483 and A5 and on to the unclassified road at the northern end of Clocaenog Forest.

12.7.3.2. Constraint points were identified along the route, based on two vehicle templates. Firstly the 45 m turbine blade and additionally, a 5 m wide nacelle which represents the longest and the widest anticipated loads, respectively.

12.7.3.3. The location of the identified constraint points are shown in Figures 12.5 and 12.6. Figure 12.5 shows the location of the constraint points on the route between the junction of A483 / A5 and the B4501 where it narrows to a single carriageway. Figure 12.6 shows the constraint points between the B4501 where it narrows and the unclassified road at the northern boundary of the Application Site. The Collett Transport report outlining the findings of the dry run is attached at Annex 12.3.

12.7.3.4. A further dry run and strategic routeing assessment has been undertaken independently by RenewableUK Cymru which includes the section of the route from Ellesmere Port Docks to the A483 / A5 junction. As partners, RWE NRL have inputted into the document which utilises similar vehicle specifications.

12.7.3.5. The assessment has confirmed that no mitigation measures are required to the trunk road network although the assessment and subsequent discussions with CWCC, identified that the route may be constrained from Ellesmere Port Docks to junction 9 of the M53. Swept path analysis has therefore been undertaken in order to identify the scope of any mitigation measures. The analysis is outlined in the following section.

#### **12.7.4. Temporary Off-Site Mitigation Works for AIL Route**

12.7.4.1. For the constraint points along the proposed AIL route shown in Figures 12.5 and 12.6, the following temporary mitigation works have been identified to facilitate the AIL movements to the Application Site:

1. Temporary highway widening is required on to the verge on the north western corner of Halton Roundabout (A483/A5);
2. Temporary highway widening is required on nearside verge on bend of A5 (known locally as Berwyn Bends);
3. Manual steering may be required to pass through Corwen Village;
4. Temporary highway widening is required which includes third party land at A5/A543 junction near Pentrefoelas. Details will be included within a separate planning application;
5. Over sail is required into third party land on A543 approximately 150m from its junction with the A5 for a distance of approximately 320m. Details will be included within a separate planning application;
6. Over sail is required into third party land on A543 approximately 850m from its junction with the A5 for a distance of approximately 450m;
7. Over sail is required into third party land on A543 at the left hand bend approximately 1.3km from its junction with the A5. Manual steering also required to minimise over sail;
8. Manual Steering is required at the left hand bend on A543 approximately 1.8km from its junction with the A5;
9. Manual steering is required to negotiate the junction of A543 / B4501. Temporary removal of 'Give Way' sign is required to facilitate manoeuvre;
10. Manual steering is required to negotiate the junction of B4501 at its spur to the A543. Further investigation is recommended to ascertain that vehicles can negotiate the junction without its axles leaving the road surface;
11. Vertical alignment issue approximately 100 m from the cattle grid where B4501 narrows to single carriageway. Measures are required to ensure suitable vehicle ground clearance is available;
12. Manual Steering is required to negotiate the right hand bend on B4501 approximately 310m from the cattle grid;

13. Vertical alignment issue approximately 350m from the cattle grid. Measures are required to ensure suitable vehicle ground clearance is available. Pruning of tree may also be required at this point;
14. Temporary highway widening is required on a left hand bend approximately 400m from cattle grid. The extent of widening work has been assessed and is within the extent of the adopted public highway boundary;
15. Manual Steering is required to negotiate the 'S bend approximately 410m from the cattle grid. Tree pruning may also be required along this section of carriageway to prevent damaging the load;
16. Temporary highway widening is required on the left hand bend approximately 1.6km from cattle grid;
17. Manual Steering is required to negotiate the left and right hand bends approximately 1.7km from the cattle grid. Tree pruning may also be required along this section of carriageway as well as temporary removal/relocation of a telegraph pole in order to facilitate the manoeuvre;
18. Manual Steering is required to negotiate the left hand bend on B4501 approximately 1.8km from the cattle grid;
19. Vertical alignment issue approximately 2km from cattle grid. Measures are required to ensure suitable vehicle ground clearance is available;
20. Manual Steering is required to negotiate the left hand bend approximately 2.1km from the cattle grid. Tree pruning may also be required along this section of carriageway to prevent damaging the load;
21. Manual Steering is required along the narrow section of carriageway approximately 2.3km from the cattle grid for approximately 250m. Tree pruning may also be required along this section of carriageway as well as temporary removal / relocation of a number of telegraph poles in order to facilitate the manoeuvre;
22. Temporary highway widening is required on a bend adjacent to an agricultural access track approximately 2.5km from the cattle grid;
23. Tree pruning may be required along this section of the route to avoid damage to the load, approximately 2.6km from the cattle grid;
24. Manual Steering is required to negotiate the left hand bend approximately 3.2km from the cattle grid;
25. Temporary highway widening is required which includes the use of third party land at B4501 / Bryn Glas Depot junction. Details will be included within a separate planning application;
26. Temporary highway widening is required on both sides of unclassified road between B4501 / Bryn Glas Depot junction and the Bryn Glas Caravan Park cross roads. Manual steering will also be required as well as tree pruning along this section of carriageway in order to facilitate the proposed loads;
27. Manual Steering is required to negotiate the right hand bend adjacent to the chicken sheds approximately 220m from the Bryn Glas Caravan Park cross roads;
28. Temporary highway widening is required on the left hand bend approximately 800m from the cross roads;
29. Temporary highway widening is required on the right hand bend approximately 1km from the cross roads. Tree pruning is required along this section of carriageway as

