

Technical Appendix 9.1: AIL Route Assessment

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1.1 Introduction

- 1.1.1 The Abnormal Indivisible Loads (AIL) route access study is to assess the transportation of wind turbine components to the proposed Cairnmore Hill Wind Farm (proposed development) site entrance near Thurso in the Highlands.
- 1.1.2 The road routes as detailed herein are for the road transport of the candidate turbine Vestas V117 turbine blades, Nacelles and associated tower components.
- 1.1.3 The site is located near Thurso. The purpose of this report is to detail access to the entrance of the proposed development wind turbine from Scrabster harbour, A9 and A836.



1.2 Methodology

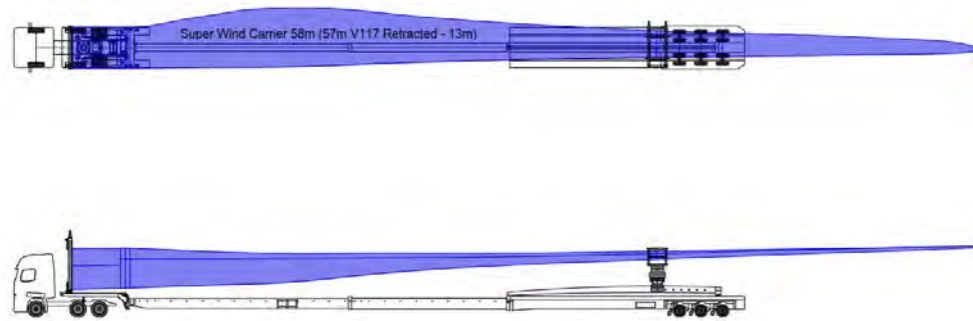
- 1.2.1 All drawings are produced using Ordnance Survey 'OS master map' mapping data, unless stated otherwise. Street furniture is not included on OS MasterMap data. This is plotted by taking measurements on site with a tape. Actual road widths are also checked and adjusted on the map data accordingly. Where adjustments to the OS MasterMap data have been made this is indicated as adjusted on the drawing. Topographic surveys have been carried out around Scrabster port at the selected piers to gather accurate locations of road widths, buildings etc.
- 1.2.2 Manual steering indicates that the steering of the rear axle is controlled by an operative using an override device. Manual steering can be used to achieve alternative swept areas where appropriate.

1.3 Route

- 1.3.1 Exiting the Queen Elizabeth pier, careful attention around the bollards and warehouse must be taken with great care. The left turn onto the A9 will require removing some of the fencing to clear the concrete wall with use of the scissor lift type system or 45-degree lifter support technology may be suitable. The trailer body and load will over sail the rocky wall (inner corner) before straightening up and avoiding the electrical building which sits on the corner of the Queen Elizabeth Pier. When exiting onto A9, attention must be made to the cliff edge of the coastal slope on the opposite side.
- 1.3.2 Option 2 will require the blade delivery vehicle to exit the St Ola pier. When leaving the pier and turning left onto the A9 some of the road blocks and a section of Armco barrier will have to be temporarily removed. This will allow the tip end of the load to sweep round onto the main road with ease as the wheel tracks will take the shorter route. The car park/waiting area would have to be cleared and emptied to allow for the manoeuvre.
- 1.3.3 The Jubilee Quay will be used for delivering nacelles and associated tower components. No street furniture will have to be removed on the initial right hand turn although careful attention must be made to the storage building on the inner corner as the rear tyres will mount the kerb. Approaching the junction for the A9 to turn left a slow manoeuvre will be required avoiding the inner concrete post/chain-link fence, building on the opposite side of road and wall to car park entrance where there is a change in level. Traffic signalling may have to be added for oncoming traffic into the harbour.
- 1.3.4 On the approach to Pennylands junction the vehicle will run close to the kerb before crossing the road and heading into the turning area bearing left. Over sail will occur only on highways avoiding any street furniture located on the left-hand side. The lamppost located on the grass verge will have to be temporarily removed to allow over sail. Once the vehicle manoeuvres through the turning area and exits while bearing left, the inner corner will avoid any over sail onto third party land. As the vehicle straightens up onto the A836, manual steering will be applied where only over sail over the stone wall and grass will occur.
- 1.3.5 After travelling 3.5 miles from Pennyland/Burnside to the site entrance (58.600619, -3.628391) along the A836 to Forss the vehicle will bear left into the newly constructed access track. Over sail will only occur on highways land opposite the junction avoiding the stone wall as the blade turns in. Light reflector verge posts will be removed upon construction of the entrance and replaced with appropriate signage.

