

9. Traffic, Transportation and Access

Introduction

- 9.1 This Chapter sets out the transportation, traffic and access assessment for the proposed Upper Ogmore Wind Farm and Energy Storage Facility as described in chapter 3 and referred to as ‘the Proposed Development’. It considers the effect of the anticipated traffic generated during the construction and decommissioning phases of the Proposal.
- 9.2 The main transportation effects will occur during the construction phase of the Proposed Development, and will be associated with the movement of abnormal loads associated with turbine component delivery and heavy goods vehicles (HGVs) delivering construction materials.
- 9.3 Due to grid restrictions, the construction of the Energy Storage Facility (ESF) will occur after the Wind Farm construction is complete. The traffic generated during construction of the ESF is presented but will not be concurrent with the Wind Farm construction and therefore the cumulative transportation effects of the schemes have not been assessed.
- 9.4 Traffic during operation would be limited to periodic visits by a maintenance team travelling in a 4x4 or similar vehicle. There may be an occasional need for HGVs to access the site for maintenance or repairs.
- 9.5 The anticipated operational period of the Wind Farm is 35 years, after which time the turbines will be decommissioned or a new planning application submitted. During decommissioning, most of the components associated with the Wind Farm would be removed and disposed of.
- 9.6 The assessment has been based on guidance given in the Institute of Environmental Assessment’s (1993) Guidelines for the Environmental Assessment of Road Traffic and other related technical and planning guidance on traffic assessment.
- 9.7 This Chapter is supported by Figures 9.1-9.4 in Volume 3.

Scope of Assessment

- 9.8 The scope of the traffic, transportation and access assessment was agreed with the Planning Inspectorate (PINS). The scope included the identification of existing conditions along the proposed access route, including traffic flows and recognised constraints or sensitive locations; and an impact assessment to determine the number and type of construction, operation and decommissioning traffic movements. The scope further required that any traffic management measures

which would be required to ensure road safety are examined, any road improvements are described, including technical drawings; and the preferred route is selected, and any mitigation measures are identified.

- 9.9 The assessment comprises desk-based and site surveys to determine the following:
- The establishment of a preferred access route to the site for abnormal loads and general construction traffic;
 - The anticipated traffic generated by the Proposed Development during construction;
 - The anticipated traffic generated by the Proposed Development during operation and decommissioning;
 - The effect of generated traffic on the preferred route;
 - Mitigation measures proposed to address identified effects, including physical modifications to the highway; and
 - Proposals for addressing the residual effects.
- 9.10 Site visits have been undertaken to inspect existing access arrangements and characteristics of the road network. This assisted in determining requirements for works that may be necessary to support the movement of abnormal loads associated with turbine component delivery and general construction traffic.

Policy context and guidance

- 9.11 The transport and traffic issues described in the following planning advice and guidance documents have been taken into account in this assessment:
- Welsh Government's Technical Advice Note (TAN) 18: Transport.
 - Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment (2004).
 - The Welsh Transport and Planning Appraisal Guidance (2017).
- 9.12 Much of the guidance above addresses developments that generate significant increases in travel as a direct consequence of their business, e.g. retail parks. The traffic generated by the Wind Farm and energy storage facility would almost entirely be limited to vehicle movements relating to the construction and decommissioning phases of the Proposed Development. However, in providing the information required in an Environmental Statement, this section addresses the local short-term transport impacts of the Proposed Development during construction and therefore addresses the issues that would be assessed within a formal transport assessment.
- 9.13 The IEMA Guidelines recommend two rules to be considered when assessing the impact of development traffic on a highway link:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%) and;
 - Rule 2: Include any other specifically sensitive areas where traffic flows will increase by more than 10% or more.
- 9.14 The above guidance is based on knowledge and experience of the environmental effects of traffic. The 30% threshold is based on research and experience, with less than a 30% increase generally resulting in imperceptible changes in the environmental effects of traffic. At a basic level, the guidance considers that predicted changes in total traffic flow of less than 10% create no discernible environmental effect.