- well as temporary removal / relocation of a telegraph pole in order to facilitate the manoeuvre;
30. Approximately 1.5km from the cross roads, the removal of a section of fence is required to facilitate the passage of the widest loads. The fence lies within the extent of adopted highway boundary;
  31. A vertical alignment issue has been identified approximately 1.9km from the cross roads. Measures are required to ensure suitable vehicle ground clearance is available; and
  32. Temporary highway works are required at left hand bend at the forest entry road within the northern boundary of the Application Site. A section of third party land within FCW control to the west of the existing highway will be required to facilitate an overrun area so that the longest vehicles can negotiate the turn. Furthermore, a section of fence on the northern frontage of the road lies within the adopted highway boundary and will need to be temporarily removed to facilitate the proposed manoeuvres.
- 12.7.4.2. The Collett Transport dry run reached just beyond point 32 shown in Figure 12.6, however the route itself continues into the forest to access each of the turbines via a combination of unclassified public roads and existing, upgraded and new private forestry tracks as detailed within the site layout plan shown on Figure 3.1a, 3.1b and 3.1c.
- 12.7.4.3. The public highway within the forest which is to be used for access will also require some temporary works to widen the existing carriageway to the minimum required width of 5 m. Land adjacent to the public highway is within the ownership of the FCW. Details of the extent of possible temporary works are outlined as points 33 and 34 in Figure 12.7.
- 12.7.4.4. In addition to the constraint points identified above, there are five cattle grids along the route, from the B4501 to the Application Site. These will need to be investigated to ascertain whether the gross vehicle weights with the loaded components can cross them safely. The locations of the cattle grids are also shown in Figures 12.5 and 12.6.
- 12.7.4.5. As stated, a separate study has been undertaken to assess the AIL route between Ellesmere Port Docks and junction 9 of the M53. Figure 12.8 shows the 45 m blade transporter vehicle exiting the port onto Merseyton Road. It can be seen that the load will oversail the verge and require the temporary removal/relocation of a street lighting column.
- 12.7.4.6. Figure 12.9 shows that the 45 m blade transporter vehicle can negotiate the roundabout and entry ramp at junction 9 onto the M53 without the need for mitigation works.
- 12.7.4.7. It was agreed with DCC that mitigation works undertaken on the B4501 and the unclassified roads within the Application Site will need to be temporary in nature so as not to adversely affect the character of the road or to increase the speed of background traffic. DCC has also noted that detailed designs for all temporary works will need to be agreed at the appropriate time and will, therefore, be covered by a condition of any subsequent planning approval.
- 12.7.4.8. NWTRA and CCBC have both requested that works on the strategic highway should be permanent in nature so that future wind farm developments can utilise the same access route without the need to implement additional works. It should be noted that, no exclusivity agreements are in place and therefore RWE NRL would not prevent the use of

these areas subject to individuals negotiating their own right of access over third party land.

- 12.7.4.9. It is expected that, dependant on seasonal variations, tree pruning may be required. A corridor of 5.5 m wide x 5.5 m high will be required to prevent any damage to the loads although it is envisaged that any required pruning will be consistent with normal cyclic maintenance programmes undertaken by the highway authorities to ensure the highway remains free from obstruction. Further cutting back of undergrowth and hedges is anticipated at points where the loads will oversail the verge. A pruning maintenance regime will be agreed with each relevant authority as part of the proposed CTMP.
- 12.7.4.10. All works within the public highway will need to be undertaken by authorised contractors and will be compliant with all relevant aspects of the Highways Act and local policy.
- 12.7.4.11. As previously stated, in the event of a turbine requiring a replacement component, the temporary mitigation works highlighted above would be required to be re-installed to facilitate its delivery.

#### **12.7.5. Works Outside the Adopted highway**

- 12.7.5.1. Works outside the adopted highway are required to facilitate the manoeuvres at several points along the route. The identified areas are located at points 4, 5, 6, 7, 25, 32, 33 and 34 as indicated previously in Section 12.7.4 and within Figures 12.5 and 12.6.
- 12.7.5.2. At points 4, 7 and 25 agreements between RWE NRL and the land owners have been reached to allow the temporary mitigation works required to facilitate the manoeuvres of the AIL. The proposed temporary mitigation required at these points is detailed in the RWE NRL Drawings *REN/CLO/0007/AP8*, *REN/CLO/0024/AP7* and *REN/CLO/0009/A* which are attached as Annex 12.4, 12.5, and 12.6 respectively.
- 12.7.5.3. At points 5 and 6, RWE NRL has agreements with the land owner to over sail the land outside of the highway boundary on both sides of the road. There are two properties where permission to over sail the land has not been granted. However, passing these properties is possible without the need to oversail their respective boundaries, given the oversail agreement for the opposite frontages. RWE NRL have an agreement with the FCW that permits the creation of new tracks and allows for over sail on FCW land. This agreement covers points 32, 33 and 34 highlighted above as well the new tracks accessing the proposed turbine locations. In order to avoid over sailing third party land on the approach to point 32, a new section of track is proposed within the forest on the western side of the road. This short section of track will allow the longest vehicles to overrun beyond the extent of the existing carriageway and loop back onto the carriageway further to the south. Temporary widening of the existing adopted highway and verge is required. There may be a requirement to remove a cattle grid and fence located within the verge on the northern side of the road to allow the vehicle to over sail the verge. It has been confirmed that the affected verge and the cattle grid and gate are within the adopted highway boundary. The plan showing the extent of adopted highway in this area is attached at Annex 12.7.
- 12.7.5.4. At point 33, mitigation can only be achieved on the eastern side of the road which is owned by FCW. There is no agreement in place to over sail the land on the western side of road that forms part of the existing Tir Mostyn wind farm. Therefore, the temporary road widening required to facilitate this will only be on the FCW side of the road.