1.4 Summary

- 1.4.1 This report comprises a study of the road and routes as detailed here in for the road transport of Vestas V117 Turbine blades and towers to entrance of Cairnmore Hill Wind farm from the port of Scrabster.



1.5 Modifications of street furniture

1.5.1 Street furniture removal will be required at a number of locations:

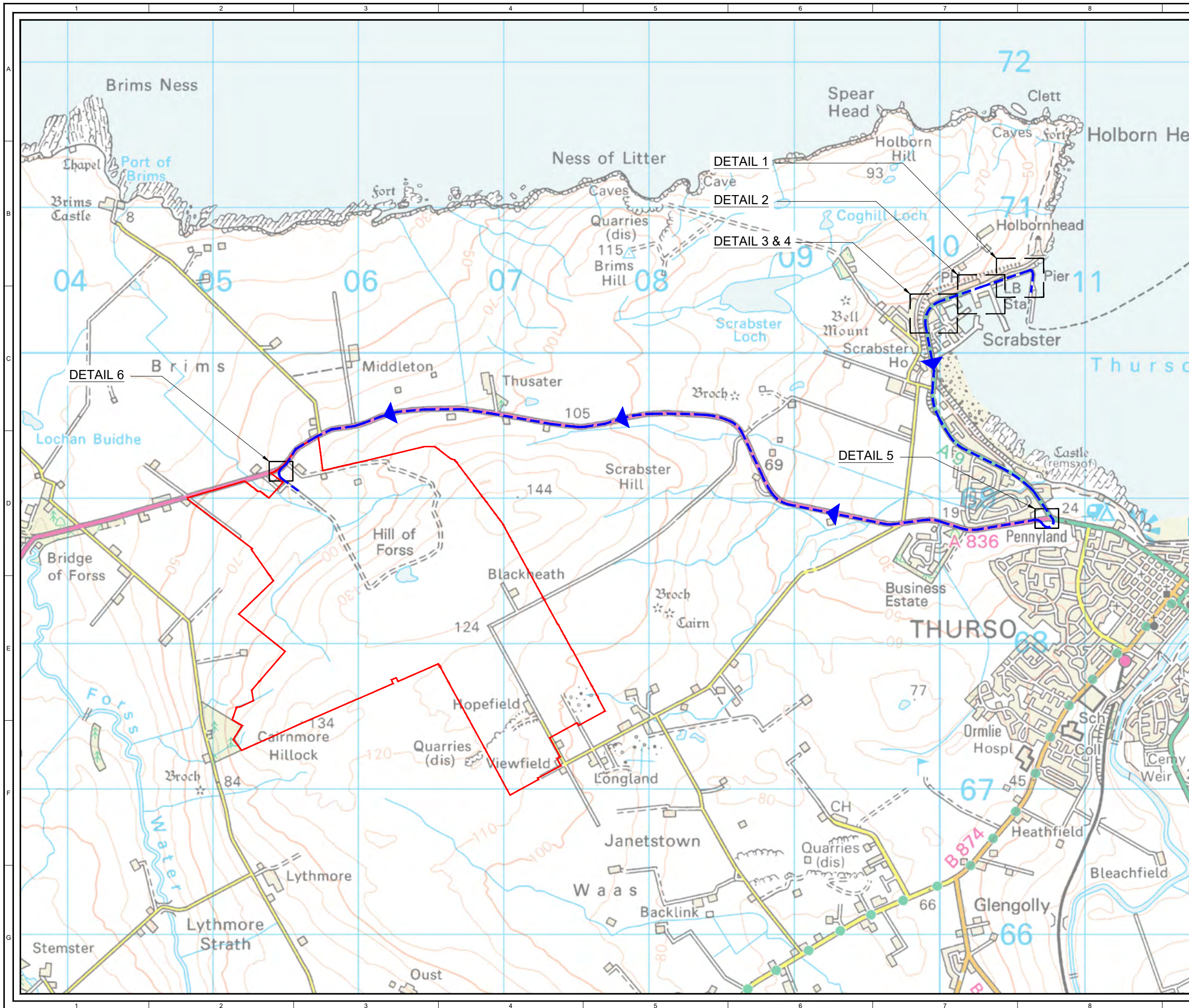
- Queen Elizabeth pier
- St Ola Pier
- Jubilee Pier
- Pennylands Junction
- A836 (Site Entrance)