Assessment Methodology

- 9.15 The following effects have been assessed as part of this Chapter:
- The volume of construction traffic on the existing traffic flows along the main access route.
 - The disruption to traffic flow and physical effects on the highway caused by the movement of abnormal load vehicles associated with turbine component delivery.
 - The impact of construction and decommissioning traffic.
- 9.16 The impact of the construction traffic on the local road network has been derived from the proportional change in vehicular flows on the local road network compared to the existing flows. The Institute of Environmental Management and Assessment (IEMA) Guidelines to the Environmental Assessment of Road Traffic indicates that changes in traffic flow of less than 30% generally result in slight environmental effects while changes in traffic flows of less than 10% create no discernible effect.
- 9.17 The generated traffic anticipated per day during the construction stages has been estimated and compared to the existing daily traffic flows along the main access route to the site.
- 9.18 The effect of abnormal load vehicles has been assessed as a desk-based exercise using swept path analysis to identify areas of overrun and oversail. This has been used to consider required physical modifications to the highway. The traffic and transportation effects during the operational and decommissioning phases of the Wind Farm have been assessed by considering traffic movements.

Data sources

9.19 Data was sourced from the locations presented in **Table 9.1**:

Table 9.1 Summary of Data Sources

Topic	Source of Information
Existing traffic flows	Department for Transport website
Abnormal loads route	Welsh Government guidance, precedent from other wind farms, site visit and topographic surveys
Topic	Source of Information
Background mapping	Ordnance Survey plans, LIDAR, aerial photography, and topographic surveys

Abnormal Load Delivery Route

Public Road Access Study

9.20 The access study considered various route options to the site. The aim of the study was to determine the route for the major wind turbine component deliveries to the Site with the minimal impact on the road network.

9.21 The access study was based on the following assumptions:

- 7 wind turbines with a maximum tip height of 149.9m would be transported.
- Maximum turbine blade length of up to 51.30m
- Maximum vehicle height of 5m.
- Maximum vehicle gross weight of 140 tonnes.
- Trailers with rear steer capacity would be used for deliveries.
- Full road width would be utilised by delivery vehicles (i.e. both carriageways) where necessary.

Route Selection

9.22 In selecting the preferred route to the site, the following criteria have been considered:

- Maximising the use of trunk roads and primary county roads.
- Delivery route used by existing wind farms near to the site.
- Minimising the distance travelled on the public highway.
- Minimising the effect on sensitive receptors such as schools and residential areas.
- Minimising land take and widening works.

9.23 The preferred route has been selected on the basis that it fulfils each of the above criteria and is considered to be most suitable for transporting abnormal loads. The preferred abnormal load route is shown on Figure 9.1, and is summarised in the following text:

- The abnormal loads will leave Swansea Docks onto the A483;
- travel east along the A483, join M4 at Junction 42;
- leave M4 at Junction 43 onto A465 towards Hirwaun;
- continue along A465 for approximately 30 km until reaching a roundabout;
- exit right off roundabout onto A4061 (Rhigos Road) near Hirwaun;
- continue along A4061 approximately 1km west to a small roundabout;
- exit left off the roundabout and approximately 2.5km further along the A4061 to the Pen y Cymoedd Wind Farm site access;
- continue along Pen y Cymoedd Wind Farm / NRW Forestry tracks for 20km (off the public highway);
- exit left off the NRW Forestry tracks onto the A4107;
- travel east along A4107 for approximately 1km to the Proposed Development site access.

9.24 A swept path analysis of the critical turbine component delivery vehicles has been undertaken. Works to the public highway will be limited to the temporary removal of street furniture. The results of the swept path analysis along the public highway are presented on Figure 9.2. Widening of the existing NRW Forestry track (between the A4061 and A4107) will be required. The results of the swept path analysis along the NRW Forestry track are presented in Figure 9.3. Typical forestry track widening details are presented in Figure 9.4.

Consultation

9.25 A range of consultation has been undertaken for the site. A summary of the consultee responses in relation to the abnormal load delivery route is provided in **Table 9.2**. Bridgend County Borough Council provided additional comments on the preferred construction traffic routes.

Table 9.2 Summary of Consultation Responses

Consultee	Summary of Comments	Response/Action Taken
PINS	A Traffic Management Plan will need to be provided in support of the application. Decommissioning phase shall be included in the ES.	Commitment to producing a Construction Traffic Management in consultation with relevant third parties prior to construction. Decommissioning of the wind included in the assessment.