12.7.5.5. At point 34, the land on either side of the road is owned by FCW, therefore any temporary highway widening required will be covered by the permitted agreement.

12.7.5.6. As outlined above, further details of all the mitigation works, temporary traffic management and signage will be agreed at the appropriate time and prior to the commencement of any AIL deliveries as part of the Construction Traffic Management Plan, as outlined later within this Chapter.

### **12.7.6 Proposed Escort Vehicle Control Strategy**

12.7.6.1. As part of the TMP scoping discussions, it was agreed that an assessment be undertaken to identify suitable locations along the AIL route where oncoming traffic will need to be stopped to allow the AILs to utilise the full width of available carriageway without obstruction.

12.7.6.2. The A5, the A543 and the B4501 to the point where it narrows to a single lane, have been assessed and the locations of appropriate stopping points for oncoming traffic have been identified in the TMP.

12.7.6.3. The TMP, outlines the sections along which traffic will be required to stop and provides an indication of the likely delay to road users based on an assumed nominal convoy speed of 20 mph (30 kph).

12.7.6.4. From the meetings undertaken to agree the scope of the TMP, it was outlined by North Wales Police that the convoy will comprise a command car and up to six motorcycle outriders. This will ensure sufficient capability to control the various side roads and accesses. Details of the specific escort strategy will be outlined post planning once more specific details are established.

12.7.6.5. Initial consultation with North Wales Police and Cheshire Police established that both Police Constabularies agree in principle to the proposed AIL route and that, given sufficient notice, the required staffing and equipment can be provided.

### **12.7.7 Civil / Mechanical Construction Works Traffic Routeing and Management**

12.7.7.1. It is likely that a significant proportion of stone aggregate will be sourced from borrow pits located within the site boundary. However, for the purposes of this assessment, it has been assumed that all stone will be imported from local quarries. As agreed with CCBC, DCC and the NWTRA during the scoping meetings, the stone aggregate and concrete vehicles will be routed to the Application Site from the A55 at junction 26 near St. Asaph and along the B5381, A548, A544, A543 and the B4501.

12.7.7.2. Once on the B4501, the civil / mechanical construction works traffic route will continue to the junction of the B5435 as outlined for the AIL vehicles. At this junction, the route will turn right on to the unnamed road signposted to Saron. At the next junction, adjacent to Bryn Glas Caravan Park, the route turns right again, where it rejoins the AIL route on to the unnamed road leading southbound to the forest access.

12.7.7.3. Given that the origins of the remaining HGV deliveries are currently unknown, it has been assumed that these vehicles will either use the aggregate delivery route described above or will access the Application Site via the A5 and A543 from the south. For assessment purposes, an equal split of 50 / 50 has been assumed for these remaining deliveries accessing from the northerly route and from the southerly route.

12.7.7.4. It is acknowledged that final routeing choices are heavily dependent on the source location of the construction materials. However, the use of the agreed routes for the aggregate and concrete deliveries will be a requirement of any contractual agreement between RWE NRL and the eventual stone aggregate and concrete haulage contractors. This agreement will ensure that no civil / mechanical construction works traffic passes through the towns of Denbigh, Abergele, Ruthin and Mold.

#### **12.7.8. Temporary Mitigation Works for Civil / Mechanical Construction Works Traffic**

12.7.8.1. A review of possible passing place locations has been undertaken. The review is a high level assessment which identifies the existing passing provisions on the single track section of the B4501 and the unnamed road leading into the forest. The existing passing locations, along with likely positions for new passing facilities, are shown on Figure 12.10. The potential passing places have been located so that intervisibility exists for drivers waiting at each passing location in order to avoid the need for reverse manoeuvres. The intervisibility assumes that trees and hedges are maintained throughout the construction period.

12.7.8.2. Given the temporary widening works that are proposed along the B4501 and the unnamed road to facilitate the movement of AILs, it is anticipated that several potential passing locations identified in Figure 12.10, will be improved sufficiently to accommodate vehicles passing without the need for further works. The locations of these passing places are provisionally outlined within this Chapter and formal agreement of the final locations will be obtained from DCC prior to the commencement of any deliveries.

#### **12.7.9. Reinstatement of All Temporary Mitigation Works**

12.7.9.1. As previously outlined, DCC has requested that mitigation works undertaken on the B4501 and the unclassified roads within the Application Site should be temporary in nature. Details of temporary works are still to be agreed although, it is envisaged that carriageway widening is likely to be in the form of compacted loose aggregate placed within the verge adjacent to the existing running carriageway.

12.7.9.2. Once the construction phase of the Project has been completed, all temporary works will be removed and the highway reinstated. As outlined later within this section, RWE NRL have committed to a maintenance strategy in order to ensure that the highway network is maintained throughout the construction period. The reinstatement of temporary works will be incorporated, as required, into this process to ensure that the works are reinstated to their original condition.

#### **12.7.10 Construction Traffic Management Plan**

12.7.10.1. A Construction Traffic Management Plan (CTMP) will be produced once the location of source materials is identified and preferred suppliers and haulage contractors are commissioned. A separate Traffic Management Plan (TMP) has been produced at the request of the Welsh Government to specifically address the transportation of AILs on the strategic road network.