1.5.2 Manual steering will be required on the route at the following locations:



- Queen Elizabeth pier
- Jubilee Pier
- A9 from Scrabster Harbour
- Pennylands Junction
- A836 (Site Entrance)


1.6 Other Areas of Note

Tree pruning of branches overhanging highways land is required to create 6.5 m x 5.85 m envelope to meet the Vestas road and crane specification.




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KEY
 PROPOSED DELIVERY ROUTE
 SITE BOUNDARY
 (INSIDE OF LINE DENOTES BOUNDARY)

KEY:
 SITE BOUNDARY
 (INSIDE OF LINE DENOTES BOUNDARY)




OVERVIEW SHEET 1 OF 5

05	SDN	SV	JC	18-09-2019	SITE BOUNDARY CHANGE
04	SDN	SV	JC	10-05-2019	VEHICLE MODEL UPDATED
03	SDN	-	JC	07-10-2016	UPDATE FOR LARGER BLADE
02	JB	ML	SF	17-07-2013	UPDATED BLADE LENGTH
01	JB	SF	SF	07-06-2013	FIRST ISSUE
ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	N/A				T-LAYOUT NO. N/A

DRAWING NUMBER
03022D2401-05

COORDS BRITISH NATIONAL GRID


PURPOSE PRELIMINARY

SCALE 1:25,000 ORIGINAL PLOT SIZE A3

PROJECT TITLE
CAIRNMORE HILL WIND FARM

DRAWING TITLE
DELIVERY ANALYSIS

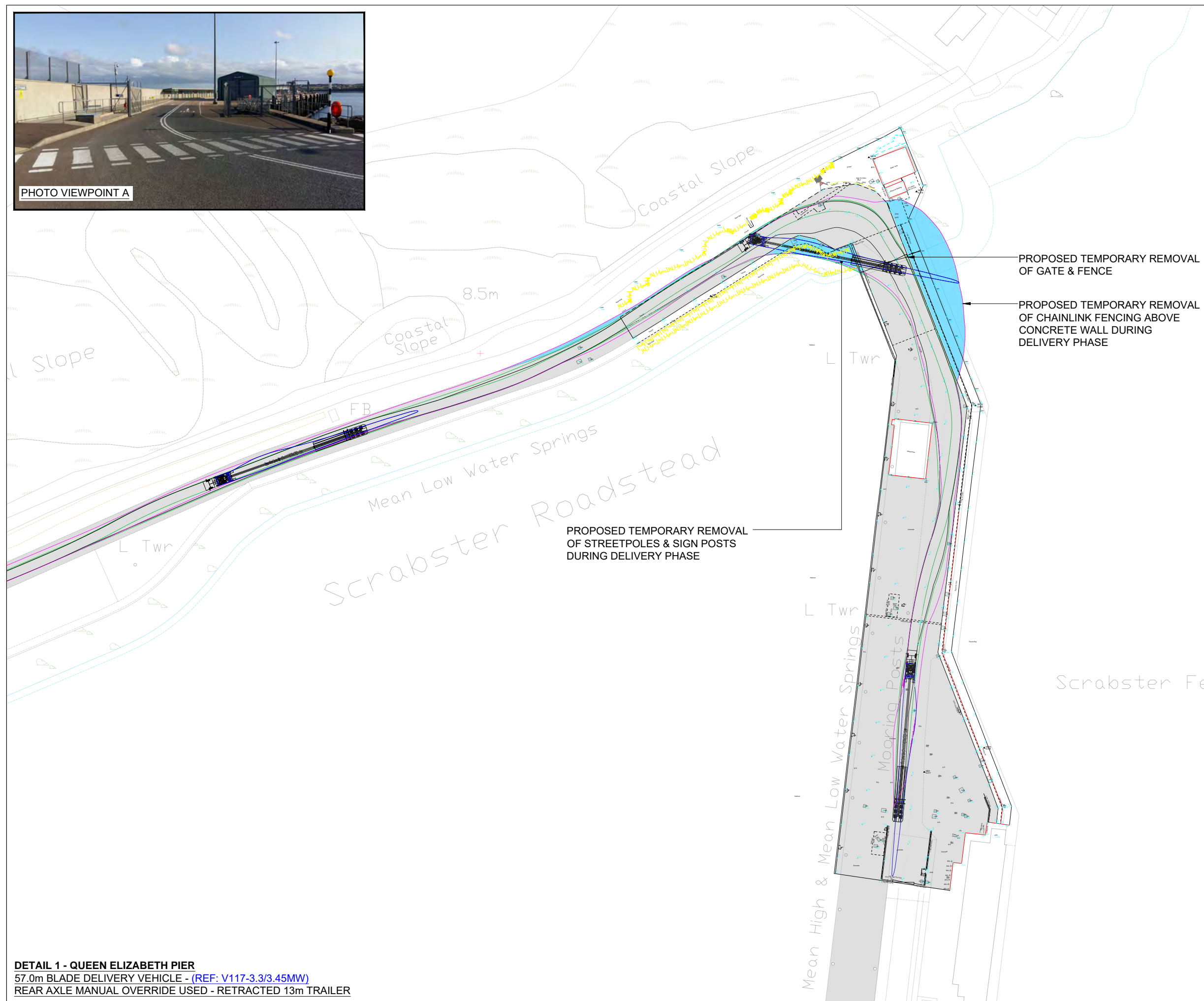
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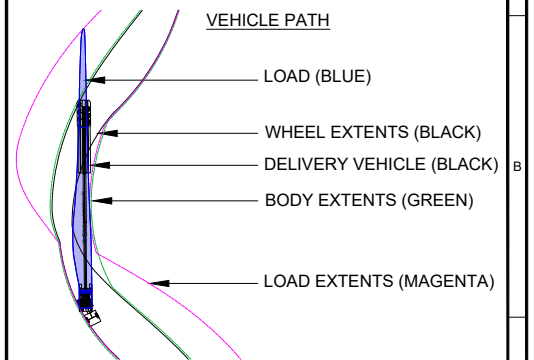


PHOTO VIEWPOINT A



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- KEY:**
- EXISTING ROAD/TRACK SURFACE
 - OVERSAIL
 - PHOTO VIEWPOINT LOCATION



ANALYSIS CARRIED OUT FOR:
57m V177 DELIVERY VEHICLE SUPER WIND CARRIER.
ALL VEHICLE DIMENSIONS SHOWN ARE TYPICAL, FOR INDICATION ONLY.
(REAR STEER VEHICLE)

**DETAIL 1
SHEET 2 OF 7**

05	SDN	SV	JC	18-09-2019	SITE BOUNDARY CHANGE
04	SDN	SV	JC	10-05-2019	VEHICLE MODEL UPDATED
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ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	N/A			T-LAYOUT NO.	N/A

DRAWING NUMBER
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PURPOSE PRELIMINARY

