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CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED BARNADIVANE WIND FARM & SUBSTATION, CO. CORK

VOLUME 2 – MAIN EIAR
CHAPTER 11 - TRAFFIC AND TRANSPORTATION

Prepared for: Barna Wind Energy (BWE) Ltd. & Arran Windfarm Ltd.

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Core House, Pouladuff Road, Cork, T 12 D773, Ireland

T: +353 21 4964 133 | E: tenders@ftco.ie

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie

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11. INTRODUCTION

11.1 Introduction

11.1.1 Purpose of Section

The purpose of this section is to assess the traffic impact of the additional traffic movements that will be generated by the Proposed Development at Barnadivane in County Cork, during both the construction and operational phases of the development. The Proposed Development comprises of the following elements;

- The Proposed Wind Farm site comprising of 6 turbines,
- The substation proposed within the Proposed Wind Farm site,

The TDR refers to the Turbine Delivery Route.

The AGCR refers to the alternative grid connection route, which is a 38kV grid connection that links the site with the already constructed Carrigarierk Wind Farm.

It is noted that the enabling works required to provide the TDR has a grant of planning permission from Cork County Council (CCL PL Ref. 14/6803) as has construction of the AGCR between the site and the Carrigarierk Wind Farm site (CCL PL Ref. 15/730). The impacts of both of these developments are assessed cumulatively with the Proposed Development in Section 11.9.5 of this EIAR.

A detailed list of the various components of the Proposed Development is provided in Section 2.3.1 of this EIAR.

For developments of this nature, the construction phase is the critical period with respect to traffic impact on the surrounding road network, both in terms of volumes and, in particular, vehicle sizes. The requirements of the additional traffic and abnormal loads generated during the construction stage were assessed on both the external highway network and at the junctions that are proposed to provide access to the site. Locations where remedial measures are required to accommodate the abnormal loads are identified.

It should also be noted that the geometric assessment presented in this report was based on aerial photography and OS base mapping.

The magnitude of the increase in traffic volumes experienced on the surrounding network is identified during the various construction stages of the development. A traffic management plan is also provided, aimed at minimising the traffic impact on the local highway network.

11.1.2 Statement of Authority

This section of the EIAR has been prepared by Alan Lipscombe of Alan Lipscombe Traffic and Transport Consultants Ltd. Alan is a competent expert in traffic and transport assessments. In 2007 Alan set up a traffic and transportation consultancy providing advice for a range of clients in the private and public sectors. Prior to this Alan was a founding member of Colin Buchanan's Galway office having moved there as the senior transportation engineer for the Galway Land Use and Transportation Study.

Since the completion of that study in 1999, Alan has worked throughout Ireland on a range of projects including: major development schemes, the Galway City Outer Bypass, Limerick Planning Land-Use and Transportation Study, Limerick Southern Ring Road Phase II, cost benefit analyses (COBA) and various studies for the NUI Galway. Before moving to Galway in 1997, Alan was involved in a wide variety of traffic and transport studies for CBP throughout the UK, Malta and Indonesia. He has particular expertise in the assessment of development related traffic and transport modelling, including over 20 wind farm developments, and is an accomplished analyst who has experience of a wide variety of modelling packages and methods.

11.1.3 Guidance on Assessment of Effects

This section of the EIAR has been completed in accordance with the EIA guidance set out in Chapter 1. The assessment uses standard terminology to describe the likely significant effects associated with the Proposed Development. Further information on the classification of effects used in this assessment is presented in Section 1.7.1 of this EIAR.

11.1.4 Scoping Consultation

Transport Infrastructure Ireland

(TII) responded to Scoping on the 3rd of January 2023 in which it provided a list of recommendations to be followed when preparing the EIAR. All relevant TII guidelines and policies have been taken into account in the preparation of this assessment, including the following;

- PE-PDV-02045, Transport Assessment Guidelines, Transport Infrastructure Ireland, May 2014,
- PE-PAG-02017, Project Appraisal Guidelines, Unit 5.3, Travel Demand Projections, Transport Infrastructure Ireland, October 2021,
- DN-GEO-03060, Geometric Design of junctions, Transport Infrastructure Ireland, April 2017,
- TII Automatic Traffic Count Data, N22 Ballyvourney.

Department of Transport, Tourism and Sport

A scoping request was sent to The Department of Transport, Tourism and Sport on the 15th of December 2022.

Cork County Council

A scoping request was sent to various Departments within Cork County Council on the 15th of December 2022.

11.1.5 Method and Section Structure

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland, or TII, in the document number PE-PDV-02045 *'Traffic and Transport Assessment Guidelines, May 2014'* The geometric requirements of the transporter vehicles were assessed using Autocad and Autotrack.

The Traffic and Transport Section of the EIAR is set out as follows:

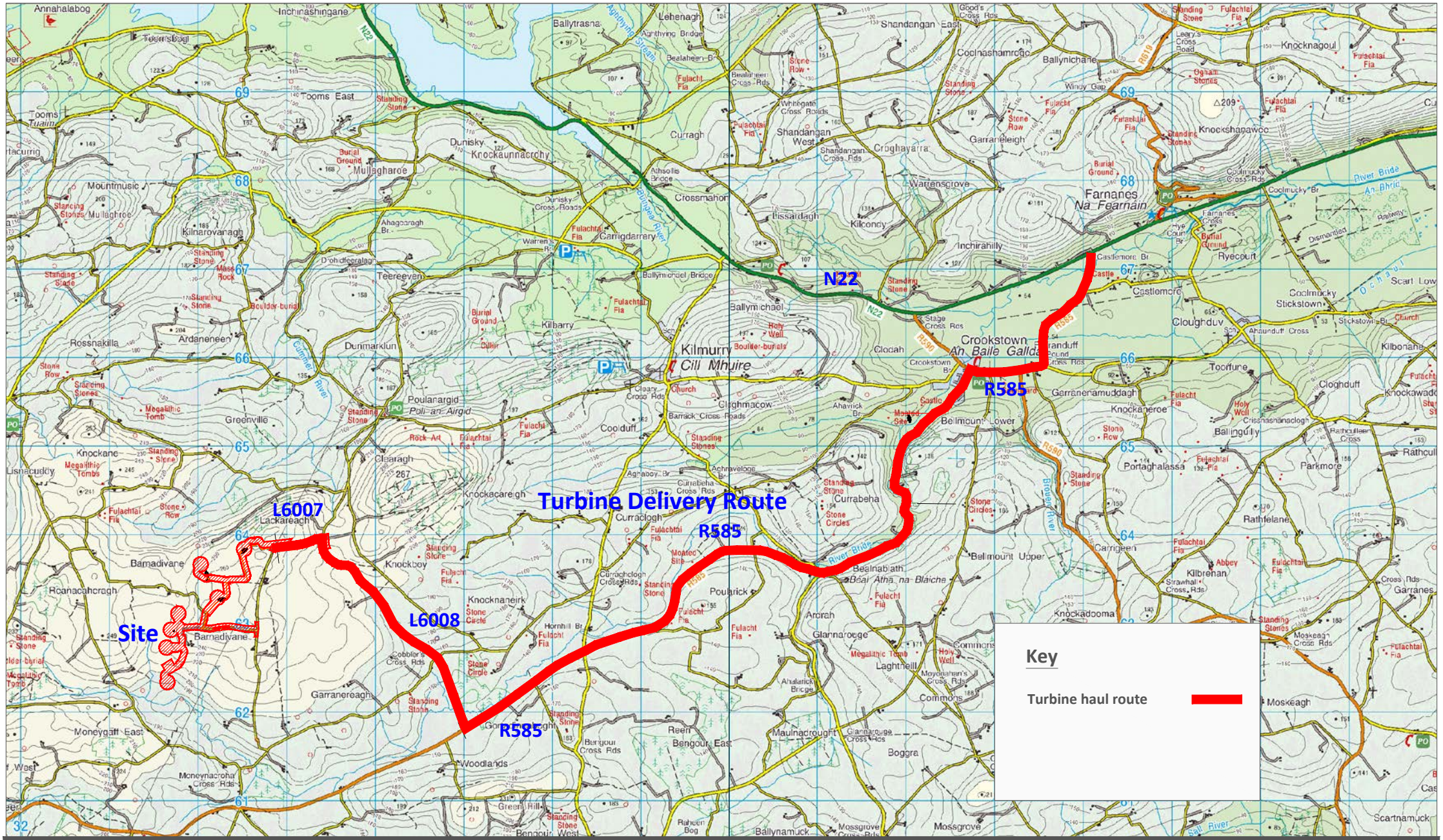
- A review of the existing and future transport infrastructure in the vicinity of the development, including an assessment of 2022 traffic flows and traffic forecasts during an assumed construction year of 2028;
- A description of the nature of the Proposed Development and the traffic volumes that will be generated during the different construction stages and when it is operational;
- A description of the abnormally large loads and vehicles that will require access to the site;
- A review of the impact of development generated traffic on links and junctions during construction and when the facility is operational;
- A geometric assessment of the route and its capacity to accommodate the abnormal loads associated with the development;
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff).

11.2 Receiving Environment

11.2.1 Site Location and proposed access

The location of the Proposed Development in Barnadivane, County Cork, is shown in the context of the national and local highway networks in Figure 11.1. The site is located in the townlands of Lackareagh, Garranereagh and Barnadivane (Kneeves).

The site is accessed by the local road Amharcóir Bóithre Poiblí Road (L6007))and is situated approximately 500m west of the local L6008 Road at its eastern boundary, 1.5kms north of the R585 Regional Road at its southern boundary and approximately 7 km west of Crookstown and the N22 National Road.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.1 Site location and turbine delivery route

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	NTS
PROJECT NO: 3790	DATE: 17.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

11.2.2 Proposed Abnormal Load Delivery Route

The proposed point of arrival for the wind farm plant is the port of Ringaskiddy in County Cork. A detailed assessment of the transport route was made from a point at which the route turns off the N22 national primary road at Castlemore, also shown in Figure 11.1.

The route assessment is confined to the haul route commencing with the left turn from the N22 onto the R585 to the northeast of Crookstown. The route then passes through the village of Crookstown and turns sharp left out of the village following the R585 in a south western direction for approximately 8 kms. The route then turns right onto the L-6008 heading north for 3 kms. The route then heads west on the local L6007 on which the proposed access to the site is located.

The locations of the pinch points assessed on the haul route are discussed in Section 11.6 and shown in Figure 11-2a, and are as follows:

- Location 1 - N22 / R585 Junction at Castlemore,
- Location 2 – Right turn on R585 at Crookstown,
- Location 3 – Left turn at R585 / R590 junction at Crookstown,
- Location 4 – Bend on R585 south of Crookstown,
- Location 5 – Series of bends in the R585,
- Location 6 – R585 through Bealnablath,
- Location 7 – R585 / L6008 junction,
- Location 8 – Bend on the L6008,
- Location 9 – The route turns left from the L6008 onto the L6007,
- Locations 10 – The route turns off the L6007 to access the site,
- Locations 11, 12 and 13 are on the internal road network through the site.

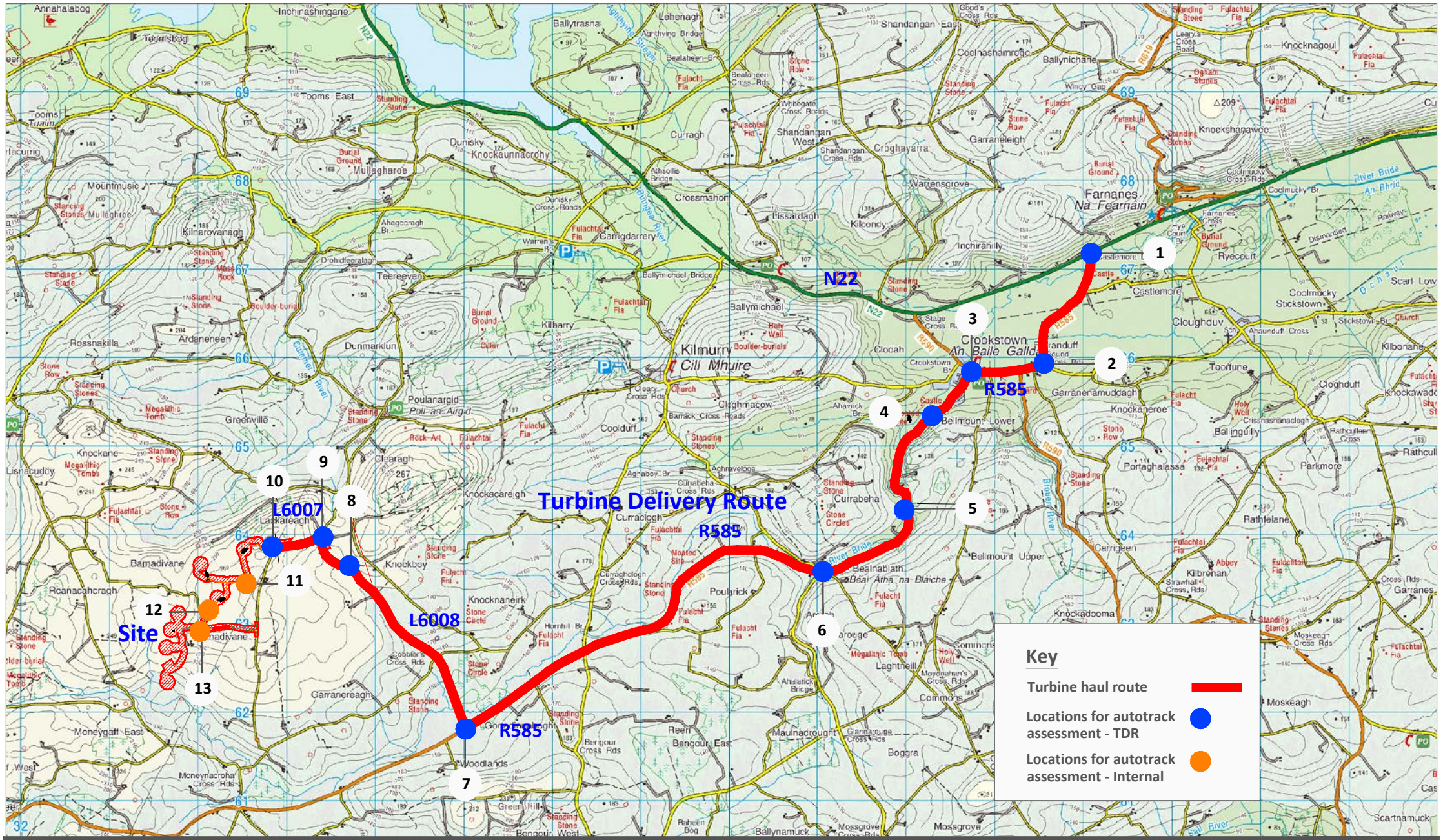


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Figure 11.2a Turbine delivery route assessment location plan

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	NTS
PROJECT NO: 3790	DATE: 16.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

11.2.3 Proposed Construction Traffic Haul Route

The delivery route for general HGV construction traffic may vary depending on the location of the suppliers of concrete and other general construction materials required to construct the Proposed Development. For the purpose of this assessment it is assumed that deliveries of smaller component parts for the wind turbines, and general construction traffic will travel to the site via the same route as the turbine deliveries, via the N22 and Crookstown, as shown in Figure 11.1. In practice it is likely that some deliveries will be made from suppliers closer to the site resulting in traffic impacts on the N22 and on the R585 through Crookstown being less than set out in the assessment below. One potential quarry that would minimise the impact on the road network for the transportation of concrete and stone is the Kilmichael Quarry located approximately 5km to the west of the site.