12.7.10.2. The CTMP will consider the operation and management of all construction traffic to ensure the safe and efficient transportation of the turbine components and other materials to the Application Site during the construction phase. The scope of the CTMP addresses the specific requirements on the local highway network of interest identified



by DCC, CCBC and NWTRA during the CTMP scoping meetings. The CTMP will be a planning requirement to the DCO.

- 12.7.10.3. The CTMP will include information on the temporary highway improvements and mitigation measures that will need to be implemented, before any deliveries commence. Specific details of construction materials, temporary signing arrangements as well as the implementation of any works within the public highway network will need to be agreed with the relevant highway authorities.
- 12.7.10.4. It is inevitable that traffic management measures will need to be implemented while works in the highway are undertaken. However, it is unlikely that any temporary diversions or road closures will be necessary for the scale of work required. If works in the public highway require its closure, suitable diversion routes will be agreed with the relevant highway authority and information will be provided to the public and emergency services to minimise any safety risk and potential delay.
- 12.7.10.5. The CTMP will include details of timings for deliveries, driver training, agreed vehicle routeing, staff parking arrangements, minibus pick up points and other matters related to safety on the public highway and within the Application Site. Additionally, it will also include a number of general traffic mitigation measures that will be implemented as best practice to minimise the effect of construction activities including reducing the impact of mud, dirt and general detritus deposits on the public highway and the implementation of temporary signing to provide advance warning at crossing points and access junctions.
- 12.7.10.6. The CTMP will detail the agreements with the selected haulage contractors to ensure that the routes outlined within this Chapter for AILs and civil / mechanical construction works traffic are utilised for all traffic entering and exiting the Application Site.
- 12.7.10.7. At this stage, no road closures are anticipated in order to facilitate the movements of abnormal vehicles on the proposed route. However where abnormal loads are required to use the whole carriageway to complete a manoeuvre or where a narrow section of the route requires single file running, traffic will need to be stopped on the highway in advance of this as outlined earlier within this Chapter. Police escorts or abnormal loads escorts will be coordinated to conduct traffic and ensure the safety of all road users. The proposed "Escort Vehicle Control Strategy" will be agreed with affected parties and incorporated into the CTMP and TMP prior to AIL deliveries commencing.
- 12.7.10.8. It is proposed that the haulage of AILs will be carried out during daylight hours, for safety reasons, and outside of typical peak hours to minimise disruption and delay on the local and wider highway network. AIL deliveries will also be scheduled to avoid the embargo in place across the trunk road network during peak holiday seasons. The scheduling of AILs is covered in detail within the TMP.
- 12.7.10.9. It is proposed that the local community be updated on the haulage delivery schedule so that people have the opportunity to plan journeys with advanced knowledge. This will help to reduce potential for disruption, specifically on minor roads.
- 12.7.10.10. It is proposed that information be disseminated via letter drop to local residents and posted at central community points such as shops and on parish notice boards. Further suggestions, noted during the TMP scoping meetings, included posting information on the Welsh Government Traffic website and the possible use of variable message signs.

- 12.7.10.11. Furthermore a channel will be available, most likely by 24 hour phone number, where specific issues and in particularly emergencies, can be brought to the attention of the project team. It is envisaged that this can also be used to highlight any particular maintenance issues as they arise.
- 12.7.10.12. As agreed during the CTMP scoping meeting with DCC and CCBC, a highway condition study will be undertaken along the civil / mechanical construction works traffic route. A review of the before and after condition of the carriageway will be undertaken in order to ascertain any damage caused by the construction traffic.
- 12.7.10.13. It is proposed that a video survey is undertaken prior to the commencement of any works and again upon their completion. This will allow all parties to agree the scope of any issues related directly to the sites construction activities. Given the prolonged period of the construction phase of the Project, it is acknowledged that some emergency works may be required during the construction phase. The details of these works will be discussed and agreed with the relevant highway authority as issues occur.
- 12.7.10.14. It is accepted that the responsibility for any maintenance requirements identified and shown to be as a direct result of site construction traffic, should lie with the RWE NRL. General highway maintenance and all maintenance post-construction will remain the responsibility of the relevant highway authority.

## **12.8. Potential Impacts**

- 12.8.1. The potential environmental impacts as a result of traffic generated during the construction phase of the Project have formed the focus of this assessment. The scope of this assessment is limited to the B4501 and unnamed roads within the forest as well as the highway network utilised for the civil / mechanical construction works traffic route as previously outlined and consideration is given to the possible impacts related to the AIL movements along the proposed AIL route. Given the agreed routeing strategies, traffic increases on the wider highway network will be negligible.
- 12.8.2. In order to identify specific impacts related to the different aspects of the construction phase of the Project, the assessment has been undertaken for two distinct types of generated traffic, namely for construction staff traffic and for civil / mechanical construction works traffic, which also includes the proposed AIL deliveries.
- 12.8.3. Potential effects related to pre-development tree clearance have not been assessed explicitly given the relatively minor increases in anticipated HGV traffic. Similarly potential effects for the operational and decommissioning phases of the Project have not been assessed, given the reduced levels of the generated traffic for both phases in comparison to the construction phase.
- 12.8.4. An assessment of the potential impacts determines the need for mitigation measures, which are discussed in detail within Section 12.9. Therefore, this section does not necessarily reflect the real impacts of the Project. The actual impacts (Residual effects) of the Project are outlined in Section 12.10.
- 12.8.5. It should be noted that the anticipated level of construction traffic to the Application Site has been calculated, based on the site establishment, infrastructure and construction requirements of the development. Subsequently, some aspects of the project have been refined to better suit the revised proposals, as more detail has been established. The anticipated levels of traffic generation for many aspects of the construction operations, as



outlined in section 12.6.2 and summarised in the traffic calculations table included as Annex 12.2, remain representative. However, the envisaged requirement for new access track and spur roads within the Application Site is now known to be significantly less than that accounted for within the traffic calculations, as set out within Chapter 3 - Project Description. As a result, the anticipated levels of traffic generation for these aspects of the operations have been over-estimated. Therefore, in overall terms, the anticipated level of construction traffic generation and hence the assessment of the significance of the resulting environmental effects, is considered robust.