SCALE 1:1,000 **ORIGINAL PLOT SIZE** A3

PROJECT TITLE
CAIRNMORE HILL
WIND FARM

DRAWING TITLE
DELIVERY ANALYSIS

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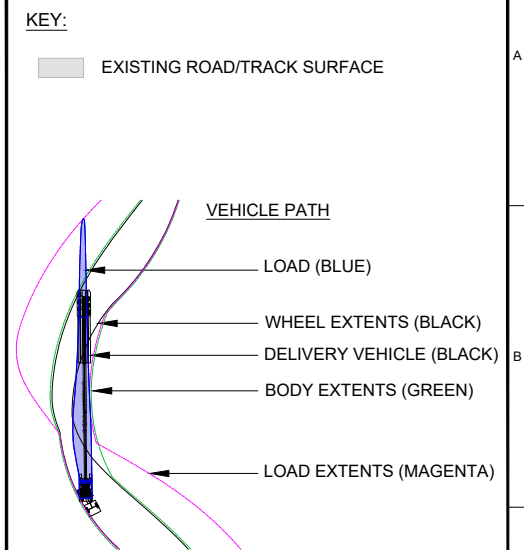
DETAIL 1 - QUEEN ELIZABETH PIER
57.0m BLADE DELIVERY VEHICLE - (REF: V117-3.3/3.45MW)
REAR AXLE MANUAL OVERRIDE USED - RETRACTED 13m TRAILER





DETAIL 2 - ST OLA QUAY
 57.0m BLADE DELIVERY VEHICLE -
 (REF: V117-3.3/3.45MW)
 REAR AXLE MANUAL OVERRIDE USED -
 RETRACTED 13m TRAILER

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 57m V117 DELIVERY VEHICLE SUPER WIND CARRIER.
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**DETAIL 2
 SHEET 3 OF 7**

05	SDN	SV	JC	18-09-2019	SITE BOUNDARY CHANGE
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PURPOSE PRELIMINARY

SCALE 1:1,000 ORIGINAL PLOT SIZE A3

PROJECT TITLE
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DRAWING TITLE
 DELIVERY ANALYSIS

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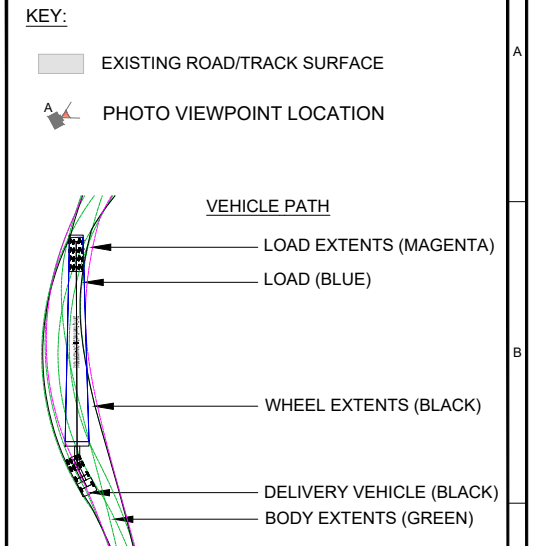


PHOTO VIEWPOINT A



DETAIL 3 - JUBILEE QUAY
 36m Top Tower Fixed Dolly EN01-003797
 REAR AXLE MANUAL OVERRIDE USED

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ANALYSIS CARRIED OUT FOR:
 36M TOP TOWER FIXED DOLLY.
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 (REAR STEER VEHICLE)

**DETAIL 3
 SHEET 4 OF 7**

05	SDN	SV	JC	18-09-2019	SITE BOUNDARY CHANGE
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ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
LAYOUT DWG	N/A			T-LAYOUT NO.	N/A

DRAWING NUMBER
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 PURPOSE PRELIMINARY
 SCALE 1:1,000 ORIGINAL PLOT SIZE A3

PROJECT TITLE
**CAIRNMORE HILL
 WIND FARM**

DRAWING TITLE
DELIVERY ANALYSIS

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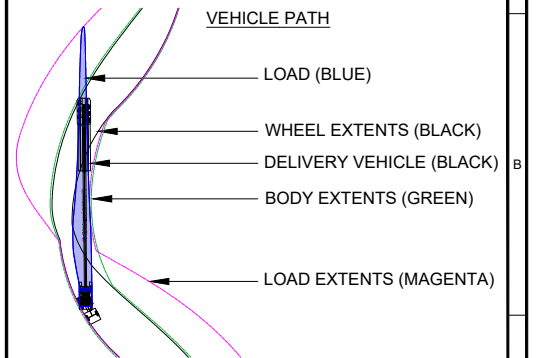