11.2.4 Existing Traffic Volumes

It should be noted that traffic volumes are discussed in terms of either vehicles or passenger car units (pcus), where each vehicle is expressed in terms of its demand on the network relative to the equivalent number of cars. For example, a typical articulated HGV is allocated a factor of 2.4 passenger car units (as per TII Project Appraisal Guidelines for National Roads Unit 5.2), while one of the extended loaders required to transport the wind turbine equipment was assigned a value of 10.

Traffic volumes on the delivery route were obtained from a combination of data available from automatic count sites maintained by TII and link and junction counts undertaken for the purpose of this EIAR. The link count locations included in the assessment are shown in Figure 11.2b.

A continuous traffic counter is maintained by TII on the N22 at Ballyvourney which provided base year all day traffic flows for the N22 (Link count location 1).

The following traffic count surveys were undertaken by Traffinomics Ltd on Tuesday 25th October 2022 in order to provide traffic counts for the remaining locations;

- A 24 hour classified automatic traffic count (ATC) on the R585 to the east of Crookstown (Link count location 2), and,
- A peak period (07:00 to 10:00 and 16:00 to 19:00) classified turning counts at the R585 / L6008 junction (Link count locations 3, 4 and 5),

For link count locations 3, 4, 5, the 6 hours of peak period traffic counts were expanded to 24 hours using an expansion factor determined from the 24 hour data collected on the R585, which was determined to be as follows;

24 hours = 1.84 x (07:00 to 10:00) + (16:00 to 19:00)

A summary of the source of the traffic counts for each location is provided in Table 11.1 with the 24 traffic flows set out in terms of total vehicles by location in Table 11.2. The figures show that in the base year 2022 traffic volumes on the delivery route range from 12,742 vehicles day on the N22 at Castlemore, to 4,475 vehicles on the R585 to the east of Crookstown, reducing to 3,057 vehicles on the R585 adjacent to the junction with the L-6008. Traffic volumes on the L-6008 approaching the site were observed to be low with a daily volume of 92 vehicles observed.

The TII Data used from the ATC site in the N22 for link count location 1 is included as Appendix 11.1 while a full listing of the traffic count surveys undertaken at link count locations 2 to 5 is included as Appendix 11.2.

It is noted that the Covid-19 pandemic was still having a minor impact on travel demand and traffic volumes in Ireland in the base year for the traffic counts, 2022. A comparison of the traffic volumes recorded at the TII ATC site on the N22 was made for the base year for the traffic assessment, 2022, and the year 2019, prior to any impacts of Covid-19. All day traffic volumes of 13,570 were recorded in 2019 prior to the pandemic, compared to 12,742 recorded in the base year of 2022. A Covid-19 correction factor of 1.065 was therefore applied to the traffic counts observed in 2022, which were then used as the base 2022 traffic volumes. These adjusted traffic volumes are also shown in Table 11.2.

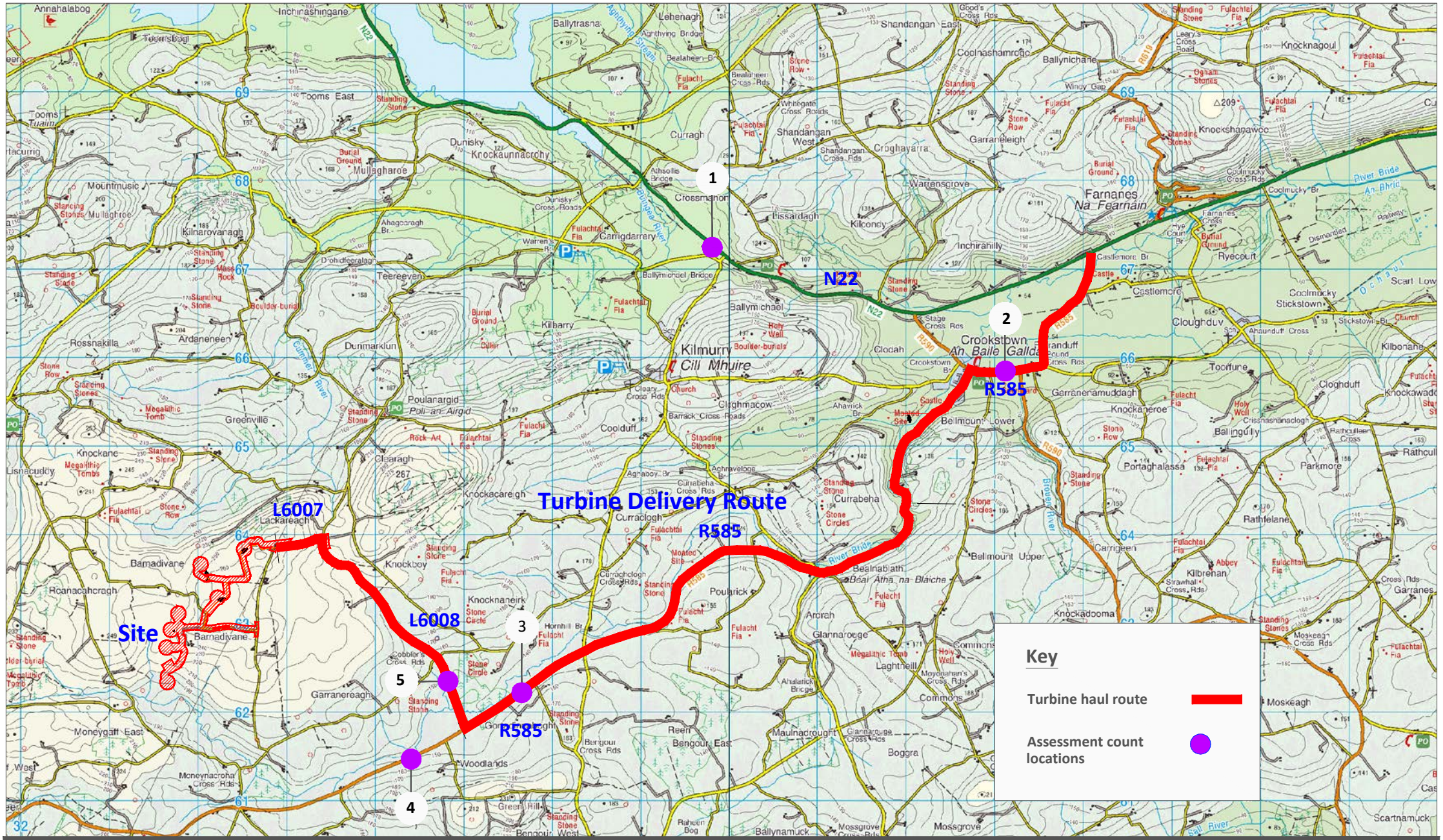

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Figure 11.2b Turbine delivery route link count locations

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	NTS
PROJECT NO: 3790	DATE: 16.02.23	DRAWN BY:	AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Table 11-1: Count locations and data source

Link	Data source
1 - N22 at Castlemore	TII ATC counter
2 - R585 east of Crookstown	ATC counter
3 - R585 east of L6008	Classified turning count
4 - R585 west of L6008	Classified turning count
5 - L6008	Classified turning count

Table 11-2: All day traffic flows by location, year 2022 (2-way vehicles)

Link	2022	2022 Covid 19 adjusted
1 - N22 at Castlemore	12,742	13,570
2 - R585 east of Crookstown	4,475	4,766
3 - R585 east of L6008	3,057	3,256
4 - R585 west of L6008	3,045	3,243
5 - L6008	92	98

11.2.5 Future Background Traffic Volumes

Updated guidelines for forecasting annual growth in traffic volumes were produced by TII in October 2021, as set out by region in the Project Appraisal Guidelines (Unit 5.3 – Travel Demand Projections). The annual growth rates for County Cork, together with factors for the years relevant to this study are shown in Tables 11.3 and 11.4, with traffic volumes forecast to increase during the period from 2022 to 2028 (the assumed construction year) by 11.9%, assuming a medium growth scenario. Year 2022 and 2028 daily traffic flows on the Study Area network are compared in Table 11.5.

It should be noted that while the assumed construction year of 2028 may vary slightly, this will not alter the forecast outcomes and effects presented in this section of the EIAR. This is due to the annual growth rate for background traffic being just 1.89% (as shown in Table 11.3) and the traffic volumes generated by the Proposed Development will remain unchanged regardless of construction year, as presented subsequently in Section 11.3.

Table 11-3: TII traffic growth forecasts, growth per annum and cumulative, County Cork

Year	Lights - Annual factor			Lights - Cumulative index		
	low	Medium	High	low	Medium	High
2022	1.0173	1.0189	1.0223	1.000	1.000	1.000
2023	1.0173	1.0189	1.0223	1.017	1.019	1.022
2024	1.0173	1.0189	1.0223	1.035	1.038	1.045
2025	1.0173	1.0189	1.0223	1.053	1.058	1.068
2026	1.0173	1.0189	1.0223	1.071	1.078	1.092
2027	1.0173	1.0189	1.0223	1.090	1.098	1.117
2028	1.0173	1.0189	1.0223	1.108	1.119	1.141

Table 11-4: TII traffic growth rates by growth scenario

Period	Factor		
	low	Medium	High
2022- 2028	1.108	1.119	1.141

Table 11-5: Average all day flows by location and year (2-way pcus)

Link	2022	2028
1 - N22 at Castlemore	13,570	15,185
2 - R585 east of Crookstown	4,766	5,333
3 - R585 east of L6008	3,256	3,643
4 - R585 west of L6008	3,243	3,629
5 - L6008	98	110

The traffic count data was also used to determine the existing percentage of HGVs on the delivery routes. The observed percentage of HGVs was observed to range from 4.6% on the R585 to the east of Crookstown to 5.5% on the N22, to 14.0% on the L6008 leading to the site. The percentage HGVs together with traffic volumes forecast on the study network are shown for the year 2028 by vehicle type in Table 11.6.

Table 11-6: AADT, percentage HGV's and volumes by vehicle type, by location, year 2028

Link	AADT (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / LGV's	HGV	Cars / LGV's	Total
1 - N22 at Castlemore	15,185	5.5%	835	14,350	2,004	14,350	16,354
2 - R585 east of Crookstown	5,333	4.6%	245	5,088	589	5,088	5,676
3 - R585 east of L6008	3,643	4.8%	175	3,468	420	3,468	3,888
4 - R585 west of L6008	3,629	4.8%	174	3,455	418	3,455	3,873
5 - L6008	110	14.0%	15	94	37	94	131

11.3 Proposed Development and Traffic Generation

11.3.1 Development Content

The Proposed Development comprises of the following elements;

- The Proposed Wind Farm site comprising of 6 turbines,
- The 110 kV substation proposed within the Proposed Wind Farm site,

It is noted that the enabling works required to provide the Turbine Delivery Route (TDR) has a grant of planning permission from Cork County Council (CCL PL Ref. 14/6803) as has construction of the Alternative Grid Connection Route (AGCR) between the site and the Carrigarierk Wind Farm site (CCL PL Ref. 15/730). The impacts of both of these developments are assessed cumulatively with the Proposed Development in Section 11.9.5 of this EIAR.

A detailed list of the various components of the Proposed Development is provided in Section 2.3.1 of this EIAR.

11.3.2 Development Trip Generation -During Construction

For the purpose of assessing the impact of traffic generated during the construction of the Proposed Development, the construction phase is considered in two stages:

- Stage 1 – Foundation preparation, groundworks and foundation pouring, construction of substation and all associated works.
- Stage 2 - Turbine construction.

Stage 1 – Foundation pouring and Site preparation and ground works.

The site preparation and groundworks stage will last approximately 12 to 18 months, although it has been assumed that all of the deliveries to the site will be made within the first 12 months (255 days).

During this period there will be 2 separate phases. One phase will involve the delivery of concrete for the foundations which will require 360 deliveries by concrete mixer to the site. As a continuous pour is required for each of the 6 days that the foundations are poured, 60 concrete mixers will access the site. The remaining material and equipment required for this stage, which includes the construction of the substation, will be delivered on a separate 227 working days, during which a total of 4,381 deliveries by truck or HGVs will be made to the site. The total number of trips made to the site during these phases is shown in Table 11.7, with the number of daily movements shown in Tables 11.8 and 11.9.

It is noted that in the event that the option of the AGCR is pursued then the construction of the substation, which accounts for 90 deliveries during this period, will not be required.

On each of the 6 concrete pouring days an additional 288 pcus (comprising 60 two-way HGV movements) will travel on the study network.

For the remaining 227 days of this stage, which includes the construction of the substation, the impact will be less, with an additional 93 pcus travelling on the road network. In the event that the AGCR option is pursued and the construction of the substation is not required it is considered that the construction time for this stage will reduce proportionally by 5 days, from 227 days to 222 days.

Table 11-7: Trip generation - Stage 1 - Site preparation, groundworks and substation - total loads

Material	Total no Truck Loads	Truck type
Concrete	360	Concrete mixer
Delivery of plant	30	Large artic
Fencing & gates	2	Large artic
Compound setup	40	Large artic
Road construction	3880	Large artics / trucks
Concrete binding	48	Trucks
Steel and anchor cages	21	Large artic
Ducting and cabling (internal)	29	Large artic
Crane (to lift steel)	1	Large artic
Substation	90	Large artic
Cranes for turbines	12	Large artic
Refueling for plant	78	Large artic
Site maintenance	90	Large artic
Miscellaneous	60	Large artic
Total	4741	

Table 11-8: Trip generation - Stage 1 - Concrete foundation pouring - total movement and volumes per delivery day

Material	Total no Truck Loads	Truck type	PCU Value	Total PCU's	Movements / day *	2- way PCU's / day
Concrete	360	Concrete mixer	2.4	864	144.0	288.0

** Based on 6 foundation pouring days*

Table 11-9: Trip generation - Stage 1 - Site preparation, groundworks and substation - total movement and volumes per delivery day

Material	Total no Truck Loads	Truck type	PCU Value	Total PCU's	PCU Movements / day *	2- way PCU's / day
Delivery of plant	30	Large artic	2.4	72.0	0.32	0.63
Fencing & gates	2	Large artic	2.4	4.8	0.02	0.04
Compound setup	40	Large artic	2.4	96.0	0.42	0.85
Road construction	3880	Large artics / trucks	2.4	9312.0	41.02	82.04
Concrete binding	48	Trucks	2.4	115.2	0.51	1.01
Steel and anchor cages	21	Large artic	2.4	50.4	0.22	0.44
Ducting and cabling (internal)	29	Large artic	2.4	69.6	0.31	0.61
Crane (to lift steel)	1	Large artic	2.4	2.4	0.01	0.02
Substation	90	Large artic	2.4	216.0	0.95	1.90
Cranes for turbines	12	Large artic	2.4	28.8	0.13	0.25
Refueling for plant	78	Large artic	2.4	187.2	0.82	1.65
Site maintenance	90	Large artic	2.4	216.0	0.95	1.90
Miscellaneous	60	Large artic	2.4	144.0	0.63	1.27
Total	4381			10514.4	46.3	92.6

Stage 2 - Turbine Construction

During the turbine construction stage, including delivery and assembly, there will be deliveries to the site made by the abnormally large vehicles, referred to in this section as extended artics, transporting the component parts of the turbines (nacelles, blades, and towers). There will also be deliveries made by standard large HGVs, transporting cables, tools, and smaller component parts.
The types of load and associated numbers of trips made to the site during the turbine construction period are shown in Table 11.10, which summarises that a total of 48 trips will be made to and from the site by extended artics, with a further 24 trips made by conventional large articulated HGVs.