### **12.8.1. Traffic Impacts**

#### **12.8.1.1. Construction Staff Traffic**

12.8.1.2. The hours of construction will be from 0700 to 1900 hours on weekdays and 0700 to 1300 hours on Saturdays.

12.8.1.3. As previously identified, there will be a maximum of 70 staff on-site at any one time throughout the construction phase. The vast majority of staff will remain on-site for the full shift and will therefore be travelling outside of the typical peak hours for background traffic. It has been assumed that general construction staff will be transported to the Application Site via a minibus with an occupancy of five persons per minibus. Specialist contractors may need to travel to the Application Site in their own vehicle.

12.8.1.4. For the purposes of the assessment it is assumed that, in total, up to 66 staff will arrive via minibus and four staff will travel in single occupancy private vehicles, giving a total of 18 inbound trips in the AM and 18 outbound trips in the PM.

12.8.1.5. As the anticipated increases in traffic flow will occur outside of the network peak hours for background traffic and background flows on the network during these time periods are low, it is unlikely that the addition of construction staff traffic will result in operational issues over the highway network of interest. In addition, the temporary nature of the construction phase means that the resultant traffic impact is considered to be insignificant, based on the significance criteria outlined in Table 12.2.

#### **12.8.1.6. Civil / Mechanical Construction Works Traffic**

12.8.1.7. The other traffic associated with the construction phase of the Project will comprise civil / mechanical construction works traffic which, with the exception of concrete deliveries, is expected to arrive and depart the Application Site with an even distribution throughout the twelve hour day, during a five day working week. No significant deliveries are anticipated on Saturdays.

12.8.1.8. It can be seen from Annex 12.2 that civil / mechanical construction works traffic will peak in month 16 with 1,671 general HGV trips required mainly due to the delivery of stone aggregate (assuming borrow pits aren't used). Additionally 128 HGV trips will be transporting concrete on days when the turbine foundations are poured, during which time there will be a significant reduction in general deliveries. For the purpose of this assessment, it has been assumed that the HGVs will operate Monday to Fridays only, which gives an anticipated operational month of 20 days for HGV deliveries. This equates to an average of 84 general HGV trips per day which equates to less than four inbound trips and four outbound trips per hour., On days when foundations are being poured there will be less than six inbound trips and six outbound trips per hour for concrete deliveries and a significant reduction in general deliveries.

12.8.1.9. The anticipated distribution of HGVs is outlined earlier in this Chapter, whereby stone and concrete deliveries are expected to arrive via the northern route with the remainder of the deliveries arriving with an equal split between the northern and southern routes. Therefore, the percentage increases in daily traffic flow on the highway network of interest have been calculated using the agreed background traffic data.

12.8.1.10. These increases are summarised below in Table 12.4.

■ **Table 12.4 Predicted Civil / Mechanical Construction Works Traffic Impact (Two-way) (excludes concrete)**

Road Name	AM Peak (Additional HGV Traffic)	PM Peak (Additional HGV Traffic)	24hr Weekday Average Flows (Additional HGV Traffic)	Percentage Impact (%)
A543 North of B4501	84 (+7)	97 (+7)	1003 (+73)	7.2
A543 South of B4501	84 (+1)	97 (+1)	1003 (+11)	1.0
A544	195 (+7)	196 (+7)	2029 (+73)	3.6
B4501	124 (+7)	100 (+7)	1189 (+84)	7.0

12.8.1.11. Table 12.4 shows that the maximum percentage increase in daily flow is 7.2 % on the A543 north of its junction with the B4501. This is significantly below the 30 % threshold for slight impact as defined in Table 12.2. Further calculation comparing just concrete deliveries of 128 HGV trips over a 12 hour period shows that the percentage increase on the A543 North of the B4501 is 13% ( $100 \times [128/1003]$ ) which is also significantly below the 30% threshold level for a slight impact.

12.8.1.12. Table 12.4 also shows that the anticipated percentage increase in daily traffic flow on the B4501 is 7.0 %. Similarly, concrete deliveries result in a percentage increase at this location of 10%. This impact is based on a background traffic flow taken on the southern spur of the B4501 close to the village of Cerrigydrudion whilst the civil / mechanical construction works traffic route runs along the eastern spur of the B4501, which does not experience the same traffic flow. It is assumed that the eastern spur of the B4501 will have a lower background flow than that experienced on the southern spur and it is therefore noted that this would result in a higher percentage increase than that calculated. However, the overall percentage increase in traffic flow is unlikely to approach the 30 % threshold.

12.8.1.13. The figures shown in Table 12.4 represent the relative growth of background traffic, due to the introduction of the anticipated civil / mechanical construction works traffic at each location. As the available background traffic data is not classified by vehicle type, it is not possible to calculate the percentage increase specific to HGV traffic. However it is noted that the proposals will result in a slight increase in the percentage of HGV traffic in comparison to baseline flows.

