

Appendix 12.1 Traffic and Transport Volumes

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Appendix 12.1 Traffic and Transport Volumes

Introduction

This document sets out estimates of traffic volumes during the main construction period of the Revised Development, which is anticipated to have a 12 month duration. The estimates are collected together and summarised in Table 12.3 of the ES, which is intended to indicate maximum traffic volumes generated by the Revised Development in a typical week for each of the construction phases. Table 12.3 is not to be taken as definitive in terms of traffic movements on any particular day, but can be regarded as a reasonable guide as to what would be expected at the highest level of activity in each construction phase. The permitted hours for deliveries to the site are anticipated to be 7am – 7pm Mondays to Fridays and 7am – 1pm on Saturdays.

Preliminaries, Mobile Plant and Equipment

Prior to the start of the main construction works, a small number of HGVs will access the site, transporting initial construction equipment, site accommodation and supplies. It is estimated that this would consist of approximately 10 deliveries of initial construction equipment, site vehicles, site offices, welfare facilities and supplies. These deliveries are envisaged to take place over a one week period.

Earthmoving equipment for access track construction and turbine foundation excavation will account for the large majority of plant movements. An estimated 12 major items of plant will need to be brought in during the start-up phase (week 1 – 2), at an average of 2 per day for 6 days (one week). This equipment will be removed from site at a similar rate towards the end of the main construction phase around the end of week 26.

Operatives, Staff, and Visitors

The number of construction personnel working on site will be approximately 45 (although numbers will vary throughout the construction phase). Site personnel will be transported to and from the site by private, light vehicles and will be encouraged to car share wherever possible. It is estimated that this will peak at 90 movements per day or 495 movements per week (90 daily movements x 5.5 working days).

Imported Stone

Stone will be required to construct additional site roads to access some of the outlying turbine locations. The finalised layout for the Revised Development, as shown on ES Figure 3.5, involves the re-use of the existing tarmac surfaced coal haul road that runs from Junction 11 of the M74 motorway through the centre of the site. This asset significantly reduces the amount of new roadway required to construct the Revised Development. There is a requirement to construct some 5km of new roadway.

The usable width of new roadway should be a minimum of 5m, with an average stone thickness of 500mm.

As much of the site has been heavily disturbed by opencast mining, the ability to identify locations on site to win suitable road-making stone is limited. Therefore, the assessment has been undertaken on the basis of importing the stone required to construct the remaining spur roads and upgrading of existing tracks to reach the outlying turbines. Access to the site direct from the motorway network means that the importation of stone and construction materials does not need to pass through any nearby communities or directly past any sensitive receptors to reach the site. Stone delivery movements have been calculated on the basis of a rock density of 1.8t to the cubic metre and it is anticipated that given the access from the motorway network that stone will be delivered to site in articulated HGVs with 20t payloads.

Stone Delivery - Track Construction Movements

As noted above, stone will be delivered to site via the direct access from Junction 11 of the M74 motorway in HGVs with a 20T payload capacity. All stone deliveries to site will be made on weekdays between 7am and 7pm and on Saturday from 7am to 1pm. The table below sets out the stone delivery requirements for the additional roadway formation.

Total Volume of Material (m3)	Total Weight of Material (t)	Total Number of HGVs (20t/load)	Total Number of Movements	Delivery Duration
12,500	22,500	1,125	2,250	Week 2 - 17

Stone Delivery - Crane Pad Construction Movements

Stone will also be required to construct the crane pad and laydown areas at each turbine location. The table below sets out the stone delivery requirements for the crane pad formation.

Total Volume of Material (m3)	Total Weight of Material (t)	Total Number of HGVs (20t/load)	Total Number of Movements	Delivery Duration
9,750	17,550	878	1,756	Week 15 - 24

Stone Delivery – Construction Compound, Batching Plant and Substation

Stone will also be required to construct the base of the construction compound, Batching Plant and substation. The table below sets out the stone delivery requirements for the compound formation.