Table 11-10: Trip generation - Stage 2 - Wind turbine plant - total loads

Material	Units	Quantity per Unit	Total quantity	Quantity per Truck	Total no Truck Loads	Truck type
Nacelle	6	1	6	1	6	Extended Artic
Blades	6	3	18	1	18	Extended Artic
Towers	6	4	24	1	24	Extended Artic
Sub total					48	
Transformer	6	1	6	1	6	Large Artic
Drive train & Hub	6	1	6	1	6	Large Artic
Other turbine equipment	6	2	12	1	12	Large Artic
Sub total					24	
Total					72	

It is proposed that the large turbine components, including the blades, tower sections and nacelles, will be transported to the site in one convoy of 3 vehicles per night. In order to transport the 48 abnormally large components to the site it will take 16 convoys spread over 4 nights per week for 4 weeks to complete. On a further 6 days the remaining equipment required during this phase will be delivered to the site using standard HGVs. The daily traffic volumes for these days are summarised in Tables 11.11 and 11.12 respectively. In Table 11.11 a PCU equivalent value of 10 was allocated to each extended artic movement, resulting in an additional 60 PCUs on the study network on these 16 days, while an additional 19.2 PCUs are forecast to appear on the remaining 6 days during the turbine construction phase, as shown in Table 11.12.

Table 11-11: Trip generation - Stage 2 - Wind turbine plant, extended artics - total movement and volumes per delivery day

Load	Units	Truck type	PCU Value	Total PCU's	2- way PCU's / day
Nacelle	1	Extended Artic	10	10	20.0
Blades	3	Extended Artic	10	30	60.0
Towers	4	Extended Artic	10	40	80.0
Total per turbine	8			80	160.0
Total per delivery day *	3		10	30	60.0

* Based on 3 abnormal loads being delivered per day on 4 days per week (total 48 loads will take 16 days over 4 weeks)

Table 11-12: Trip generation - Stage 2 - Wind turbine plant, standard artic HGVs - total movement and volumes per delivery day

Material	Units	Quantity per Unit	PCU Value	Total PCU's	2- way PCU's / day
Transformer	6	1	2.40	14.4	4.8
Drive train & Hub	6	1	2.40	14.4	4.8
Other turbine equipment	6	2	2.40	28.8	9.6
Total	18			57.6	19.2

** Based on equipment for 2 turbines being moved per week spread over 3 weeks

Construction Employee Traffic

It is estimated that for a worst case scenario 70 staff members will be employed on the site during the 12 – 18 month long site preparation and groundworks stage of construction, reducing to 40 staff during the 6-month turbine construction stage. If a worst case is assumed that all staff will travel to / from the site by car, at an average of 2 persons per car, then a total of 70 two-way pcu movements (each trip is two way) will be added to the network during the groundworks stage of the development, reducing to 40 pcu trips during the turbine construction stage. The impact of these trips on the junctions on the delivery route during the construction stage is discussed in Section 11.5.4.

11.3.3 Development Trip Generation During Operation

It is estimated that the traffic volumes that will be generated by the development once it is operational will be minimal, with a maximum of 3 staff employed on site at any one time. In the event that each staff member travels separately in a car or lgv, this would equate to 6 car movements, or 6 pcus.

11.4 Construction Traffic Design Vehicles

11.4.1 Construction Traffic Vehicle Types

The geometric assessment for the requirements of the vehicles that will require access to the site is based on the vehicle specification for the largest plant that will require access. For the purpose of this assessment a rotor blade of 58.5 metres was assumed with the key dimensions for the wind farm design vehicles as follows:

Transport of Blades – Articulated HGV with blade

Total length	63.2 m
Length of blade	58.5 m
Inner radius	25.0 m

Transport of Tower – Using low-bed or drop deck trailers

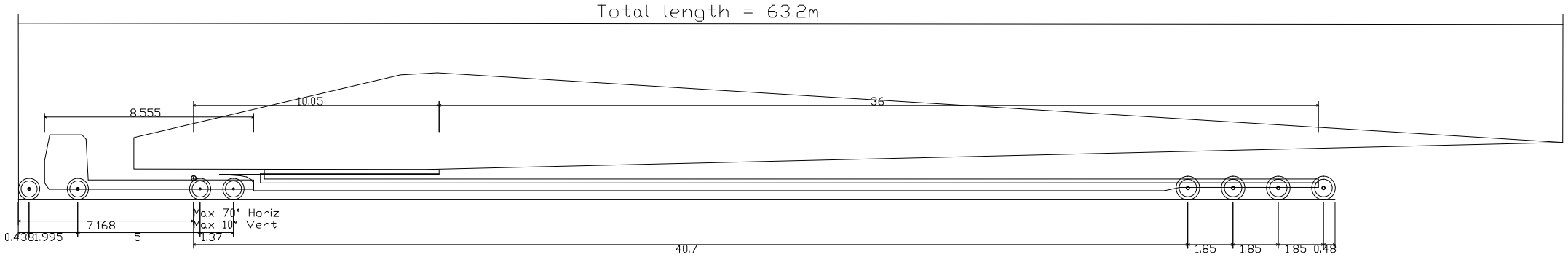
Total length (with load)	50.0 m
Length of load	29 m
Inner radius	25.0 m

The critical vehicles in terms of size and turning geometry requirements, and used in the detailed route assessment discussed in Section 11.6, are the blade transporter and the tower transporter with the geometry of each shown in Figures 11.3 and 11.4 respectively.

It is noted that a rear overhang of 10 metres is typical for vehicles transporting the blades to the site. For one location on the access route where the existing geometry is tight (location 2 at Crookstown) it was required to increase the overhang to approximately 14 metres in order to negotiate the bend.

The vehicles used to transport the nacelles will be similar to the tower transporter although will be shorter in length.

All other vehicles requiring access to the site will be significantly smaller than the design test vehicles.



58.5m blade	
Overall Length	53.897m
Overall Width	2.550m
Overall Body Height	2.661m
Min Body Ground Clearance	0.375m
Track Width	2.500m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.3 Design blade extended artic profile

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	NTS
PROJECT NO: 3790	DATE: 17.02.23	DRAWN BY:	AL

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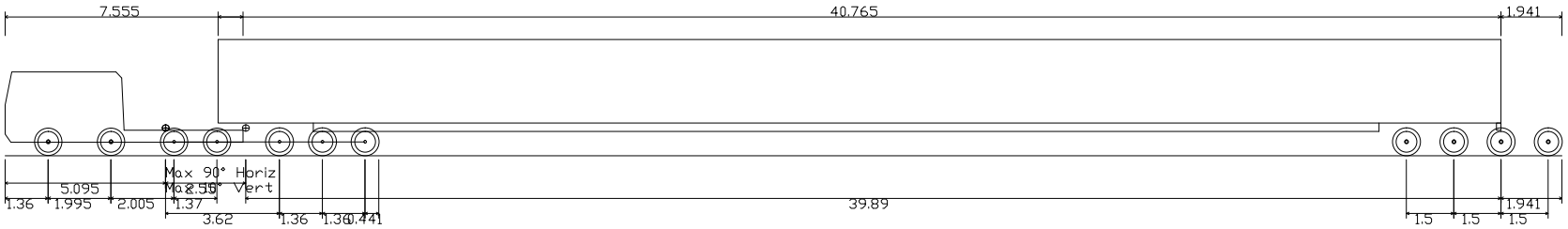

Siemens Tower (Final)	
Overall Length	49.476m
Overall Width	2.550m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Max Track Width	2.520m
Lock to Lock Time	6.00s
Wall to Wall Turning Radius	9.800m

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.4 Design tower extended artic profile

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	NTS
PROJECT NO: 3790	DATE: 17.02.23	DRAWN BY:	AL

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11.5 Traffic Effects During Construction and During Operation

11.5.1 Effect on Link Flows – During Construction

Background traffic volumes and development generated traffic volumes are shown for the 4 typical construction days discussed in Section 11.3 in Tables 11.13 to 11.16 and are summarised in Tables 11.17 to 11.20.

In terms of daily traffic flows the results may be summarised as follows:

During Stage 1 – foundation concrete pouring

For 6 weekdays an additional 358 PCU's per day will travel on the study network. On these days, the percentage increase in traffic volumes experienced on the study network will be between +2.2% on the N22 at Castlemore, to +6.3% on the R585 through Crookstown, to +9.2% on the R585 leading to the L6008. On the L6008 approaching the site, which for the do-nothing scenario is forecast to provide for just 131 pcus per day in the construction year of 2028, it is forecast that on these busiest 6 days traffic volumes will increase by slightly less than a factor of 4 (or +273%).

During Stage 1 - Site Preparation, Groundworks and Substation

For 227 weekdays an additional 163 PCU's per day will travel on the study network. On these days, the percentage increase in traffic volumes experienced on the study network will be between +1.0%, on the N22 at Castlemore, to +2.9% on the R585 through Crookstown, to +4.2% on the R585 leading to the L6008. On the L6008 approaching the site, it is forecast that traffic volumes will increase by +124.3%.

In the event that the AGCR option is pursued and the construction of the substation is not required it is considered that the daily impacts on traffic flows will be as above but the construction time for this stage will reduce proportionally by 5 days, from 227 days to 222 days.

During Stage 2 - Turbine Construction Stage – Delivery of large equipment using extended articulated vehicles

For 16 weekdays an additional 100 PCU's per day will travel on the study network when it is forecast that the percentage increase in traffic volumes experienced on the study network will be between +0.6% on the N22 at Castlemore, to +1.8% on the R585 through Crookstown, to +2.6% on the R585 leading to the L6008. On the L6008 approaching the site, it is forecast that traffic volumes will increase by +76.3%.

The traffic impact during these days will be the most significant during the construction of the Proposed Development, primarily due to the slow speeds, size, and geometric requirements of these vehicles. The provision of traffic management measures, addressed at a preliminary level in Section 11.7, will be required to minimise the impact of development traffic on the study network on these days. Undertaking these deliveries during night time hours will significantly reduce the impact during these deliveries (as is proposed and discussed in Section 11.7).

During Stage 2 - Turbine Construction Stage – Other deliveries using conventional articulated HGV's

For 6 weekdays in one year, approximately 2 days per week for 3 weeks, an additional 59 PCU's per day (comprising of cars and standard articulated HGV movements to and from the site) will travel on the study network.

On these days the percentage increase on the study network will increase by between 0.4% on the N22 at Castlemore) to +1.1% on the R585 through Crookstown, to +1.5% on the R585 leading to the L6008. On the L6008 approaching the site, it is forecast that traffic volumes will increase by +45.0%.

Table 11-13: Daily traffic volumes during Stage 1 - concrete pouring - background, development generated and total (pcus)

Link	Background PCU's			Development PCU's			Total PCU's		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 - N22 at Castlemore	14,350	2,004	16,354	70	288	358	14,420	2,292	16,712
2 - R585 east of Crookstown	5,088	589	5,676	70	288	358	5,158	877	6,034
3 - R585 east of L6008	3,468	420	3,888	70	288	358	3,538	708	4,246
4 - R585 west of L6008	3,455	418	3,873	70	288	358	3,525	706	4,231
5 - L6008	94	37	131	70	288	358	164	325	489

Table 11-14: Daily traffic volumes during Stage 1 - site preparation, ground works and substation - background, development generated and total (pcu's)

Link	Background PCU's			Development PCU's			Total PCU's		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 - N22 at Castlemore	14,350	2,004	16,354	70	93	163	14,420	2097	16517
2 - R585 east of Crookstown	5,088	589	5,676	70	93	163	5,158	682	5839
3 - R585 east of L6008	3,468	420	3,888	70	93	163	3,538	513	4051
4 - R585 west of L6008	3,455	418	3,873	70	93	163	3,525	511	4036
5 - L6008	94	37	131	70	93	163	164	130	294

Table 11-15: Daily traffic volumes during Stage 2 - turbine construction, extended HGV's - background, development generated and total (pcu's)

Link	Background PCU's			Development PCU's			Total PCU's		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 - N22 at Castlemore	14,350	2,004	16,354	40	60	100	14,390	2,064	16,454
2 - R585 east of Crookstown	5,088	589	5,676	40	60	100	5,128	649	5,776
3 - R585 east of L6008	3,468	420	3,888	40	60	100	3,508	480	3,988
4 - R585 west of L6008	3,455	418	3,873	40	60	100	3,495	478	3,973
5 - L6008	94	37	131	40	60	100	134	97	231

Table 11-16: Daily traffic volumes during Stage 2 - turbine construction, standard HGV's - background, development generated and total (pcu's)

Link	Background PCU's			Development PCU's			Total PCU's		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 - N22 at Castlemore	14,350	2,004	16,354	40	19	59	14,390	2,023	16,413
2 - R585 east of Crookstown	5,088	589	5,676	40	19	59	5,128	608	5,735
3 - R585 east of L6008	3,468	420	3,888	40	19	59	3,508	439	3,947
4 - R585 west of L6008	3,455	418	3,873	40	19	59	3,495	437	3,932
5 - L6008	94	37	131	40	19	59	134	56	190

Table 11-17: Summary daily effects of development traffic – Stage 1 - concrete pouring - % increase and duration

Link	Background	Development	Total	% increase	No days
1 - N22 at Castlemore	16,354	358	16,712	2.2%	6
2 - R585 east of Crookstown	5,676	358	6,034	6.3%	6
3 - R585 east of L6008	3,888	358	4,246	9.2%	6
4 - R585 west of L6008	3,873	358	4,231	9.2%	6
5 - L6008	131	358	489	273.0%	6

Table 11-18: Summary daily effects of development traffic – Stage 1 - site preparation, groundworks and substation - % increase and duration

Link	Background	Development	Total	% increase	No days
1 - N22 at Castlemore	16,354	163	16517	1.0%	227
2 - R585 east of Crookstown	5,676	163	5839	2.9%	227
3 - R585 east of L6008	3,888	163	4051	4.2%	227
4 - R585 west of L6008	3,873	163	4036	4.2%	227
5 - L6008	131	163	294	124.3%	227

Table 11-19: Summary daily effects of development traffic Stage 2 - turbine construction, extended artics - % increase and duration

Link	Background	Development	Total	% increase	No days
1 - N22 at Castlemore	16,354	100	16,454	0.6%	16
2 - R585 east of Crookstown	5,676	100	5,776	1.8%	16
3 - R585 east of L6008	3,888	100	3,988	2.6%	16
4 - R585 west of L6008	3,873	100	3,973	2.6%	16
5 - L6008	131	100	231	76.3%	16

Table 11-20: Summary daily effects of development traffic Stage 2 - turbine construction, standard artics - % increase and duration

Link	Background	Development	Total	% increase	No days
1 - N22 at Castlemore	16,354	59	16,413	0.4%	6
2 - R585 east of Crookstown	5,676	59	5,735	1.0%	6
3 - R585 east of L6008	3,888	59	3,947	1.5%	6
4 - R585 west of L6008	3,873	59	3,932	1.5%	6
5 - L6008	131	59	190	45.0%	6

An assessment of the impact on link capacities in the Study Area was undertaken for the various construction stages as set out in Table 11.21, Table 11.22 and Table 11.23. The capacity for each link in the Study Area is shown in Table 11.21. The capacities range from a daily flow of 11,600 vehicles on the N22 down to 5,000 on the R585 and L-6008, and are based on road widths and capacities set out in the TII Standards document DN-GEO-03031 Road Link Design, Table 6/1.