12.8.1.14. The civil / mechanical construction works traffic is unlikely to result in operational issues over the highway network of interest, given the temporary nature of the construction



phase and the low background flows observed. The resultant traffic impact is therefore considered to be insignificant, as categorised in Table 12.2.

## **12.8.2 Severance**

12.8.2.1. Severance refers to the level of crossing difficulty for pedestrians, which may be caused by the introduction of additional traffic. The threshold for assessing severance given in EART is that a 30 % increase in traffic will result in a slight severance impact, as previously defined. As detailed in the previous paragraphs, it is unlikely that the anticipated traffic increases will approach this 30 % threshold, despite the low background flows.

12.8.2.2. Pedestrian activity in the vicinity of the Application Site is extremely low due mainly to the very remote nature of the Application Site and this is highlighted by the lack of dedicated pedestrian infrastructure on the surrounding highway network. Therefore, the impact from construction staff traffic and from civil / mechanical construction works traffic on severance is considered to be insignificant based on the significance criteria outlined in Table 12.2.

## **12.8.3 Accidents and Road Safety**

### **12.8.3.1. Construction Staff Traffic**

12.8.3.2. Staff travel will be outside of the typical network peak hours and at times when background traffic flows are likely to be low. However, any increase in traffic can result in the potential for accidents to increase, therefore the impact from construction staff traffic on road safety is considered to be slight, as categorised in Table 12.2.

### **12.8.3.3. Civil / Mechanical Construction Works Traffic**

12.8.3.4. The likely increases in traffic associated with the movement of civil / mechanical construction works traffic and most notably the larger and slow moving AIL vehicles will result in an increase in the potential for accidents, specifically along the AIL delivery route.

12.8.3.5. The potential for accidents has been identified when related to the passing of large HGVs on the single track sections of the route along the B4501 and the unnamed road through to the forest. The anticipated frequency of large vehicles means that there is a requirement for multiple passing manoeuvres. In some instances, the need for a passing manoeuvre may result in vehicles straying beyond the extents of the running carriageway where the risk of either collision or becoming stranded increases. The resultant impact on road safety is assessed as moderate, based on the significance criteria outlined in Table 12.2.

## **12.8.4. Driver Delay**

### **12.8.4.1. Construction Staff Traffic**

12.8.4.2. EART states that driver delay can increase at the site entrance where there is an increase in on-street parking. Parking for construction staff will be provided entirely within the Application Site boundary or at a remote location where staff will then be brought to



the Application Site in mini buses. Therefore any background traffic on the unclassified roads through the Application Site will not be adversely affected.

12.8.4.3. In addition, driver delay can also increase due to increased traffic flows through junctions. Given the fact that anticipated staff vehicle numbers are low and staff travel will be outside of the typical network peak hours, the impact from construction staff traffic on driver delay is considered to be insignificant, as categorised in Table 12.2.

#### 12.8.4.4. **Civil / Mechanical Construction Works Traffic**

12.8.4.5. Civil and mechanical construction works traffic will deliver directly to either the main construction compound or each turbine pad, as required. There is no requirement for these vehicles to load or unload on the public highway and therefore background traffic will not be adversely affected.

12.8.4.6. The anticipated traffic increases from the civil / mechanical construction works traffic, suggest that it is unlikely that background traffic will experience a notable increase in delays due to traffic flows through junctions.

12.8.4.7. The most likely cause for driver delay is during the delivery of the AILs, which will be travelling at slower speeds and may require the use of the full carriageway width when negotiating junctions and tight bends.

12.8.4.8. The resultant impact on driver delay, specifically when related to AIL movements, is therefore considered to be moderate, as categorised in Table 12.2.

#### 12.8.5. **Pedestrian Amenity, Fear and Intimidation**

12.8.5.1. Pedestrian amenity, fear and intimidation are affected by the perceived traffic flow, traffic composition, footway width and its separation away from the carriageway.

12.8.5.2. Due to the remote nature of the Application Site and the limited pedestrian infrastructure on the surrounding highway network, the resultant pedestrian activity is likely to be low. Therefore, the impact from construction staff traffic and from civil / mechanical construction works traffic on pedestrian amenity, fear and intimidation is considered to be insignificant, as categorised in Table 12.2.

### 12.9. **Mitigation**

12.9.1. This section highlights the potential for mitigation measures where a slight or greater impact has been identified. More details relating to proposed mitigation for the ES as a whole can be seen within Chapter 16 (Mitigation & Enhancement).

#### 12.9.1. **Accidents and Road Safety**

12.9.1.1. A moderate impact on road safety has been identified as a result of the additional development traffic. An area highlighted with an increased risk of accidents is the single track section of the B4501 and the unnamed road into the forest. In order to minimise the potential for accidents with civil / mechanical construction works traffic along this section of the route, it has been agreed with DCC that temporary passing places be introduced to allow large vehicles to pass safely, details of which, will be agreed and outlined within the CTMP.

- 12.9.1.2. In addition, the AIL vehicles, which represent an increased accident potential along the complete AIL route, will be escorted by the Police or dedicated escort vehicles. This standard practice will ensure that other road users receive advanced notice of slow moving and large vehicles. The escort vehicles can travel ahead to ensure that junctions and narrow sections of road are clear from vehicles as identified earlier within this Chapter and the TMP.
- 12.9.1.3. The CTMP will be agreed with the affected highway authorities and implemented by the construction contractor. The CTMP is intended, in part, to ensure the safety of all road users. More details are outlined earlier within this Chapter.
- 12.9.1.4. The above mitigation measures mean that the residual effect on road safety from the civil / mechanical construction works traffic, specifically associated with the movement of AILs, albeit temporary, is reduced and considered to be slight. The residual effect from construction staff traffic is considered to be insignificant.