PHOTO VIEWPOINT A

DETAIL 4 - TURN ONTO A9
 57.0m BLADE DELIVERY VEHICLE -
 (REF: V117-3.3/3.45MW)
 REAR AXLE MANUAL OVERRIDE USED -
 RETRACTED 13m TRAILER

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ANALYSIS CARRIED OUT FOR:
 57m V117 DELIVERY VEHICLE SUPER WIND CARRIER.
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 (REAR STEER VEHICLE)

**DETAIL 4
 SHEET 5 OF 7**

05	SDN	SV	JC	18-09-2019	SITE BOUNDARY CHANGE
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PURPOSE PRELIMINARY

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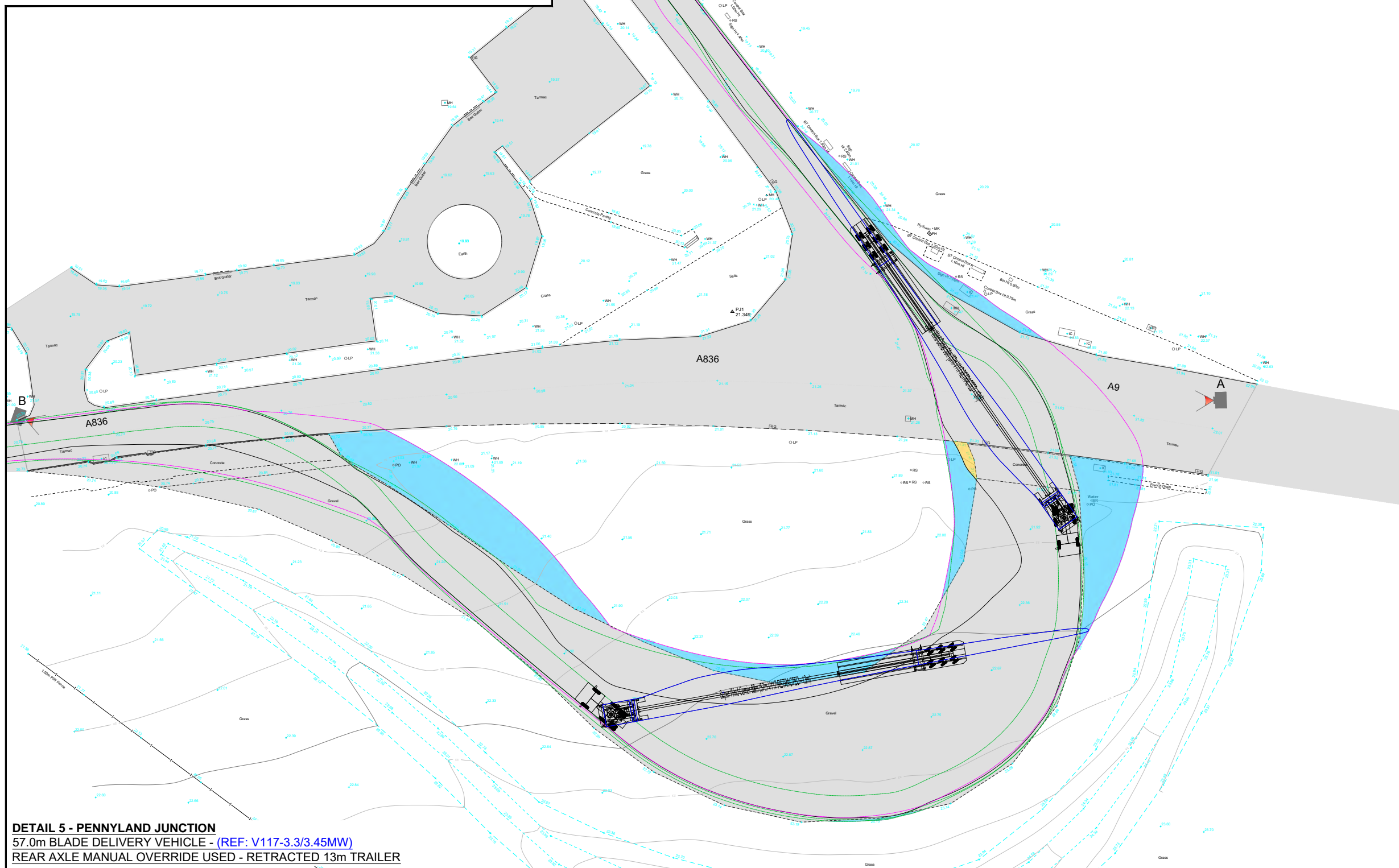
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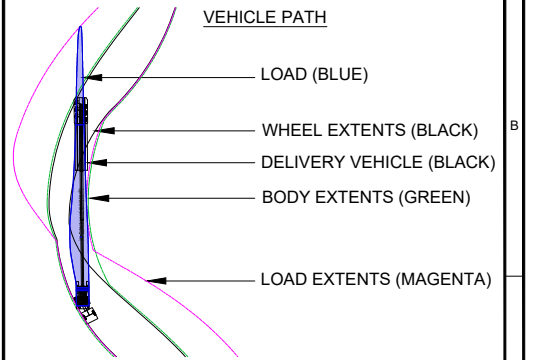
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KEY:

- EXISTING ROAD/TRACK SURFACE
- OVERSAIL
- OVERRUN
- PHOTO VIEWPOINT LOCATION



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DETAIL 5
SHEET 6 OF 7

05	SDN	SV	JC	18-09-2019	SITE BOUNDARY CHANGE
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PURPOSE PRELIMINARY

SCALE 1:500 ORIGINAL PLOT SIZE A3

PROJECT TITLE
**CAIRNMORE HILL
WIND FARM**

DRAWING TITLE
DELIVERY ANALYSIS

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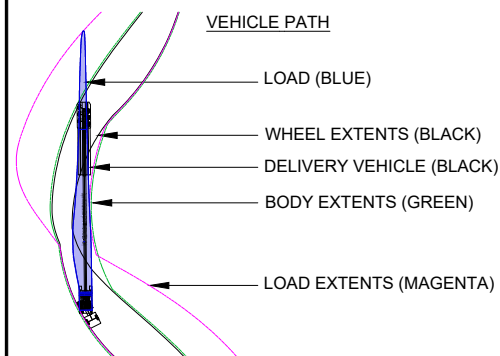
DETAIL 5 - PENNYLAND JUNCTION
57.0m BLADE DELIVERY VEHICLE - (REF: V117-3.3/3.45MW)
REAR AXLE MANUAL OVERRIDE USED - RETRACTED 13m TRAILER





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 - PHOTO VIEWPOINT LOCATION



ANALYSIS CARRIED OUT FOR:
57m V117 DELIVERY VEHICLE SUPER WIND CARRIER.
ALL VEHICLE DIMENSIONS SHOWN ARE TYPICAL, FOR INDICATION ONLY.
(REAR STEER VEHICLE)



PHOTO VIEWPOINT A

**DETAIL 6
SHEET 7 OF 7**

05	SDN	SV	JC	18-09-2019	SITE BOUNDARY CHANGE
04	SDN	SV	JC	10-05-2019	VEHICLE MODEL UPDATED
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PURPOSE PRELIMINARY

SCALE 1:500 ORIGINAL PLOT SIZE A3

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WIND FARM**

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DELIVERY ANALYSIS

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DETAIL 6 - SITE ENTRANCE
57.0m BLADE DELIVERY VEHICLE - (REF: V117-3.3/3.45MW)
REAR AXLE MANUAL OVERRIDE USED - RETRACTED 13m TRAILER