It is noted that the capacity of the local L6008 will be less than 5,000 vehicles per day as it narrower than a 6m Type 3 single carriageway. While there is no designated capacity for this type of road a capacity of <5000 vehicles per day was adopted for this link.

Background, or do-nothing traffic flows, are compared to flows forecast for the various construction delivery stages in Table 11-22 with the percentage capacity reached for each link and stage shown in Table 11.23. Based on this assessment the following points are noted;

- On the external network the N22 is the busiest road with the link capacity forecast to operate at 141% capacity for the do-nothing scenario, increasing to a maximum of 144% during the 6 days that the concrete foundations will be poured. During the construction period, although it is likely that concrete deliveries to the site will come from facilities closer to the site, deliveries may also make use of the N22. All these options have been included in the assessment.
- The section of the R585 between Crookstown and the N22 is also forecast to operate over capacity for the do-nothing scenario, 114%, which is forecast to increase to a maximum of 121% during the 6 days that the concrete foundations will be poured.
- All other sections of the haul routes are forecast to operate within capacity for the duration of the construction period.

Table 11-21: Delivery route carriageway widths, link type and link capacity

Link	Width (m)	Link type	Capacity
1 - N22 at Castlemore	7.0	Type 1 single	11,600
2 - R585 east of Crookstown	6.0	Type 3 single	5,000
3 - R585 east of L6008	6.0	Type 3 single	5,000
4 - R585 west of L6008	6.0	Type 3 single	5,000
5 - L6008	<6.0	Local road	<5,000

Table 11-22: Delivery route Link capacity and summary of link flows by construction delivery stage

Link	Link capacity	Construction deliver stage				
		Background	Concrete pour	Oher site works	Turbine plant	Turbine other
1 - N22 at Castlemore	11,600	16,354	16,712	16,517	16,454	16,413
2 - R585 east of Crookstown	5,000	5,676	6,034	5,839	5,776	5,735
3 - R585 east of L6008	5,000	3,888	4,246	4,051	3,988	3,947
4 - R585 west of L6008	5,000	3,873	4,231	4,036	3,973	3,932
5 - L6008	<5,000	131	489	294	231	190

Table 11-23: Link capacity and % of link capacity by construction delivery stage

Link	Link capacity	Construction deliver stage				
		Background	Concrete pour	Oher site works	Turbine plant	Turbine other
1 - N22 at Castlemore	11,600	141%	144%	142%	142%	141%
2 - R585 east of Crookstown	5,000	114%	121%	117%	116%	115%
3 - R585 east of L6008	5,000	78%	85%	81%	80%	79%
4 - R585 west of L6008	5,000	77%	85%	81%	79%	79%
5 - L6008	<5,000	3%	10%	6%	5%	4%

11.5.2 Effect on Link Flows – During Operation

Once the Proposed Development is operational it is estimated that there will be a maximum of 3 staff members employed on site with a similar number of vehicle trips, or 6 pcus on one day. It is considered that the traffic impact during this phase will be imperceptible once functioning.

11.5.3 Effect on Junctions – During Construction

The capacity of the Study Area junctions was assessed using the industry standard junction simulation software PICADY which permits the capacity of any junction to be assessed with respect to existing or forecast traffic movements and volumes for a given time period.

The capacity for each movement possible at the junction being assessed is determined from geometric data input into the program with the output used in the assessment as follows:

- Queue – This is the average queue forecast for each movement and is useful to ensure that queues will not interfere with adjacent junctions.
- Degree of Saturation or ratio of flow to capacity (% Sat or RFC) – As suggested, this offers a measure of the amount of available capacity being utilised for each movement. Ideally each movement should operate at a level of no greater than 85% of capacity.
- Delay – Output in seconds, this gives an indication of the forecast average delay during the time period modelled for each movement.

Scenarios Modelled

The 2 junctions in the Study Area that will be impacted during the construction of the Proposed Development will be as;

- R585 / L6008 junction approaching the site, and,
- N22 and R585 in Castlemore due to the increased numbers of cars passing through it due to staff accessing the site.

R585 / L6008 Junction Capacity Test Results

The traffic flows observed through the junction are shown for the observed year 2022 in Figure 11.5a and for the proposed construction year 2028 in Figure 11.5b. The additional traffic movements forecast to be generated by construction staff is set out in Figure 11.5c with the 2028 traffic flows including construction staff shown in Figure 11.5d

The results of the capacity tests undertaken for the R585 / L6008 junction are shown in Table 11.24. The results show that the additional 35 car trips passing through the junction will result in the maximum ratio of flow to capacity (RFC) at the junction increasing from 8.0% to 10.1%, which will apply to the exit from the L6008 onto the R585 during the PM peak hour. As these levels are well within 85% it is concluded that this junction will operate well within capacity for all scenarios.

Table 11-24: Junction capacity test results - R585 / L6008 junction, without and with construction traffic, by time period, years 2028

Arm	AM peak hour						PM peak hour					
	No development			With development			No development			With development		
	RFC	Q	Delay	RFC	Q	Delay	RFC	Q	Delay	RFC	Q	Delay
From L6008	1.5	0.01	0.14	1.5	0.02	0.14	8.0	0.01	0.14	10.1	0.11	0.16
Right turn from R585	0.7	0.01	0.11	2.8	0.04	0.11	0.5	0.01	0.08	0.5	0.01	0.08

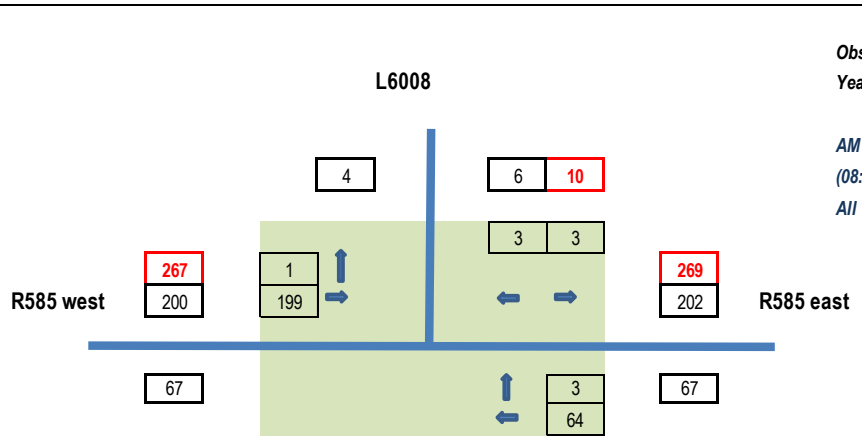
N22 / R585 Junction Capacity Test Results

The traffic flows observed through the junction are shown for the observed year 2022 in Figure 11.5e and for the proposed construction year 2028 in Figure 11.5f. The additional traffic movements forecast to be generated by construction staff is set out in Figure 11.5g with the 2028 traffic flows including construction staff shown in Figure 11.5h.

The results of the capacity tests undertaken for the N22 / R585 junction are shown in Table 11.25. The results show that the additional car trips passing through the junction will result in the maximum ratio of flow to capacity (RFC) at the junction increasing from 70.4% to 78.0%, which will apply to the right turn from the R585 onto the N22 during the PM peak hour. As these levels are also within 85% it is concluded that this junction will operate within capacity for all scenarios.

Table 11-25: Junction capacity test results – N22 / R585 junction, without and with construction traffic, by time period, years 2028

Arm	AM peak hour						PM peak hour					
	No development			With development			No development			With development		
	RFC	Q	Delay	RFC	Q	Delay	RFC	Q	Delay	RFC	Q	Delay
Right turn from R585 to N22	38.4	0.61	0.36	38.6	0.62	0.36	70.4	2.05	1.48	78.0	2.81	1.85
Left turn from R585 to N22	2.8	0.03	0.17	2.8	0.03	0.17	6.9	0.07	0.58	10.3	0.11	0.89
Right turn from N22 to R585	0.4	0.00	0.05	0.4	0.00	0.05	0.6	0.01	0.09	0.6	0.01	0.09



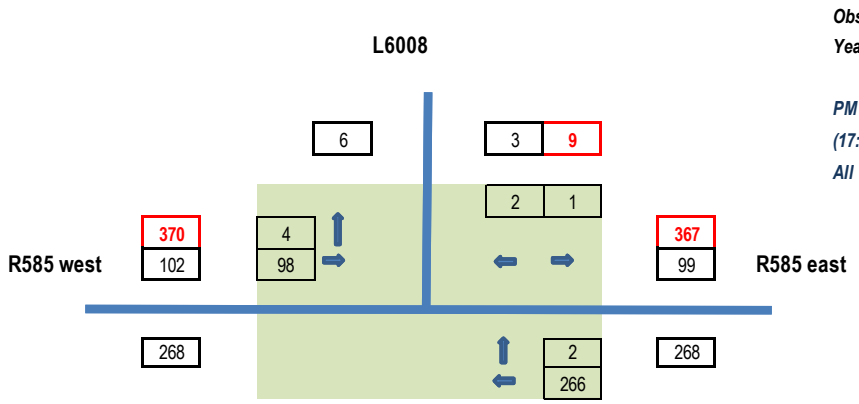


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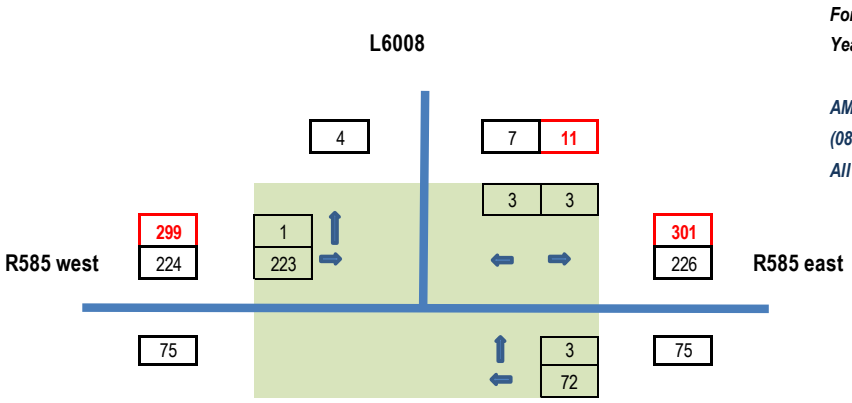
Figure 11.5a Observed backgroud traffic flows, AM & PM hours, R585 / L6008 junction, Year 2022 - All vehicles



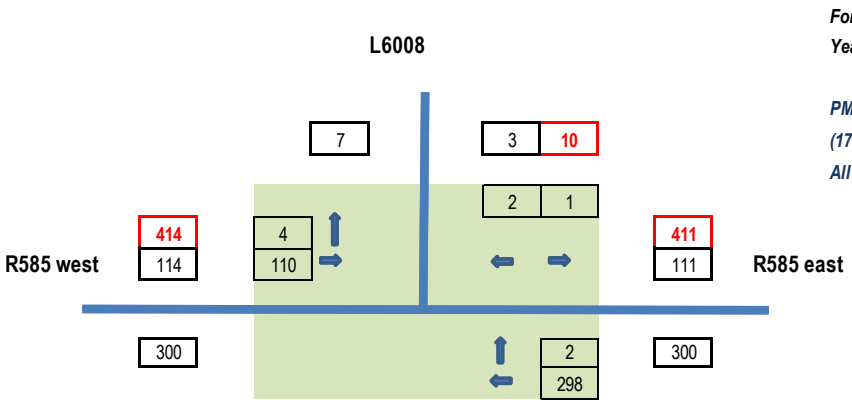


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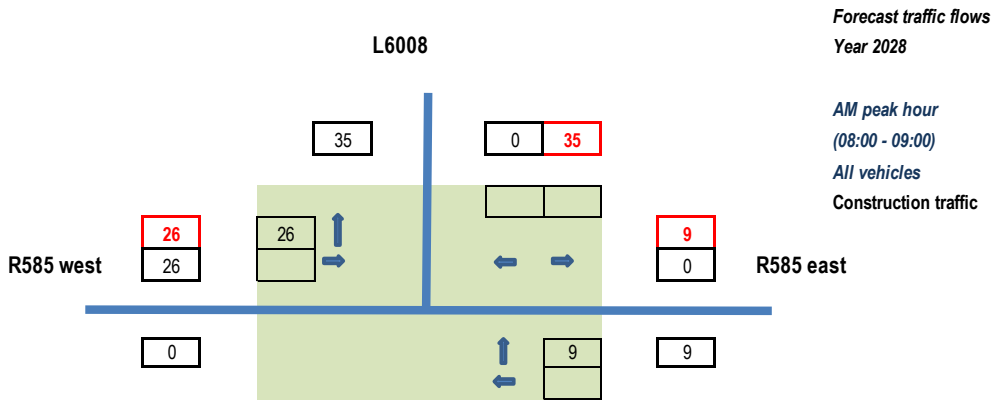
Figure 11.5b Forecast background traffic flows, AM & PM peak hours, R585 / L6008 junction, Year 2028 - All vehicles