## 12.9.2. Driver Delay

- 12.9.2.1. The impact from civil / mechanical construction works traffic on driver delay has been assessed as moderate due, specifically to the movement of AIL vehicles at junctions and narrow sections of the route. The Police or dedicated escort vehicles will be utilised to minimise delay to other road users by providing a traffic management function at junctions and narrow sections of the route and to allow vehicles to overtake where necessary. An Escort Vehicle Control Strategy has been outlined within the TMP, which highlights sections of the route where traffic will need to be stopped in order to allow the AIL vehicles to pass. The strategy document has sought to locate stopping zones so as to minimise delays to other road users for each of the identified zones.
- 12.9.2.2. Timing of the AIL deliveries will be outlined within the TMP to ensure these vehicles avoid potentially congested networks at peak hours such as Llangollen and Corwen town centres. These measures will help to reduce delay along the entire AIL route.
- 12.9.2.3. The implementation of temporary passing places located along the single track section of the B4501 and unnamed road into the forest, will allow the civil / mechanical construction works traffic to pass without the need for reversing or excessive waiting. Given the implementation of the above mitigation measures, the residual effect related to civil / mechanical construction works traffic and AIL vehicles is considered to be slight.

## 12.10. Residual Effects

- 12.10.1. Table 12.5 summarises the predicted residual effects related to the generated traffic for the Project.

### ■ Table 12.5 Summary of Effects

Potential Impact	Mitigation	Significance of Residual Effect
Traffic Impacts	None	Insignificant
Severance	None	Insignificant
Accidents & Road Safety	Temporary Highway Works, AIL Escort Vehicles, CTMP and TMP,	Slight

	Passing Places	
Driver Delay	AIL Escort Vehicle, CTMP and TMP, Passing Places	Slight
Pedestrian Amenity, Fear & Intimidation	None	Insignificant

## 12.11. Cumulative Effects

### 12.11.1 Identified Sites

12.11.1.1. An investigation into similar developments in the surrounding area has identified four proposals of interest which could result in a cumulative environmental impact related to traffic and transport, given the status of the proposals. It is noted that there is potential for the construction periods for these proposals to coincide with this Project. The locations of the identified wind farm developments identified are shown in Figure 1.3 and are summarised in Table 12.6 below:

■ **Table 12.6 Summary of Cumulative Assessment Sites**

Site	Planning Authority	Number of Turbines
Llys Dymper Wind Farm	CCBC	10
Nant Bach Wind Farm	CCBC	11
Brenig Wind Farm	DCC	16
Derwydd Bach Wind Farm	DCC	10

12.11.1.2. An assessment of the cumulative effects of all five sites is based on the traffic generated during the construction phases of each site and assumes a worst case scenario where all developments are constructed simultaneously.

#### 12.11.1.3. Llys Dymper Wind Farm

12.11.1.4. The Llys Dymper Wind Farm proposal is shown as Site 19 on Figure 1.3. A review of the site location, AIL route and civil / mechanical construction works traffic route has identified that the AIL route is different to that of this Project. Given the location of the Llys Dymper proposal, it is likely that civil / mechanical construction works traffic will utilise the same haulage route along A55, B5381, A548 and A544 before the routes diverge.

12.11.1.5. Overall the Llys Dymper proposal will generate a peak of 146 two-way HGV trips a day during concrete deliveries. The AIL movements will have no potential for any cumulative impact in relation to this Project.

#### 12.11.1.6. Nant Bach Wind Farm

12.11.1.7. The Nant Bach Wind Farm proposal is shown as Site 9 on Figure 1.3. A review of the site location, AIL route and civil / mechanical construction works traffic route has identified that the AIL route is the same as that for this Project. However, given the



location of the Nant Bach proposal, it is likely that civil / mechanical construction works traffic will utilise the A5 trunk road and is therefore unlikely to impact on the same highway network as this Project. No reference has been made to the number of AIL deliveries required for each turbine, therefore it has been assumed that, as anticipated for this Project, each turbine will require 11 AIL deliveries.

12.11.1.8. Overall the Nant Bach proposal will generate up to 110 AIL movements during the construction period. The civil / mechanical construction works traffic will have no potential for any cumulative impact.

#### 12.11.1.9. **Brenig Wind Farm**

12.11.1.10. The Brenig Wind Farm proposal is shown as Site 2 on Figure 1.3. A review of the site location, AIL route and civil / mechanical construction works traffic route has identified that the AIL route is similar as this Project. No reference has been given to the likely route of the civil / mechanical construction works traffic. It has been assumed that this proposal will use the same route as this Project, given its location.

12.11.1.11. Overall the Brenig proposal will generate a peak of 92 two-way HGV trips a day during concrete deliveries. There will be up to 14 AIL movements per turbine, equating to 224 AIL movements in total.

#### 12.11.1.12. **Derwydd Bach Wind Farm**

12.11.1.13. The Derwydd Bach Wind Farm proposal is shown as Site 6 on Figure 1.3. A review of the site location, AIL route and civil / mechanical construction works traffic route has identified that the AIL route is similar to this Project. No reference has been given to the likely route of the civil / mechanical construction works traffic. It has therefore been assumed that this proposal will use the same route as this Project, given its location.