Consultee	Summary of Comments	Response/Action Taken
Bridgend County Borough Council (BCBC)	<p>The proposed route for transportation of the turbines is considered appropriate as it would have minimal impact on the Highways Network within the BCBC administrative area.</p> <p>Avoid construction / abnormal loads utilising the A4061 from Blackmill through Nant-y-moel, due to issues with bridges and slip planes along the route and planned bridge replacement works.</p> <p>If possible construction traffic should avoid the A4063 / Maesteg Town.</p>	
Neath Port Talbot County Borough Council	No issues on the section of public highway on the abnormal load delivery route.	
Rhondda Cynon Taf County Borough Council	No issues on the section of public highway on the abnormal load delivery route.	
Swansea Council	The route proposed whereby the loads will contra-flow from Swansea docks onto the A483 Eastbound is acceptable in terms of highway structures. The only Swansea Council Bridge crossed will be Baldwins bridge (B324).	Include application for the contra-flow manoeuvre in the Construction Traffic Management Plan.
Network Rail	The proposed route does not affect any Network Rail owned road over rail bridges or tunnels therefore no objection.	
South Wales Trunk Roads	<p>No obvious issues, but advise that due to the length of the load, RES should consider the following:</p> <p>A possible requirement for street furniture to be removed.</p> <p>Traffic Order requirement if the carriageway needs to be shut.</p> <p>Swept Path Analysis</p>	<p>Full SPA undertaken along the delivery route.</p> <p>Include application for Traffic Order in the Construction Traffic Management Plan.</p>
Welsh Government Highways	<p>The weights will not be a problem but highlighted the turbine blades are longer than those delivered for the Pen y Cymoedd Wind Farm.</p> <p>Recommendation to undertake a full swept path analysis (SPA) along the route.</p> <p>In due course you will need to liaise with the Police and our South Wales Trunk Road</p>	Full SPA undertaken along the delivery route.

Consultee	Summary of Comments	Response/Action Taken
	Agent (SWTRA) that normally responds on our behalf to AIL Notifications.	

Baseline Conditions

Existing Traffic Data

9.26 Traffic count data for various locations along the preferred delivery route was obtained from the Department of Transport’s website of Annual Average Daily Flow (AADF) data. This gives the total daily average number of motor vehicles passing the count points in both directions in 2016. The data is summarised on **Table 9.3** below. The background traffic flows along this route are unlikely to change materially prior to commencement of the construction of the proposed Wind Farm.

Table 9.3 - Annual Average Daily Flow (AADF) in Both Directions

Road	Location	AADF	% HGVs
A483	Between Local Authority Boundary and B4290	32,128	2.5%
A483	Between B4290 and M4 Junction 42 Eastern Spur	30,843	2.5%
M4	Between J42 and A48/A483	26,860	6.0%
M4	M4 Main Carriageway between Junction 42 and Junction 43	25,936	5.6%
A465	Between Junction 43 M4 and A48/A474	41,736	4.1%
A465	Between A48/A474 and A4109	31,346	3.7%
A465	Between A4109/A4230 and B4242	22,187	4.4%
A465	Between B42452 and A4109	16,979	5.7%
A465	Between A4109 and Local Authority Boundary	18,119	6.5%
A465	Between Local Authority Boundary and A4059	18,669	4.6%
A4061	Between Hill Street, Treherbert and A465 / A4059	3,262	5.4%
A4107	Between Local Authority Boundary and A4061	1,131	2.3%

Access for General Construction Traffic

Likely Origins/Destinations

9.27 General construction traffic is likely to comprise heavy goods vehicles delivering construction materials, fuel tankers and staff vehicles. A range of general building materials will be required to construct the Upper Ogmore Wind Farm, including concrete and steel for turbine foundations, aggregate for access tracks and crane hardstandings, and power and instrumentation cabling.

- 9.28 The use of site won stone will significantly reduce the volume of stone imported onto the site to construct the site tracks and hardstands. Aggregate and ready mixed concrete will be sourced locally. The origin of staff vehicles and fuel tankers supplying the generators and plant on site during the construction phase is more difficult to predict at this stage.

Assumed Routeing

- 9.29 It is assumed that vehicles from most suppliers based in the area would follow the M4 and A465 onto the A4061 to approach the site from the north along the A4061 and subsequently the A4107. Assessment of the effect of construction traffic on alternative routes has not been undertaken as these routes are considered most likely.
- 9.30 Construction traffic will not be permitted to access the site from the south along the A4061 through Nant y Moel due to issues with bridges and slip planes highlighted by Bridgend County Borough Council. Prior to construction commencing a Construction Traffic Management Plan (CTMP) will be developed in consultation with Bridgend County Borough Council.