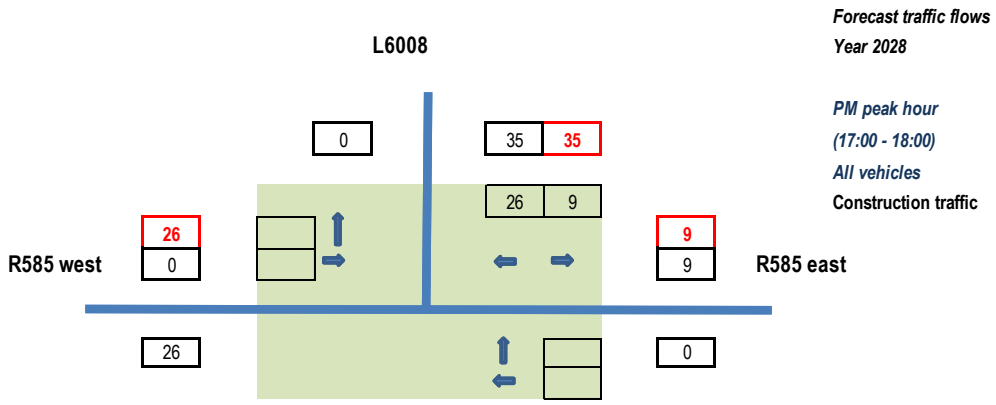


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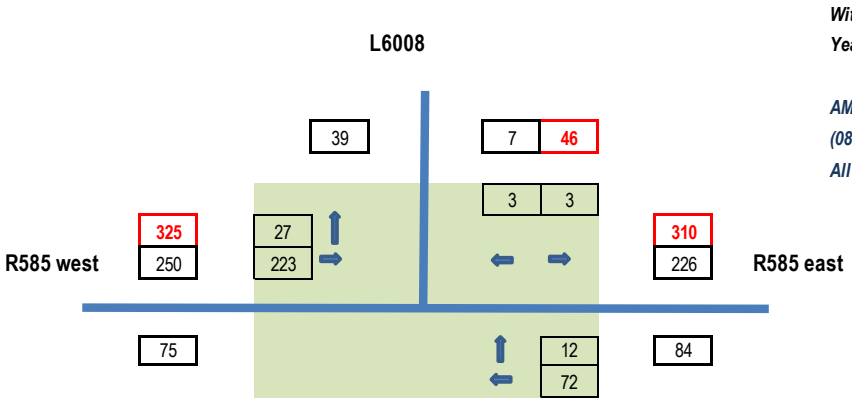
Figure 11.5c Forecast construction traffic flows, AM & PM peak hours, R585 / L6008 junction, Year 2028 - All vehicles



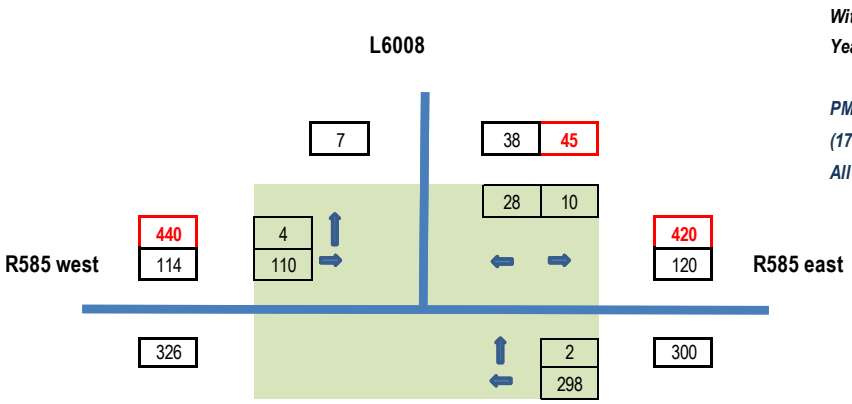


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Figure 11.5d Forecast with construction traffic flows, AM & PM peak hours, R585 / L6008 junction, Year 2028 - All vehicles

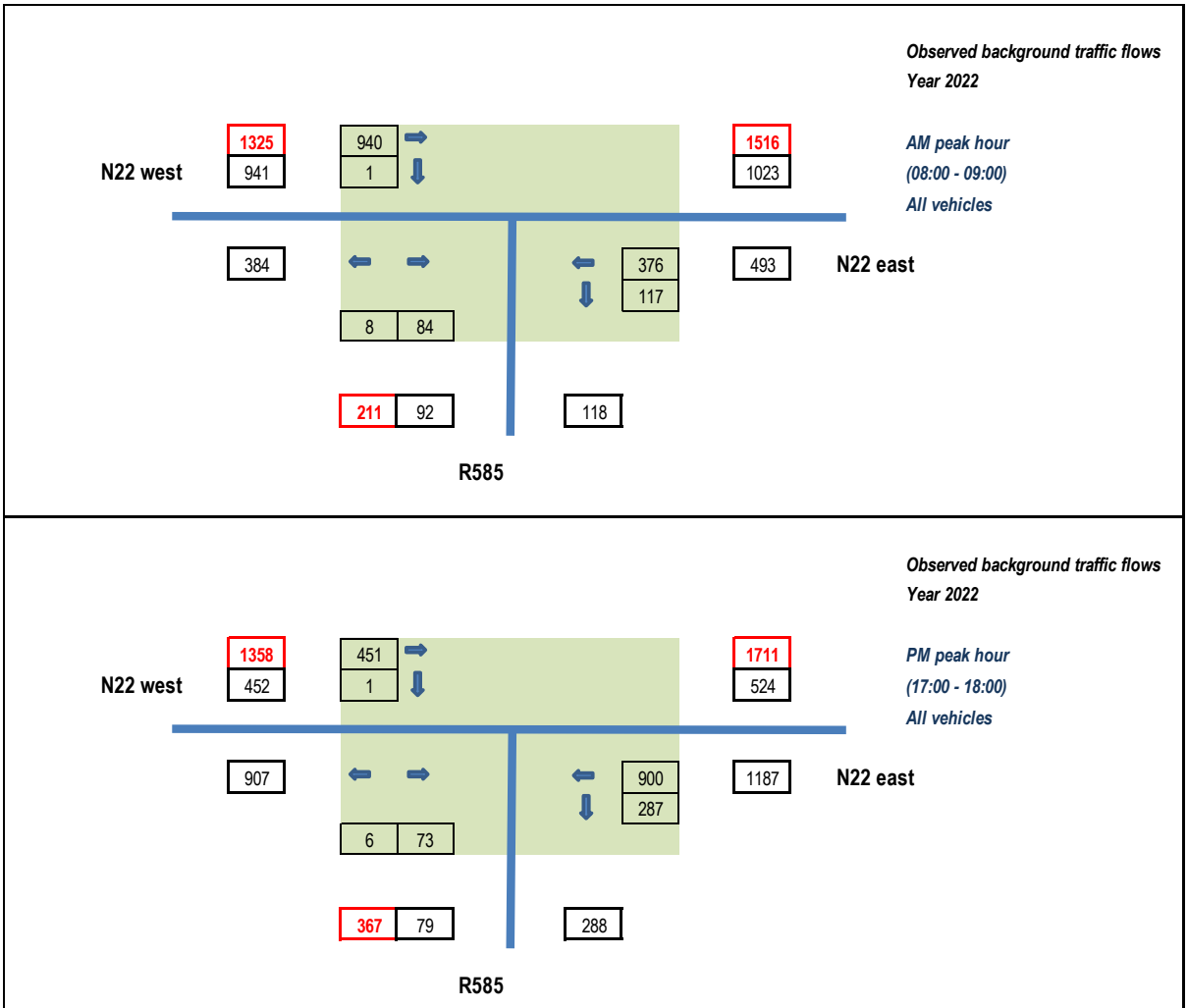

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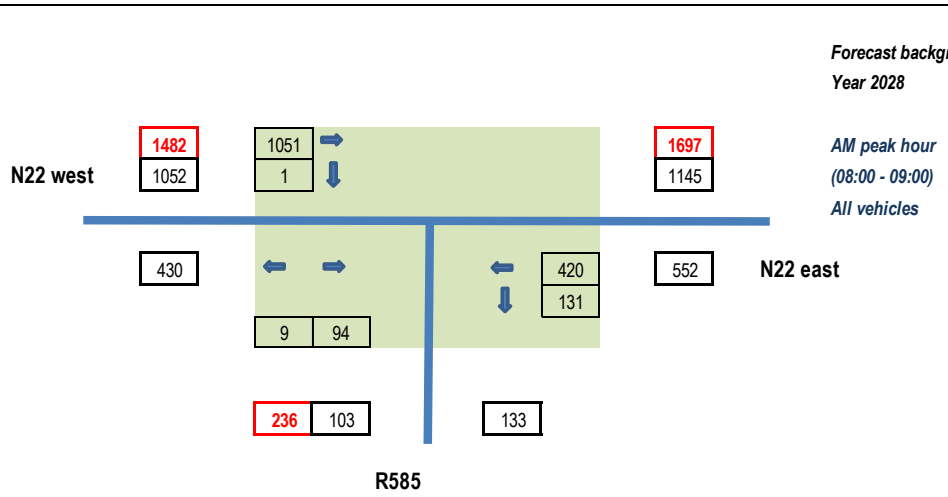
Figure 11-5e Forecast backgroud traffic flows, AM & PM peak hours, N22 / R585 junction, Year 2022 - All vehicles



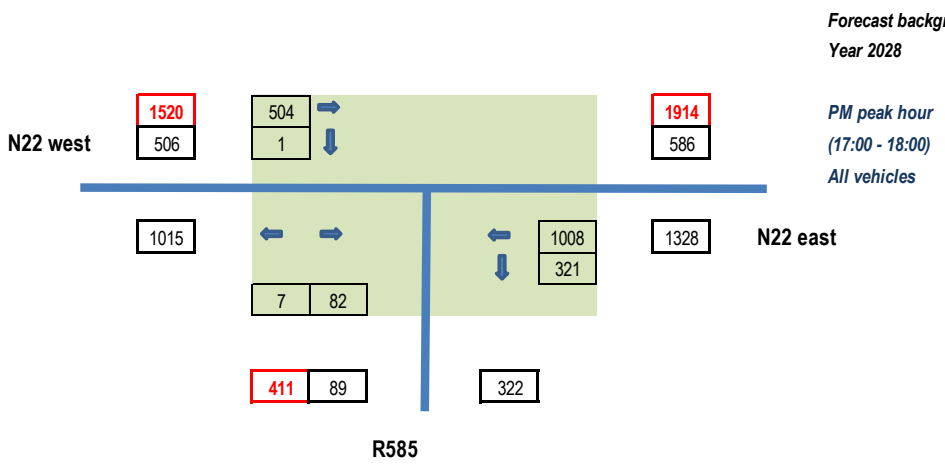


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Figure 11.5f Forecast background traffic flows, AM & PM peak hours, N22 / R585 junction, Year 2028 - All vehicles

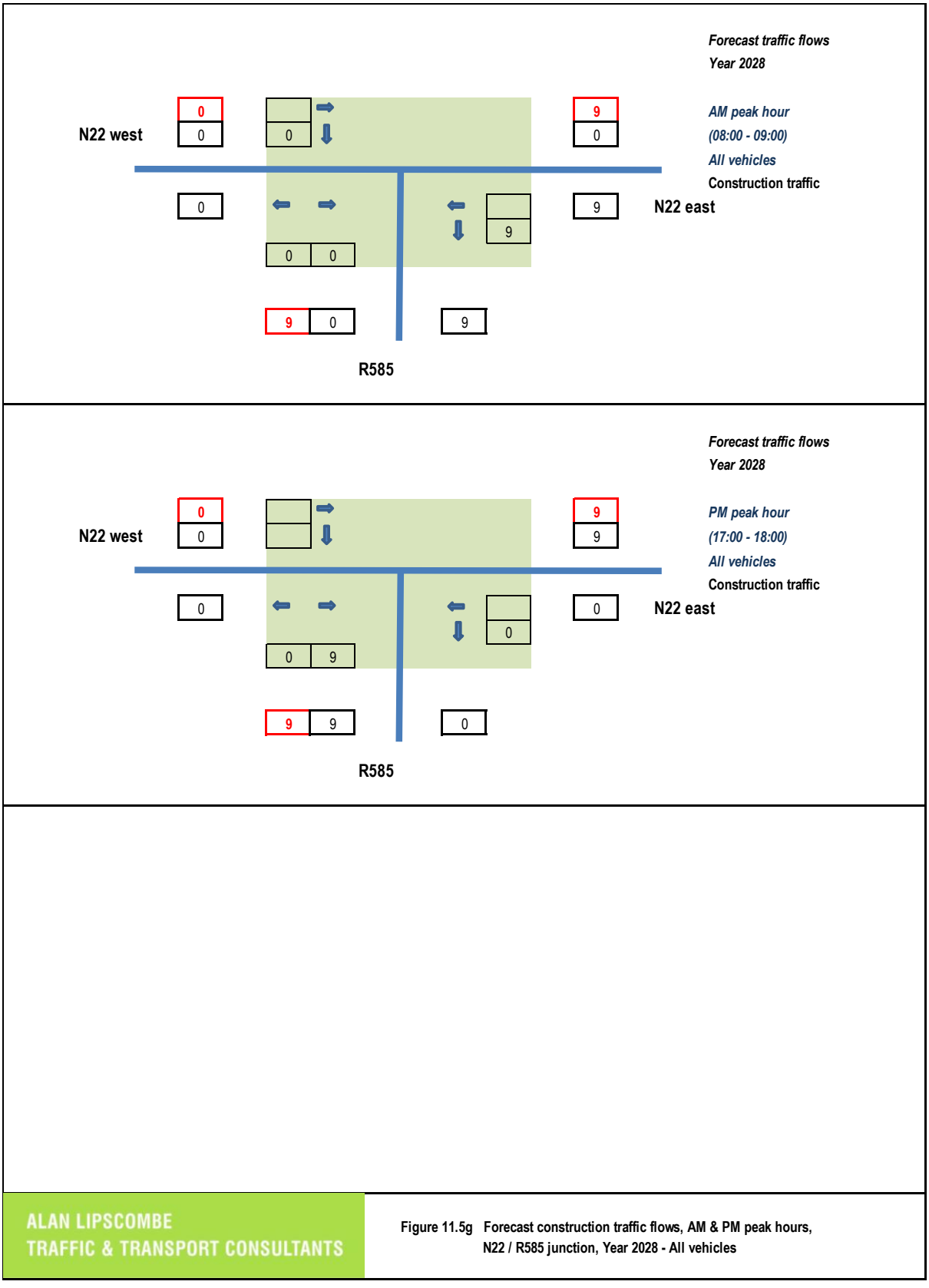

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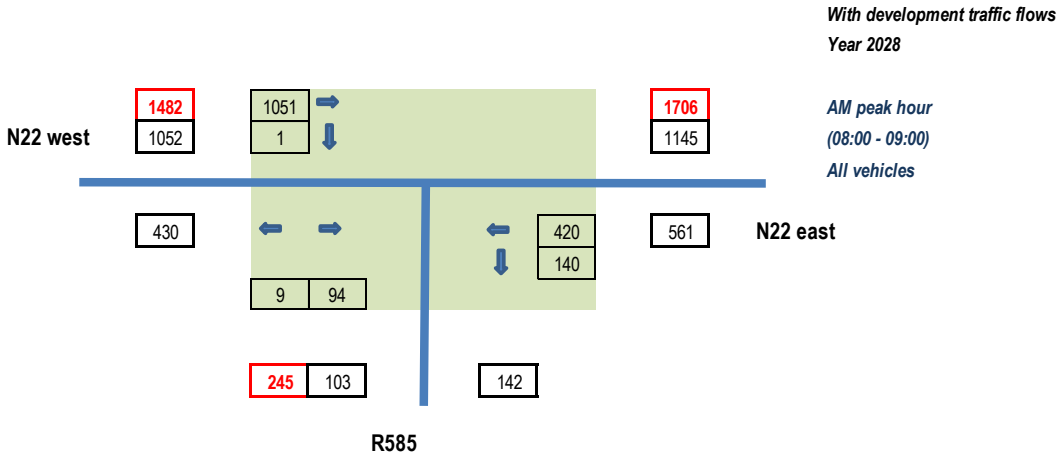
Figure 11.5g Forecast construction traffic flows, AM & PM peak hours, N22 / R585 junction, Year 2028 - All vehicles



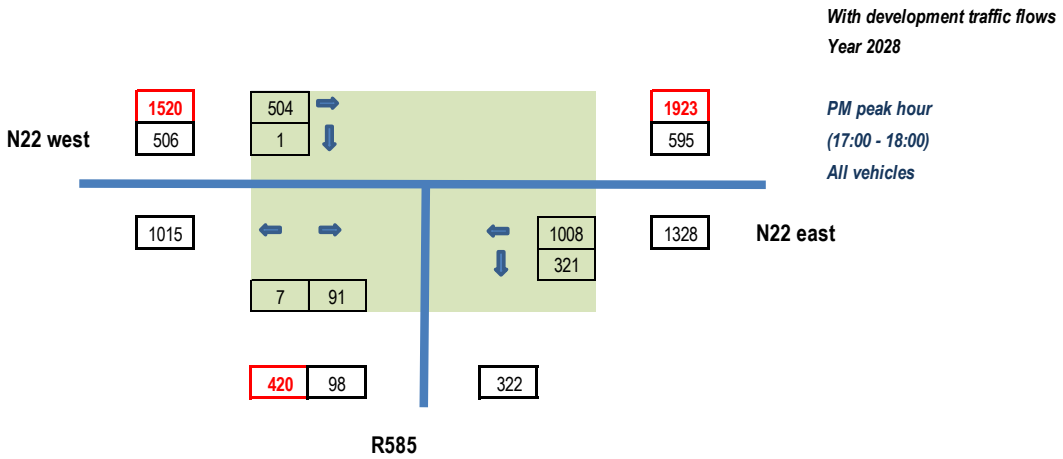


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Figure 11.5h Forecast with construction traffic flows, AM & PM peak hours, N22 / R585 junction, Year 2028 - All vehicles

11.5.4 Effect on Junctions – During Operation

As discussed in Section 11.3.3 it is forecast that once operational the Proposed Development will generate a maximum of one or two car trips per day for maintenance purposes. It is therefore concluded that the effect of the Proposed Development once operational will be imperceptible through the R585/L6008 and N22 / R585 junctions.