Technical Appendix 9.2: Anticipated Proposed Construction Traffic by Month

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Phase	Purpose	Vehicle	Approximate No. of deliveries for project duration	Approximate period when deliveries occur (assumes 12 months programme)	Month											
					1	2	3	4	5	6	7	8	9	10	11	12
Site mobilisation	Portacabin delivery	Low loader	6	1	6											
	Skip delivery	Low loader	5	1	5											
	Generator delivery	Low loader	2	1	2											
	Water and fuel tank delivery	Low loader	1	1	1											
	Excavator delivery	Low loader	2	1-2	1	1										
	Tool container delivery	Low loader	2	2	2											
	Roller-compactor	Low loader	1	2	1											
	Articulated dumper truck	Low loader	1	2	1											
Site tracks & hardstands	Stone for site tracks	Tipper lorry	1042	1-5	209	209	208	208	208							
	Stone for control building and substation compounds	Tipper lorry	136	1-5	27	27	28	27	27							
	Stone for construction compound and gatehouse	Tipper lorry	244	1-5	49	49	48	49	49							
	Stone for turning heads	Tipper lorry	22	1-5	4	5	5	4	4							
	Stone for pathways	Tipper lorry	21	5-10					4	4	4	3	3	3		
	Stone for crane hardstanding	Tipper lorry	1304	1-5	261	261	261	261	260							
Foundation construction	Excavator delivery	Low loader	2	3			2									
	Misc works	Backhoe loader	2	3			2									
	Concrete for turbine foundations, piles & transformer plinths	Mixer truck	267	3-5				89	89	89						
	Steel delivery	Flat bed	10	3-5			4	3	3							
	Foundation bolts or steel	Flat bed	5	5					5							
	Place foundation bolt cage or	30t to 50t crane	1	5					1							
Turbine erection	Tower section delivery	Clamp lift trailer	15	9									15			
	Blade delivery	Extendible trailer	15	9									15			
	Nacelle	Low loader	5	9									5			
	Hub and rotor	Low loader	5	9									5			
	Drive train	Low loader	5	9									5			
	Large crane delivery and removal	1000t to 1200t crane	2	9										2		
	Crane associated equipment delivery and removal	Low loader	20	9										20		
	Smaller crane delivery and removal	150t to 200t crane	2	9										2		
Cable Installation	Cable delivery	Flat bed	4	6						4						
	Sand delivery	Tipper lorry	76	6					76							
	Excavator delivery	Low loader	2	6					2							
	Cable laying	Tele handler	2	6					2							
Control building & substation	Concrete delivery	Mixer truck	36	6					36							
	Brick delivery	Flat bed	3	6					3							
	Roofing & cladding	Flat bed	3	8								3				
	Switchgear	Flat bed	2	8								2				
Misc electrical equipment	Flat bed	3	8								3					
Reinstatement	Removal of temporary tracks	Tipper lorry	218	11-12											109	109
	Removal of temporary compound & gate house stone	Tipper lorry	244	11-12											122	122
	Removal of temporary turning head stone	Tipper lorry	22	11-12											11	11
	Removal of temporary hardstanding stone	Tipper lorry	328	11-12											164	164
Misc	Waste removal	Skip lorry	104	1-12	9	9	9	8	8	8	8	9	9	9	9	9
	Water/fuel deliveries	Small tanker	104	1-12	9	9	9	8	8	8	8	9	9	9	9	9
Site demobilisation	Portacabin removal	Low loader	6	12												6
	Skip removal	Low loader	5	12												5
	Generator removal	Low loader	2	12												2
	Water and fuel tank removal	Low loader	1	12												1
	Roller-compactor	Low loader	1	9									1			
	Dumper truck	Low loader	1	12												1
	Excavator removal	Low loader	2	6-12												2
	Misc works	Backhoe loader	2	12												2
TOTAL Heavy Good Vehicles			4316		583	574	665	657	666	143	20	29	91	21	424	443
Site Staff and Deliveries	Staff	Cars & minivans	7800	1-12	650	650	650	650	650	650	650	650	650	650	650	650
	Miscellaneous deliveries	Vans	1248	1-12	104	104	104	104	104	104	104	104	104	104	104	104
TOTAL Cars & Light Good Vehicles			9048		754	754	754	754	754	754	754	754	754	754	754	754
TOTAL VEHICLES			13364		1337	1328	1419	1411	1420	897	774	783	845	775	1178	1197