12.11.1.14. Overall the Derwydd Bach proposal will generate a peak of 120 two-way HGV trips a day during concrete deliveries. There will be up to 105 AIL movements in total.

### 12.11.2. **Assessment of Cumulative Impact**

#### 12.11.2.1. **Civil / Mechanical Construction Works Traffic**

12.11.2.2. As outlined within this Chapter the peak civil / mechanical construction works traffic flows for this Project are 84 two-way HGV trips per day.

12.11.2.3. The following cumulative impact assessment assumes a worst case scenario whereby the peak construction periods for each of the identified developments will coincide and the associated civil / mechanical construction works traffic will utilise the haul route from the A55, as appropriate. In total, 442 two-way trips are anticipated over the 12 hr day, which equates to 19 inbound trips and 19 outbound trips, on average, per hour, on the shared sections of the route.

12.11.2.4. Table 12.7 below summarises the anticipated cumulative effects on the civil / mechanical construction works traffic route based on the location of each of the wind farm sites.

■ **Table 12.7 Summary of Cumulative Assessment**

Civil / Mechanical Route Section	Wind Farm Sites that affect the Route	Average Weekday Background Flows	Cumulative Flows	Cumulative Percentage Impact
A55 to A544 at Llansannan	Llys Dymper Brenig Derwydd Bach Clocaenog	2029 (A544)	442	22 %
A544 at Llansannan to A543	Brenig Derwydd Bach Clocaenog	2029	296	15 %
A543 North of B4501	Brenig Derwydd Bach Clocaenog	1003	296	30 %
B4501	Brenig Derwydd Bach Clocaenog	1189	296	25 %

12.11.2.5. Table 12.7 shows that the maximum percentage increase in cumulative daily flows is 30 % north of the junction of the B4501 on the A543, which is at the 30 % threshold for slight impact as defined in Table 12.2.

12.11.2.6. Although a traffic increase of this magnitude is notable in percentage terms, it is considered that this level of increased HGV traffic could be accommodated on the civil / mechanical construction works traffic route. Given the likelihood of all developments proceeding simultaneously and the temporary nature of the anticipated traffic increases along with the mitigation measures that will be implemented as part of this Project, the additional cumulative impact is considered to be insignificant as categorised in Table 12.2.

12.11.2.7. **Abnormal Loads Traffic**

12.11.2.8. Of the sites which utilise the same abnormal route as this Project, there will be a total 439 AIL movements. Additionally, there will be 256 AIL movement generated by this Project for the movement of wind turbine components. Given the potential for disruption inherent in the transportation of AILs, it is proposed that all four sites coordinate AIL deliveries in order to ensure that simultaneous deliveries do not cause unnecessary disruption or other significant impacts for road users. This coordination can be assured by all the Highway Authorities involved by means of the standard process whereby permission is granted for abnormal load movements along the sections of highway within the Authorities' remit. Initial discussions with the Welsh Government has outlined the need for coordination and it is anticipated that a planning tool, such as that used for the mid-Wales wind farm groups would form the best framework for the representatives of the above developments to proceed.

12.11.2.9. Full consideration has been given to the potential for cumulative environmental impacts on the wider highway network due to construction traffic related to this Project in conjunction with other similar proposals in the wider area. It is considered that, along with the points noted above, the cumulative impact of the identified proposals in conjunction with this Project is considered to be insignificant as categorised in Table 12.2.



## **12.12. Conclusion**

- 12.12.1. The environmental impacts of traffic generated by this Project has been assessed with reference to EART guidelines published by the IEA and in consultation with the relevant Highway Authorities and other stakeholders, namely Welsh Government, DCC, CCBC, the NWTRA, Cheshire West and Chester Council, A-one on behalf of the Highways Agency, North Wales Police Authority and Cheshire Police Authority.
- 12.12.2. The likely traffic generated by this Project during the initial pre-development tree clearance period, infrastructure and turbine construction, operation and decommissioning phases has been identified and the site access proposals, and the routing of civil / mechanical construction works traffic and AILs, has been discussed.
- 12.12.3. Temporary mitigation measures required to accommodate the movement of AILs along the proposed route have been identified and the principles agreed with the relevant authorities. Further aspects related to the detailed construction methodology will need to be agreed post consent within a CTMP. Some aspects, specific to the strategic highway network are covered within the TMP.
- 12.12.4. The potential impacts relating to traffic impact, severance, accidents and road safety, driver delay and pedestrian amenity, fear and intimidation have been assessed and where the impact has been identified as slight or greater, mitigation measures have been considered and identified.
- 12.12.5. The residual effects relating to this Project's generated traffic have been reviewed and summarised. This assessment shows that the effects are mainly insignificant with the exception of those on Accidents and Road Safety and Driver Delay where they have been classified as slight when related to the movement of civil / mechanical construction works traffic and AILs.
- 12.12.6. Proposals for other developments in the local and wider area have been identified and an assessment into the possibility of any cumulative effects has been undertaken and reviewed. The assessment shows that the highway network is sufficient to accommodate all anticipated construction traffic, even given a worst case scenario where all developments are constructed simultaneously.
- 12.12.7. In conclusion, this Chapter demonstrates the suitability of the existing and proposed highway infrastructure, to accommodate the likely types and volumes of traffic anticipated throughout the lifecycle of the Project.



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**Appendix 3.13b – Clocaenog Forest Wind Farm Construction Programme**