Site Entrance

- 9.31 A single site entrance on the A4107 at the location of an existing field entrance, has been identified and verified by subsequent site visits. Modification will be required to facilitate the passage of abnormal delivery vehicles, including earthworks and improved visibility splays. Details are shown on Figure 3.9. This access will be used by all vehicles accessing and leaving the site.
- 9.32 Details of the construction strategy and temporary traffic management measures for the new access will be included in the Construction Traffic Management Plan (CTMP).
- 9.33 Any temporary traffic measures will be in place for as little time as possible, without compromising the health and safety of members of the public.

Predicted Effects

Construction effects

- 9.34 The main transportation effects will occur during the construction stage of the Development. The effects will be caused either by an increase in traffic levels or by physical alterations required to facilitate the passage of abnormal loads.

Wind Farm Traffic Generation

9.35 Traffic will be generated by each of the activities given on **Table 9.4**. For each activity an estimate is given of the total number of journeys anticipated and the maximum number of journeys that may conceivably be made in one day. A journey is considered to be a round trip, where a vehicle travels from its origin to the site then back to its origin. The figures given in Table 9.4 are estimates; there will be days when the activity generates no traffic and days when an activity generates the maximum number of journeys stated.

9.36 The construction period is estimated to be 10 months. Site working during construction would be Monday to Saturday during hours to be agreed with the planning authority, other than during turbine erection and commissioning when the site will work 7 days a week.

Table 9.4 - Traffic Movements during Construction Phase of the Wind Farm

Phase	Purpose	Vehicle	Total journeys	Maximum journeys possible per day	Approximate Month when Deliveries Occur (assumes 10 months programme)
Site Set-Up	Portacabin delivery	Low loader	6	5	1
	Skip delivery	Low loader	5	5	1
	Generator delivery	Low loader	2	2	1
	Water and fuel tank delivery	Low loader	1	1	1
	Excavator delivery	Low loader	5	5	1-2
	Tool container delivery	Low loader	2	2	1-2
	Roller-compactor	Low loader	5	5	1-2
	Articulated dumper truck	Low loader	5	5	1-2
Site tracks & hard standings	Stone for site tracks	Tipper lorry	1012	50	1-5
	Stone for control building and substation compounds	Tipper lorry	105	50	1-5
	Stone for construction compound and gatehouse	Tipper lorry	99	50	1-5
	Stone for pathways	Tipper lorry	16	16	4-10
	Stone for crane hardstanding	Tipper lorry	965	50	1-5
Foundation construction	Excavator delivery	Low loader	2	2	2-3
	Misc works	Backhoe loader	2	2	2-3

Turbine erection	Concrete for turbine foundations, piles & transformer plinths	Mixer truck	420	60	2-5
	Concrete for Comms & Met instruments	Mixer truck	3	3	5-10
	Steel delivery	Flat bed	14	14	2-5
	Foundation bolts or steel insert delivery	Flat bed	7	7	4-5
	Place foundation bolt cage or steel insert	30t to 50t crane	1	1	4-5
	Tower section delivery	Clamp lift trailer	28	8	8-9
	Blade delivery	Extendible trailer	21	6	8-9
	Nacelle	Low loader	7	2	8-9
	Hub and rotor	Low loader	7	2	8-9
	Drive Train	Low loader	7	3	8-9
	Large crane delivery and removal	1000t to 1200t crane	2	1	8-9
	Crane associated equipment delivery and removal	Low loader	20	10	8-9
	Smaller crane delivery and removal	150t to 200t crane	2	1	8-9
Cable Installation	Cable delivery	Flat bed	4	4	5
	Sand delivery	Tipper lorry	86	20	5
	Excavator delivery	Low loader	2	1	5
	Cable laying	Tele handler	2	1	5
Sub-Station and Control Building	Concrete delivery	Mixer truck	73	60	5
	Brick delivery	Flat bed	3	3	5
	Roofing & Cladding	Flat bed	3	3	6-8
	Switchgear	Flat bed	2	2	6-8
Reinstatement	Misc electrical equipment	Flat bed	3	3	6-8
	Removal of temporary compound & gate house stone	Tipper lorry	99	50	10-11
Misc	Removal of temporary hardstanding stone	Tipper lorry	352	50	10-11
	Waste removal	Skip lorry	87	1	1-11
	Water/fuel deliveries	Small tanker	87	1	1-11
Site Demobilisation	Portacabin removal	Low loader	6	6	11
	Skip removal	Low loader	5	5	11
	Generator removal	Low loader	2	2	11
	Water and fuel tank removal	Low loader	1	1	11
	Roller-compactor	Low loader	5	1	8-9