It should be noted that any works outside of routine maintenance will be assessed prior to any works commencing e.g., blade replacement, etc.

11.6 Route Assessment

The proposed turbine delivery route is indicated in Figure 11.2a, and all following commentary in this section refers to the route in the direction that vehicles accessing the site will travel. All locations along the route referred to in this section are also highlighted in Figure 11.2a. Detailed assessment is confined to locations considered as potentially presenting constraints for the abnormally sized loads, as identified from site visits. For these locations preliminary road and junction alignments, based on site surveys, OS base plans and aerial photography, were supplied by the project team. A swept path analysis was then undertaken using Autotrack in order to establish the locations where the wind farm transporter vehicles will be accommodated, and the locations where some form of remedial measure would be required.

The locations discussed are shown in Figure 11.2a, and are as follows:

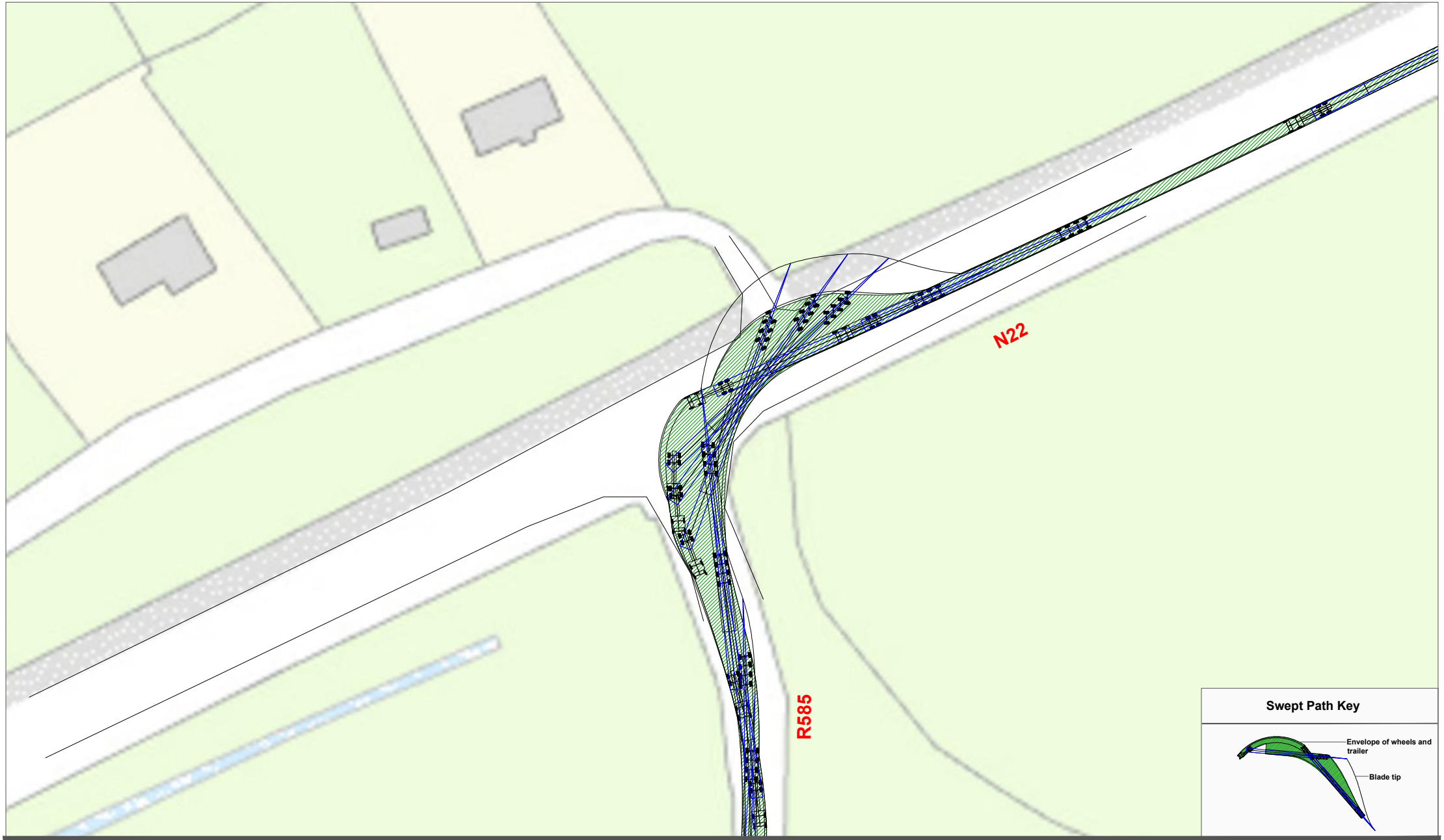
- Location 1 - N22 / R585 Junction at Castlemore,
- Location 2 – Right turn on R585 at Crookstown,
- Location 3 – Left turn at R585 / R590 junction at Crookstown,
- Location 4 – Bend on R585 south of Crookstown,
- Location 5 – Series of bends in the R585,
- Location 6 – R585 through Bealnablath,
- Location 7 – R585 / L6008 junction,
- Locations 8 – The bend on the L6008,
- Location 9 – The left turn from the L6008 onto the L6007,
- Locations 10 – The access junction off the L6007, and
- Locations 11 to 13 – The access junction and route through the site.

Location 1 N22 / R585 junction at Castlemore

The junction between the N22 and the R585 takes the form of a priority junction with the N22 comprising the major arm. The swept path assessment for the design vehicles negotiating the junction is shown in Figures 11.6 and 11.7 for the blade and tower sections respectively. The figures show that both vehicles will be accommodated by the current junction layout.

Plate 11-1: Location 1 – N22/R585 Junction at Castlemore, looking west along N22

Plate 11-2: Location 1 – N22/R585 Junction at Castlemore, looking north from R585 to N22



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.6 Location 1 - N22 / R585 junction at Castlemore, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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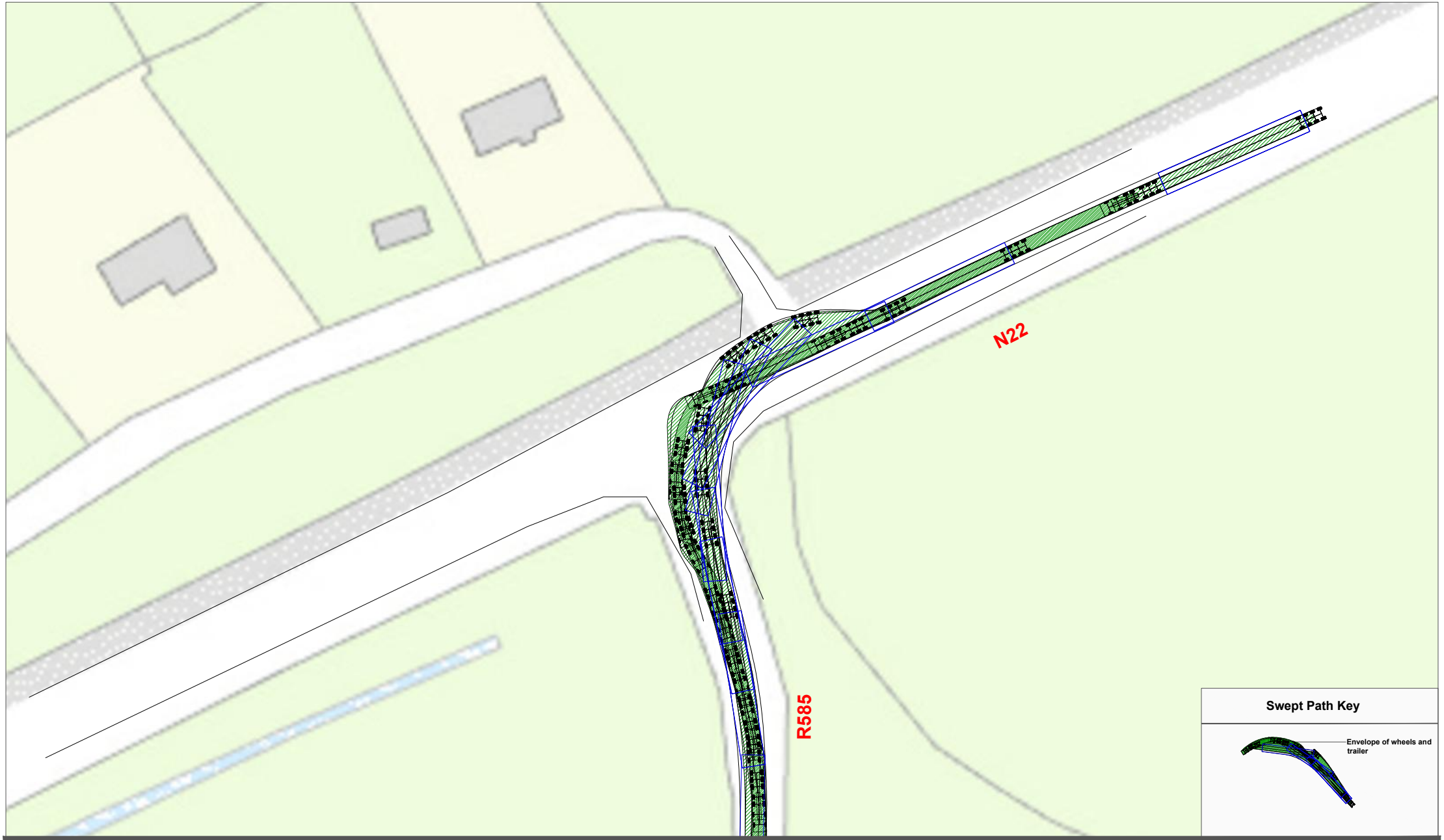

NOTES:

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Figure 11.7 Location 1 - N22 / R585 junction at Castlemore, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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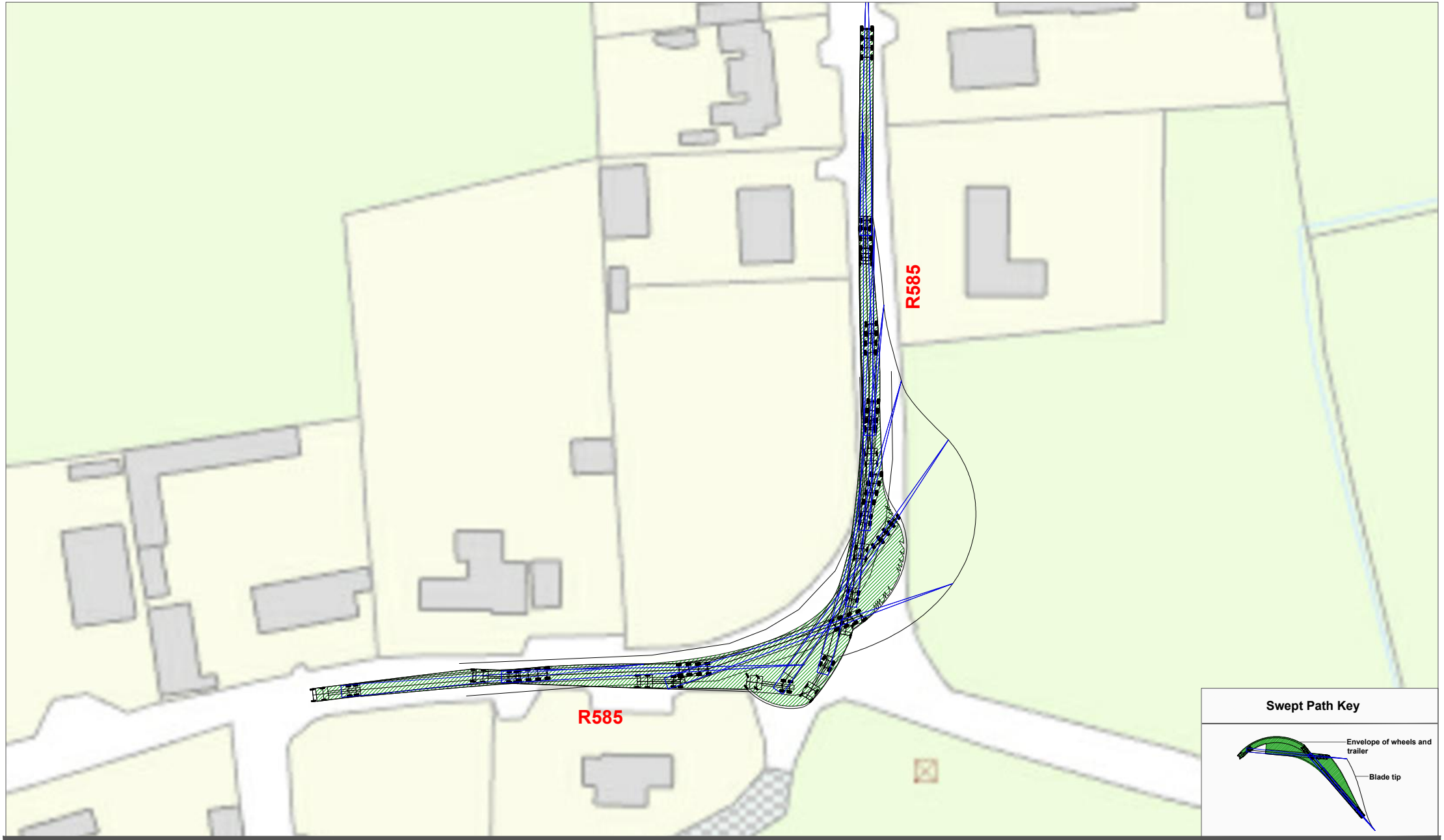
Location 2 Right turn on R585 at Crookstown

The swept path analysis for this location is shown in Figures 11.8 and 11.9 for the blade and tower transport vehicles respectively. The assessment shows that the blade will require to over-sail the field to the northeast of the junction in order for the blade transporter to negotiate the bend.