Total Volume of Material (m3)	Total Weight of Material (t)	Total Number of HGVs (20t/load)	Total Number of Movements	Delivery Duration
5,800	10,440	522	1,044	Week 1 - 2

Stone Delivery – Miscellaneous Movements

A nominal additional amount of externally quarried materials has been allowed for over the first 18 weeks of construction (excluding the first week of mobilisation) to provide for miscellaneous tasks such as making up levels beneath foundation slabs, and providing bedding for culverts and electricity cables etc. An estimated 1,800 tonnes would be delivered in average 20 tonne loads. Deliveries would be intermittent, but for the purposes of the transport assessment deliveries have been averaged over the 18 week period as set out in the table below.

Total Volume of Material (m3)	Total Weight of Material (t)	Total Number of HGVs (20t/load)	Total Number of Movements	Delivery Duration
1,028	1,800	90	180	Week 2 - 19

Concrete – Turbine Foundations

For transport assessment purposes, it has been assumed that all 13 turbines will have gravity base foundations. An allowance for some stone infill at each base has also been included should there be a need to make up levels beneath foundation slabs as explained above.

Assuming gravity foundations for all turbines, approximately 500m³ of concrete will be required for each slab. This calls for delivery of 63 ready mix loads per base, assuming 8m³ per wagon, equating to 819 loads in total. The programmed rate of foundation construction (taking into account weather delays etc) is an average of 1.25 foundations per week between weeks 7 - 18. This results in an average of 81 concrete deliveries per week during that period as set out in the table below.

Total Foundation Volume (m3)	Readymix Lorry Capacity (m3)	Total Number of Readymix Lorries	Total Number of Movements	Delivery Duration
6,500	8	813	1,626	Week 7 - 18

On-site readymix batching options will be considered which would reduce the number of readymix deliveries required.

Concrete – Substation

An allowance of approximately 270m³ of concrete has been made for the substation works as set out in the table below.

Total Foundation Volume (m3)	Readymix Lorry Capacity	Total Number of Readymix Lorries	Total Number of Movements	Delivery Duration
270	8	34	68	Week 23

Reinforcement Steel and Foundation Parts

The amount of steel reinforcement required in each turbine foundation depends upon the design finally adopted, but each foundation will require approximately two deliveries of reinforcement. The rate of delivery would need to match the foundation construction rate. Therefore 26 deliveries of steel will be required over the period between weeks 7 - 18.

Foundation bolts or inserts may also be required. These are steel sections which are cast into the concrete foundation and used for connecting the foundation to the wind turbine tower. Foundation parts typically require a further one load per two turbines. Therefore, there will be a total of 33 HGV deliveries of reinforcement steel and foundation parts between weeks 7 – 18.

On-site Electricity Cabling

The electrical cable for the wind turbine power distribution will be delivered in cable drums by flatbed HGV. Cables will be laid in trefoil formation, with an overall requirement for approx. 11,000m x 3, or 33,000m, plus a further 11,000m of earthing cable. This is likely to be delivered in 500m reels, with each flatbed HGV carrying 9 reels. The total number of deliveries generated by the on-site cable requirement is set out in the table below. These will be brought to site in a 4 week period between weeks 13 – 16.

Total Length of Cable Run (m)	Length per Drum (m)	Total Number of Drums	Drums per Lorry	Total No. of Lorries	Total No. of Movements	Delivery Duration
44,000m	500m	88	9	10	20	Week 13 - 16

Fuel and Oil

The fleet of earthmoving equipment required on site will be at its peak during the first 26 weeks of the construction project during the construction of additional roads, crane pads, cable trenches etc. It is estimated that an average of two tanker loads of gas oil each week, and one delivery of lubricants will be required for the first 26 weeks. In the remaining weeks, fuel and oil requirements are much reduced.

Miscellaneous Materials and other Items

In addition to the deliveries specifically identified above, a range of materials will be required, including formwork for concrete foundations, geotextiles, ducting, control cabling, plastic pipes for culverts, building materials for the sub-station, fencing etc. These items are difficult to quantify individually since precise requirements will depend upon final designs and conditions actually encountered. An allowance of 5 HGV deliveries per week has therefore been made between weeks 2 – 26.