	Dumper truck	Low loader	5	1	11
	Excavator removal	Low loader	5	5	5-11
	Misc works	Backhoe loader	10	2	11
TOTAL Heavy Good Vehicles			3612		
Site Staff and Deliveries	Staff	Cars & minivans	6500	25	1-11
	Miscellaneous deliveries	Vans	1040	4	1-11
TOTAL Cars & Light Good Vehicles			7540		
TOTAL VEHICLES			11152		

- 9.37 The total number of vehicle journeys during the 10 month Wind Farm construction stage is anticipated to be approximately 11,500.
- 9.38 The greatest number of journeys per day would be generated between months five and seven, as several key activities are planned for this period. Experience has shown that most traffic is generated on days when turbine foundations and transformer bases are poured. Each turbine foundation pour would typically require no more than 60 mixer trucks per turbine. As there are 7 proposed turbines, these busy days would only occur 7 times.
- 9.39 The total number of journeys anticipated on a turbine foundation pouring day would be a maximum of 90, allowing for 60 mixer trucks and 5 additional HGVs serving other site activities, and 25 site staff. This equates to a 1% increase in AADF on the A465 near Rhigos, a 5.5% increase on the A4061 Rhigos Road, and a 15.9% increase on the A4107 near the site.
- 9.40 The IEMA Guidelines for the Environmental Assessment of Road Traffic states that it should be assumed that anticipated changes in traffic flow of less than 10% would create no discernible environmental effect.
- 9.41 The 15.9% increase in traffic flows on the A4107 will occur during the pouring of turbine foundation bases. The increase in traffic flows above 10% on the A4107 will be limited to 7 days during the construction period. Given this limited frequency and considering the A4107 is not a sensitive location, the increase in traffic flows on the A4107 will result in imperceptible changes in the environmental effects of traffic.
- 9.42 Given the negligible increase in traffic flows during construction of the Wind Farm there would not be a significant air quality (vehicle emissions) effect, or consequential increase in risk to human health.

Energy Storage Facility Traffic Generation

- 9.43 Due to electricity grid restrictions, the construction of the Energy Storage Facility (ESF) will occur after the Wind Farm construction is complete. The traffic generated during construction of the ESF will not be concurrent with the Wind

Farm construction and therefore the cumulative transportation effects of the schemes have not been assessed.

- 9.44 Traffic will be generated by each of the activities given on **Table 9.5**. The figures given in **Table 9.5** are estimates; there will be days when the activity generates no traffic and days when an activity generates the maximum number of journeys stated.
- 9.45 The construction period is estimated to be 6 months. Site working during construction would be Monday to Saturday during hours to be agreed with the planning authority.

Table 9.5 - Traffic Movements during Construction Phase of the energy storage facility

Phase	Purpose	Vehicle	Total journeys	Maximum journeys possible per day	Approximate Month when Deliveries Occur (assumes 6 months programme)
Enclosure and associated electrical infrastructure installation	Onsite battery container delivery and combined PCS and transformer units	Low loader	24	4	3
Battery delivery	Battery delivery in containers	Low loader	16	4	4
Substation delivery (including Harmonic Filter, PIR, etc.)	Substation delivery (including Harmonic Filter, PIR, etc.)	Low loader	10	2	4
Cable installation	Duct delivery	Flat bed	10	4	1-2
	Cable delivery	Flat bed	6	2	1-2
Enclosure and substation Foundations	Concrete delivery	Mixer truck	1	1	1-2
	Pre-cast concrete delivery	Flat bed	4	2	1-2
TOTAL Heavy Good Vehicles			71		
Site Staff and Deliveries	Staff	Cars & minivans	800	20	1-6
	Miscellaneous deliveries	Vans	200	4	1-6
TOTAL Cars & Light Good Vehicles			1000		
TOTAL VEHICLES			1071		

9.46 The total number of vehicle journeys during the 6 month energy storage facility construction stage is anticipated to be approximately 1,100.