NOTES:

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Figure 11.8 Location 2 - Right turn on R585 Crookstown, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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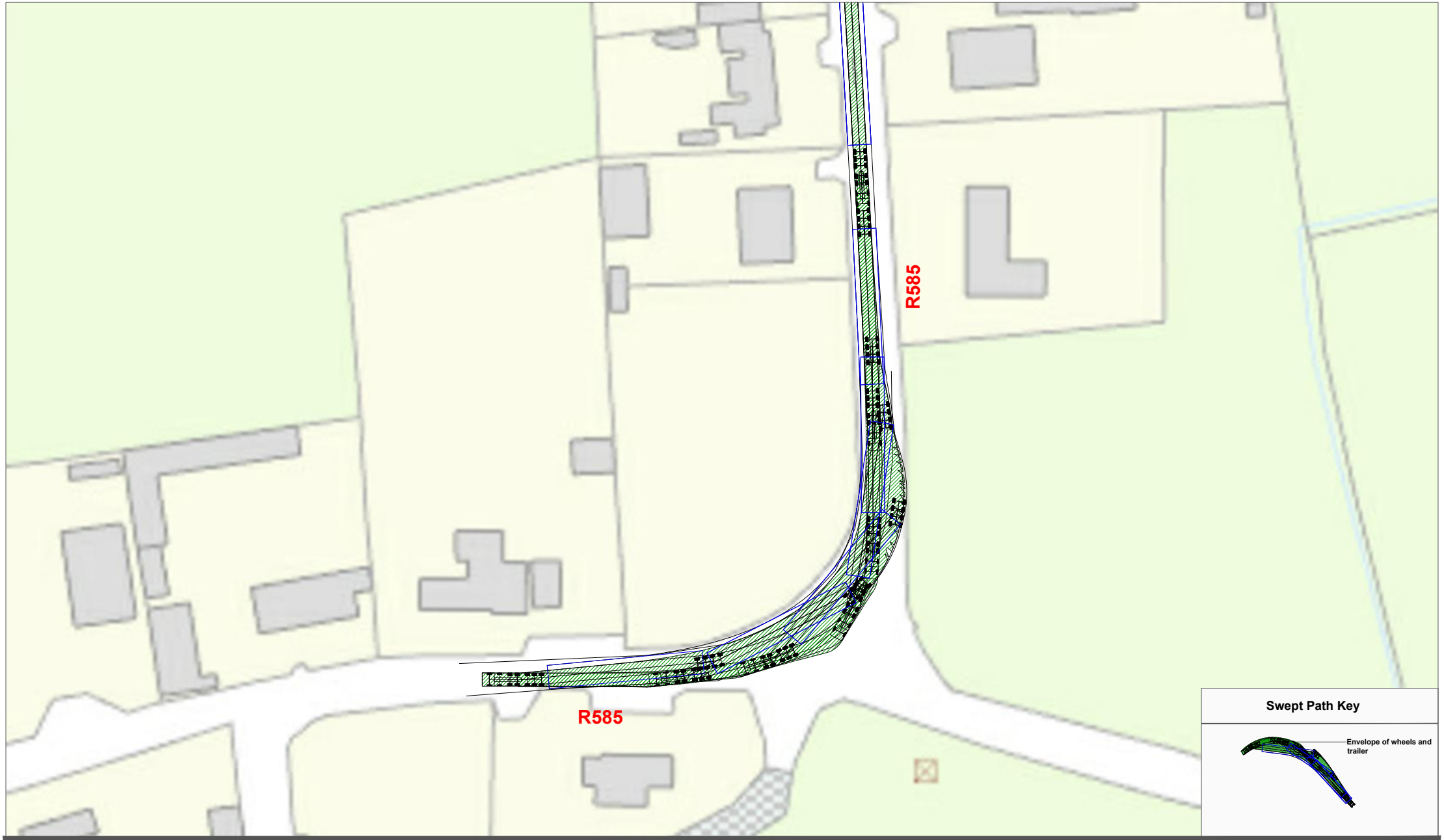

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Figure 11.9 Location 2 - Right turn on R585 Crookstown, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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Location 3 Left turn at R585 / R590 junction at Crookstown

The junction in the centre of Crookstown is relatively tight with properties and boundary walls on all sides of the junction, including Clifford's Bar public house located on the south west corner. A number of service cables also pass through the site.

The swept path analysis for the left turn following the R585 through the junction is shown in Figure 11.10 for the blade transporter and Figure 11.11 for the tower. The swept path for the blade shows that the full width of the carriageway will be required, including the parking area on the east side of the public house. The analysis also shows that the tip of the blade will oversail the edge of carriageway on the north side of the junction, and that the wheels of the transport vehicle will over run the footpath on the same side. The figure also shows that a section of the site on the south-eastern corner of the junction will be required for over-sail for the blade transport vehicle to make this turn.

The tower transporter will also require the full available geometry at this location with the wheels over-running onto the footpath on the northern side of the R585 and the parking area outside the public house. During the delivery stage of the turbine vehicles, the following will be required at this location:

- The temporary removal of existing street furniture and service cables,
- The possible temporary alteration of the footpath on the northern side of the R585
- The temporary removal of all parking, including the area adjacent to the public house on the west side of the R585.

NOTES:

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Figure 11.10 Location 3 - Left turn at R585 / R590 junction at Crookstown, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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NOTES:

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Figure 11.11 Location 3 - Left turn at R585 / R590 junction at Crookstown, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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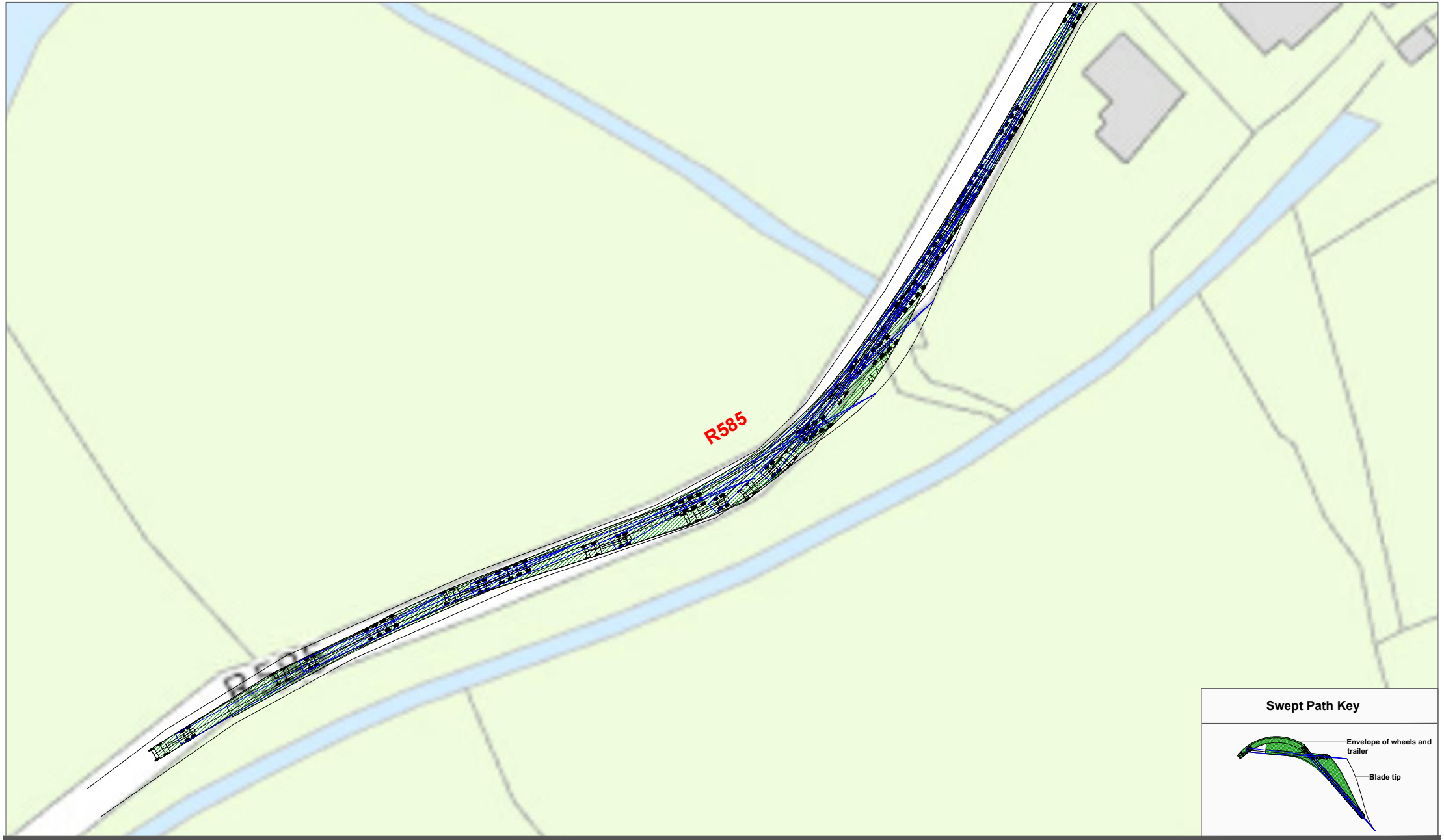
Plate 11-3: Location 3 – Left turn on R585 in Crookstown, looking southwest

Plate 11-4: Location 3-Left Turn on R585 in Crookstown, looking North

Location 4 Bend on R585

The swept path analysis is shown in Figure 11-12 for the blade and Figure 11-13 for the tower, this indicates that the wind farm turbine vehicles will be able to negotiate this bend.



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.12 Location 4 - Bend on R585, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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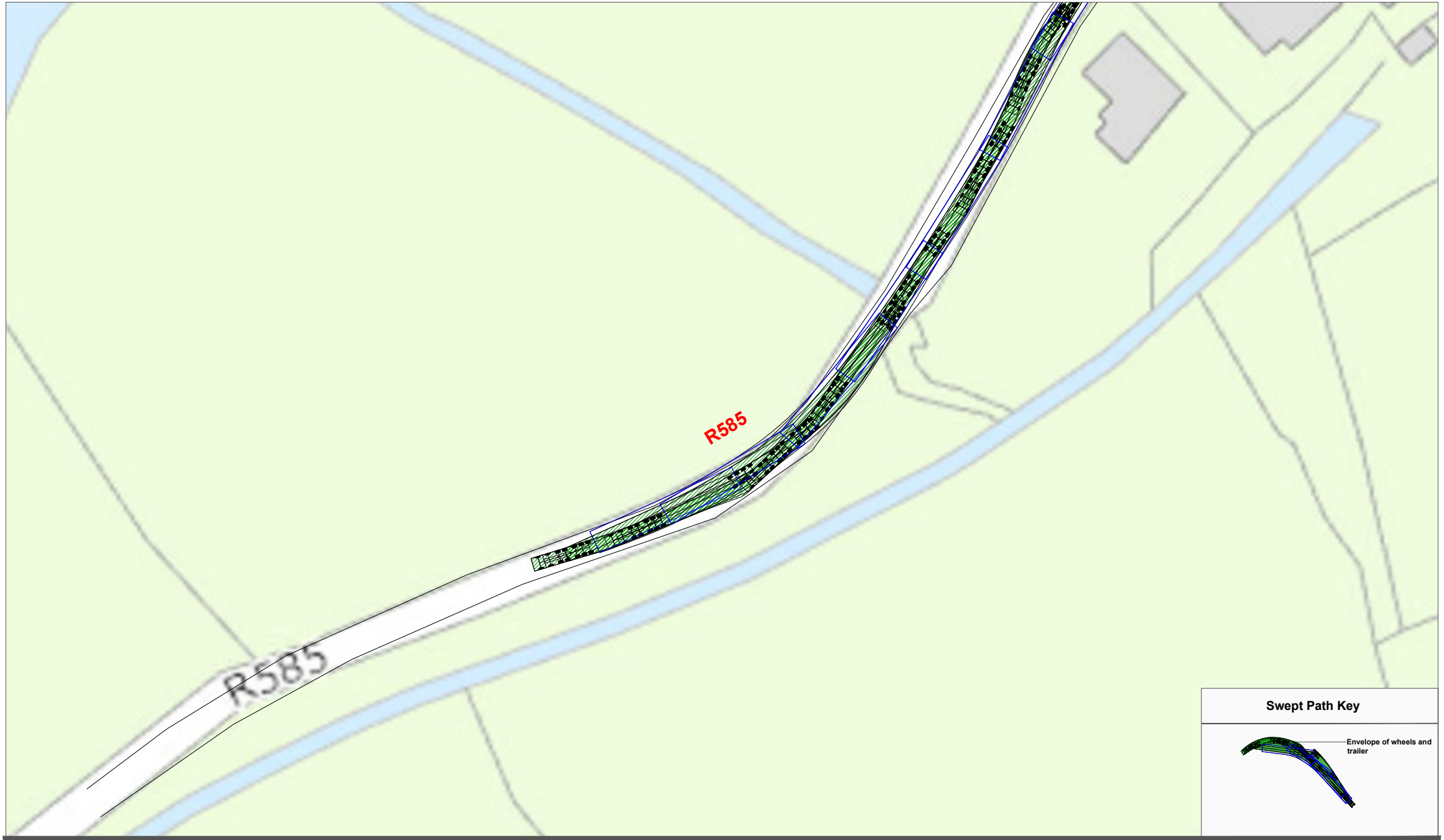

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.13 Location 4 - Bend on R585, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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Location 5 Series of bends on R585

The swept path requirements for the design vehicles passing through a series of S-bends on the R585 are shown in Figures 11.14a, 11.14b, 11.15a and 11.15b. The figures show that the existing geometry at this section of the R585 will accommodate all wind farm transport vehicles. It is noted that some minor trimming of foliage will be required.