Transformers & Switchgear

For each turbine, one flatbed HGV delivery will be required over a 9 week period between weeks 31 - 39. A total of 15 loads will therefore be transported to site over a period of 9 weeks, assumed to be the equivalent of a maximum 2 deliveries each week.

Turbine Components

The turbines are broken down into components for transport to site. The main component sections are classified as Abnormal Loads due to their weight, length, width or height when loaded and will be delivered to site on oversize transporters (OST). For the purposes of the assessment, 'worst case' transport numbers and component dimensions have been generated by using the standard transport dimensions for the Vestas V136m turbine with an individual blade length of 66.5m which represents the maximum blade length which may be used at the site dependent upon final turbine choice.

Component	Number per Turbine	Method of Transport
Tower base	1	OST
Mid tower	1	OST
Top tower	1	OST
Nacelle	1	OST
Generator	1	OST
Hub	1	OST

Component	Number per Turbine	Method of Transport
Rotor blades	3	OST
Site Parts (shared containers)	0.5	HGV
Total Deliveries per Turbine	9.5	Various
Number of Turbines	13	-
Total Turbine Component Deliveries	124	Various

The turbine components will be delivered to site during a 6 week period between weeks 28 – 33.

An overview of the main turbine transport vehicles is shown in Annex 1 for information.

Handling Cranes

It is estimated that four handling cranes will be required on site for the 9 week turbine erection period which is estimated to take place between weeks 31 – 39. The cranes will arrive on site at the end of week 30 and remain there until the completion of turbine erection. Example crane types are shown in the table below.

	Crawler crane		Wheeled crane	
Crane type	600t	750t	600t	750t
Length / basic unit	11.70m	11.70m	20.00m	20.00m
Width / basic unit	10.50m	10.50m	3.00m	3.00m
Track gauge	10.50m	10.50m	3.00m	3.00m
Supporting base	/	/	14.00m × 14.00m	14.00m × 14.00m

We have allowed for 35 HGV movements to bring the crane and associated equipment to site during week 30 and the same for removal of the cranes during week 40.

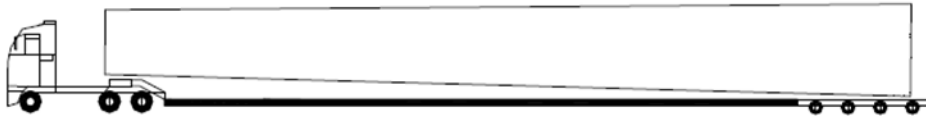
Site Reinstatement at end of Construction Phase

An allowance has been made for the removal of remaining temporary items of plant, office buildings etc at the end of the construction phase. An allowance of 20 HGV movements over weeks 51 – 52 has been made for this purpose.

Annex 1 – Overview of Main Turbine Transport Vehicles

Source: Enercon GmbH - UK

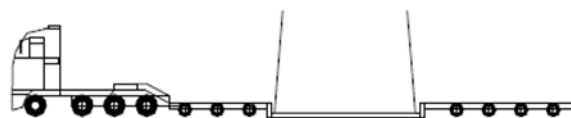
Semi transport truck – Steel tower sections



Adapter vehicle – Steel tower sections



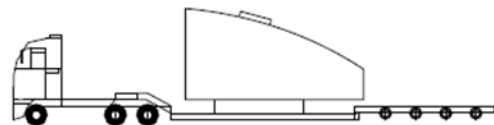
Flatbed transport truck – Precast concrete tower



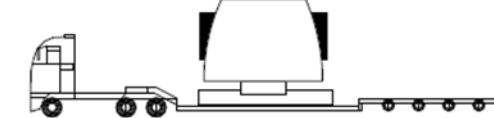
Semi transport truck – Generator



Flatbed transport truck – Machine house



Flatbed transport truck – Hub



Extendable semi transport truck – Rotor blade