9.47 The greatest number of journeys per day would be generated by staff movements.

9.48 The total number of journeys anticipated on a single day during the construction period would be a maximum of 30. This equates to a 0.3% increase in AADF on the A465 near Rhigos, a 1.8% increase on the A4061 Rhigos Road, and a 5.3% increase on the A4107 near the site. The IEMA Guidelines for the Environmental Assessment of Road Traffic states that it should be assumed that anticipated changes in traffic flow of less than 10% would create no discernible environmental effect.

- 9.49 Given the negligible increase in traffic flows during construction of the Wind Farm there would not be a significant air quality (vehicle emissions) effect, or consequential increase in risk to human health.

Physical Effect

- 9.50 Movement of the turbine components as abnormal loads to the site could have a significant effect if not properly managed. Site visits and desktop studies were undertaken to identify the junctions and bends to be analysed.
- 9.51 The potential effect on the physical layout of the public highway along the proposed access route was assessed using swept path analysis. AutoTRACK software was used to model the movement of an extended transport vehicle suitable for a 51.3m long turbine blade. The analysis was based on Ordnance Survey (OS) MasterMap data and topographic survey undertaken specifically for the Project. The results of the analysis are shown on **Figure 9.2**.
- 9.52 It will be necessary to temporarily remove some street furniture at roundabout locations shown during delivery of abnormal loads. The works will involve creating socketed sign posts, alterations to bollards to allow them to be temporarily removed, and temporary measures to allow overrun of traffic islands. The alterations will be agreed in consultation with the relevant authorities.
- 9.53 Works will be required to create the upgraded site access off the A4107. The traffic management measures associated with creating a safe system of work and a safe environment for road users will be agreed in consultation with Bridgend County Borough Council, prior to construction commencing. The works will be planned to minimise disruption on the A4107.

Operational Effects

- 9.54 After construction, traffic associated with the Wind Farm would be minimal. Site traffic would be limited to small maintenance vehicles carrying crews of two people undertaking general maintenance work and repair. Typically, four maintenance visits would be carried out per month.

Decommissioning Effects

- 9.55 At the end of the 35 year consent period, the Wind Farm and Energy Storage Facility will be decommissioned, or a new planning permission would be required. All items of plant, including the turbines and associated infrastructure, would be dismantled and removed from site. The number of vehicle movements required would be substantially fewer than the number required during construction.

- 9.56 Prior to decommissioning commencing a Decommissioning Traffic Management Plan will be developed in consultation with Bridgend County Borough Council.

Cumulative Effects

- 9.57 Consultation with Bridgend County Borough Council and the Planning Inspectorate has confirmed there are no other wind farms or large infrastructure projects currently in planning or expected to be submitted for planning approval within 10km of the Site.
- 9.58 Therefore, it can be reasonably concluded that no cumulative effects would arise as a result of the Proposed Development as there are no other developments with the potential to significantly impact on traffic or transport in the vicinity.

Mitigation and Enhancement

Highway Improvement Works

- 9.59 It is proposed to improve the existing field entrance to facilitate the movement of both abnormal loads and general construction traffic to and from the site. At present the existing site access has inadequate visibility splays to the west. This can be resolved by further cutting back the existing road cutting to achieve the minimum 120 m visibility in each direction.

Traffic Flow Mitigation

- 9.60 Various mitigation measures have been included in the design to reduce the anticipated traffic generated from the construction works. It is proposed to source stone from two on site borrow pits, significantly reducing the number of stone deliveries to the site. Detailed design of the tracks and hardstandings will aim to achieve a cut/fill balance; any excess spoil will be retained rather than removed from site, thereby avoiding the need for additional HGV trips.

Traffic Management Mitigation

- 9.61 Although the preferred route has been chosen to minimise potential disruption to traffic, the movement of abnormal loads and other construction traffic still has the potential to create an effect on other road users. Therefore, the following mitigation measures are proposed to ensure highway safety:
- Deliveries would be scheduled in consultation with the appropriate authorities to minimise disruption as far as reasonably practicable.
 - The police would be notified of the movement of abnormal vehicles and authorisation would be obtained prior to any abnormal vehicle movements. Any movements will comply with legislation regarding the movement of

abnormal loads e.g. notice procedures will be accompanied by a police escort where required.

- Maximum of four abnormal vehicles in any one convoy unless agreed beforehand with the relevant authorities.
- Marking of vehicles as long/abnormal loads.
- Warning signs to advise other road users of 'Caution Slow Plant Turning Ahead' would be placed at intervals from both directions along the A4107 approaching the site entrance during the construction phase.

9.62 A CTMP will be agreed with the relevant Highways Authorities and the police prior to any works being carried out and would be implemented during the construction phase in consultation with the relevant authorities.

Video Footage and Road Repairs

9.63 Video footage of the pre-construction phase condition of public roads agreed with the Highways Authorities would be recorded around the site entrance and access routes to provide a baseline record of the state of the road prior to any construction work commencing. This would enable any repairs and maintenance work required to the road due to any damage caused by the passing of heavy vehicles associated with the Wind Farm construction to be identified following the construction phase. The roads would be returned at least to the baseline condition at the end of the construction phase. Any damage caused by Wind Farm traffic during the construction period that would be hazardous to public traffic would be repaired immediately.

Operational Mitigation & Enhancement

9.64 Traffic during operation of the Wind Farm will be minimal, with weekly maintenance visits by one vehicle. Mitigation should not be required. In the unlikely event of a component failure, a replacement will be brought to the site. This movement will be handled in the same manner as during the construction phase.

Decommissioning Mitigation & Enhancement

9.65 Traffic to and from the site will be managed in the same way as during the construction phase. A traffic management plan will be agreed with the relevant Highways Authorities and the police prior to any works being carried out and would be implemented during the decommissioning phase in consultation with the relevant authorities.

Residual Effects

- 9.66 In general, daily traffic flows along the anticipated construction traffic route will increase by no more than 7% during peak delivery days in the 10 month Wind Farm and 6 month energy storage facility construction period. The Institute of Environmental Assessment's Guidelines for the Environmental Assessment of Road Traffic states that it should be assumed that anticipated changes in traffic flow of less than 10% would create no discernible environmental effect.
- 9.67 The 15.9% increase in traffic flows on the A4107 will occur during the pouring of turbine foundation bases. The increase in traffic flows above 10% on the A4107 will be limited to 7 days during the construction period. Given this limited frequency and considering the A4107 is not a sensitive location, the increase in traffic flows on the A4107 will result in imperceptible changes in the environmental effects of traffic.
- 9.68 The physical works associated with improving the existing access from the A4107 will have a temporary impact on traffic flows. Temporary traffic management measures will be required to create a safe environment for road users. Through consultation with Bridgend County Borough Council and implementation of the CTMP the impact will be minimised.
- 9.69 The movement of turbine components to site as abnormal loads will create disruption for oncoming traffic and those following the abnormal loads on the delivery route as the vehicles will require the full width of the carriageway at various points. Following traffic will be delayed because the abnormal load convoy is likely to travel more slowly than general traffic, although opportunities for overtaking will be provided where possible. Oncoming traffic will be delayed when held by the police to enable the abnormal loads to pass.

Conclusion

- 9.70 This assessment demonstrates that the construction of the Upper Ogmere Wind Farm would result in a short-term increase in traffic levels on identified sections of the A4107, A4061, and A465. These increases are considered to be insignificant due to the expected low percentage increase in traffic on these roads.
- 9.71 A suitable route for transporting abnormal loads has been identified and received no objections from the local Highway Authorities, Network Rail, or South Wales Trunk Roads. Abnormal loads would be scheduled to occur during off-peak periods, at times to be agreed with the Police and the local authorities. The residual effect would therefore be minimal.

- 9.72 Works to create the upgraded access off the A4107 will be planned and agreed in a CTMP in consultation with Bridgend County Borough Council. Implementation of the CTMP will minimise the temporary disruption to road users. The residual effect would therefore be minimal.
- 9.73 Traffic generated during decommissioning of the Wind Farm will be lower than the levels associated with the construction. A Decommissioning Traffic Management Plan (DTMP) will be developed in consultation with Bridgend County Borough Council. Implementation of the DTMP will minimise the temporary disruption to road users. The residual effect would therefore be minimal.