NOTES:

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Figure 11.14a Location 5 - Series of bends on R585, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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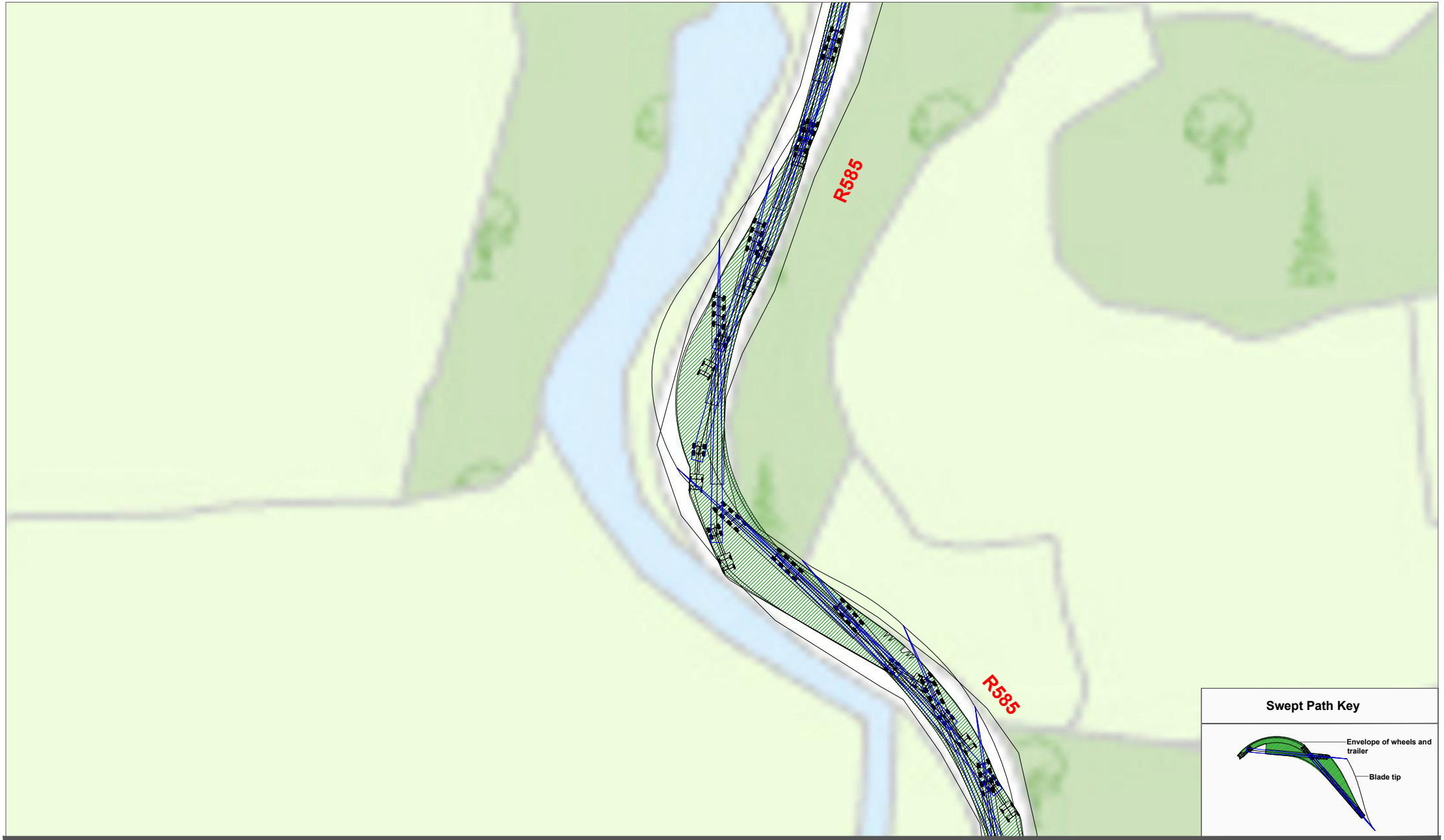

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.14b Location 5 - Series of bends on R585, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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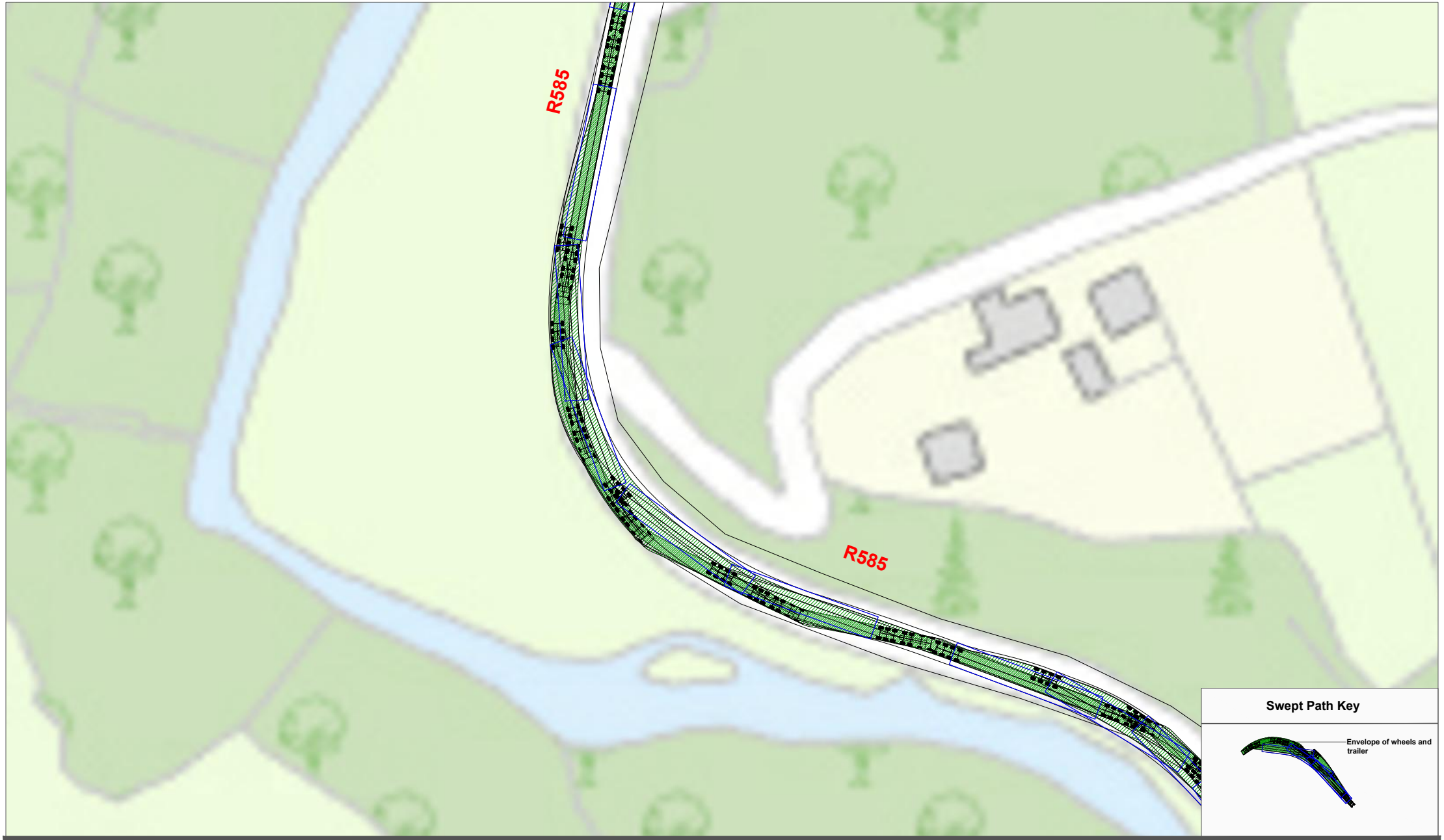

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 11.15a Location 5 - Series of bends on R585, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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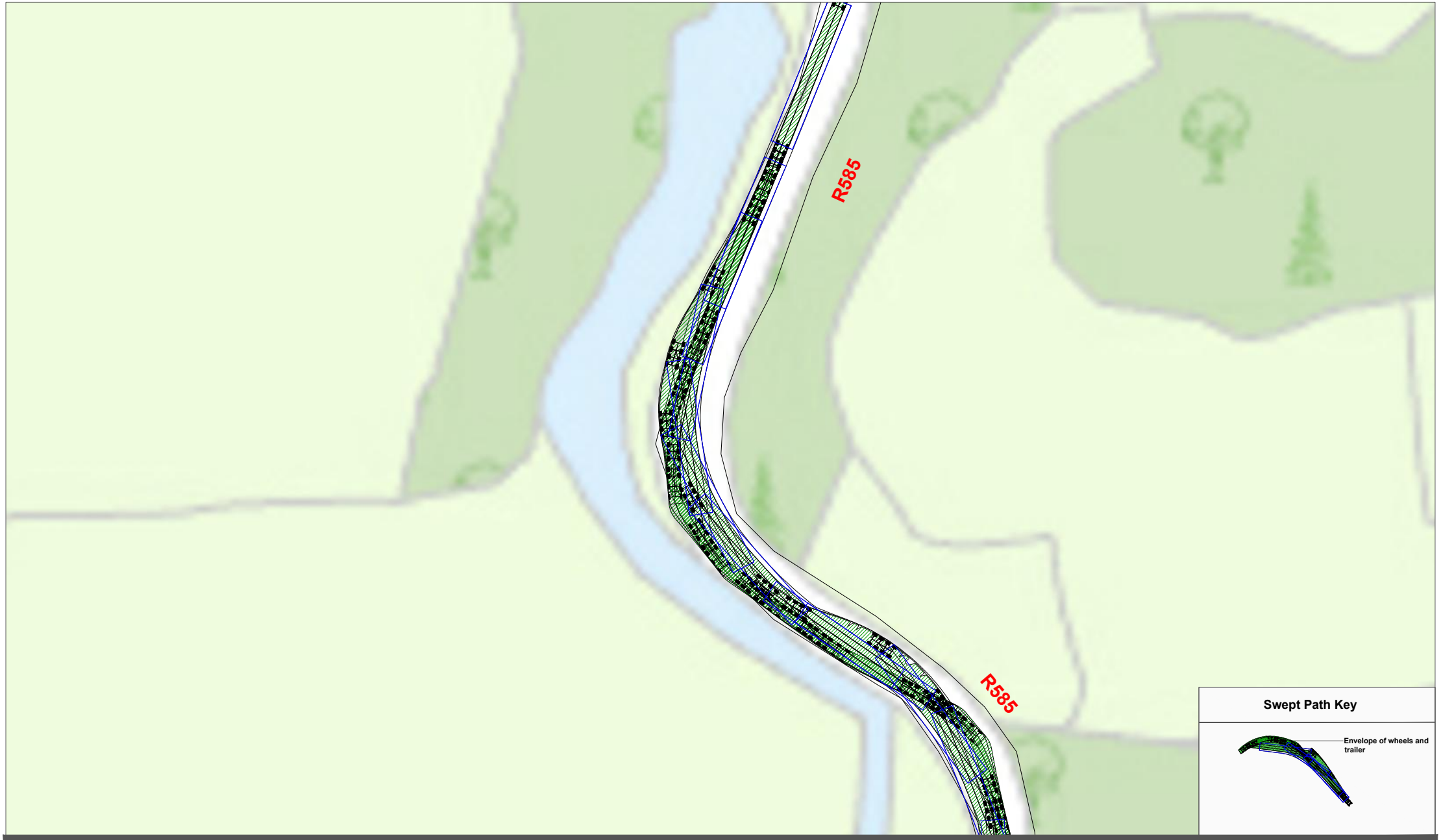

NOTES:

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Figure 11.15b Location 5 - Series of bends on R585, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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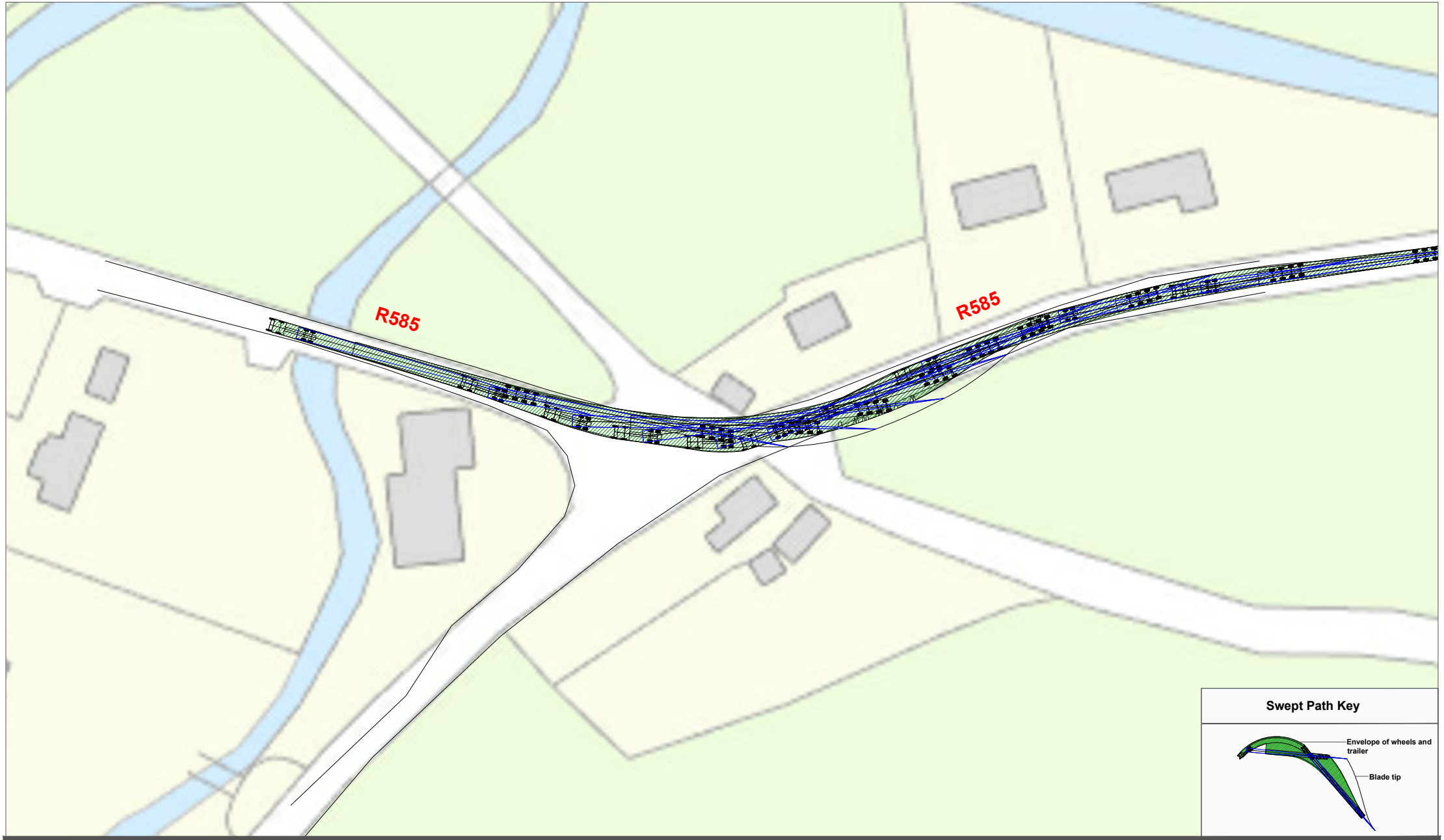
Location 6 R585 through Bealnablath

The swept path requirements for the design vehicles passing through this location on the R585 are shown in Figures 11.16 and 11.17. The figures show that the existing geometry will accommodate all wind farm transport vehicles.

Plate 11-5: Location 6 – R585 through Bealnablath, looking west



NOTES:

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Figure 11.16 Location 6 - R585 through Bealnablath, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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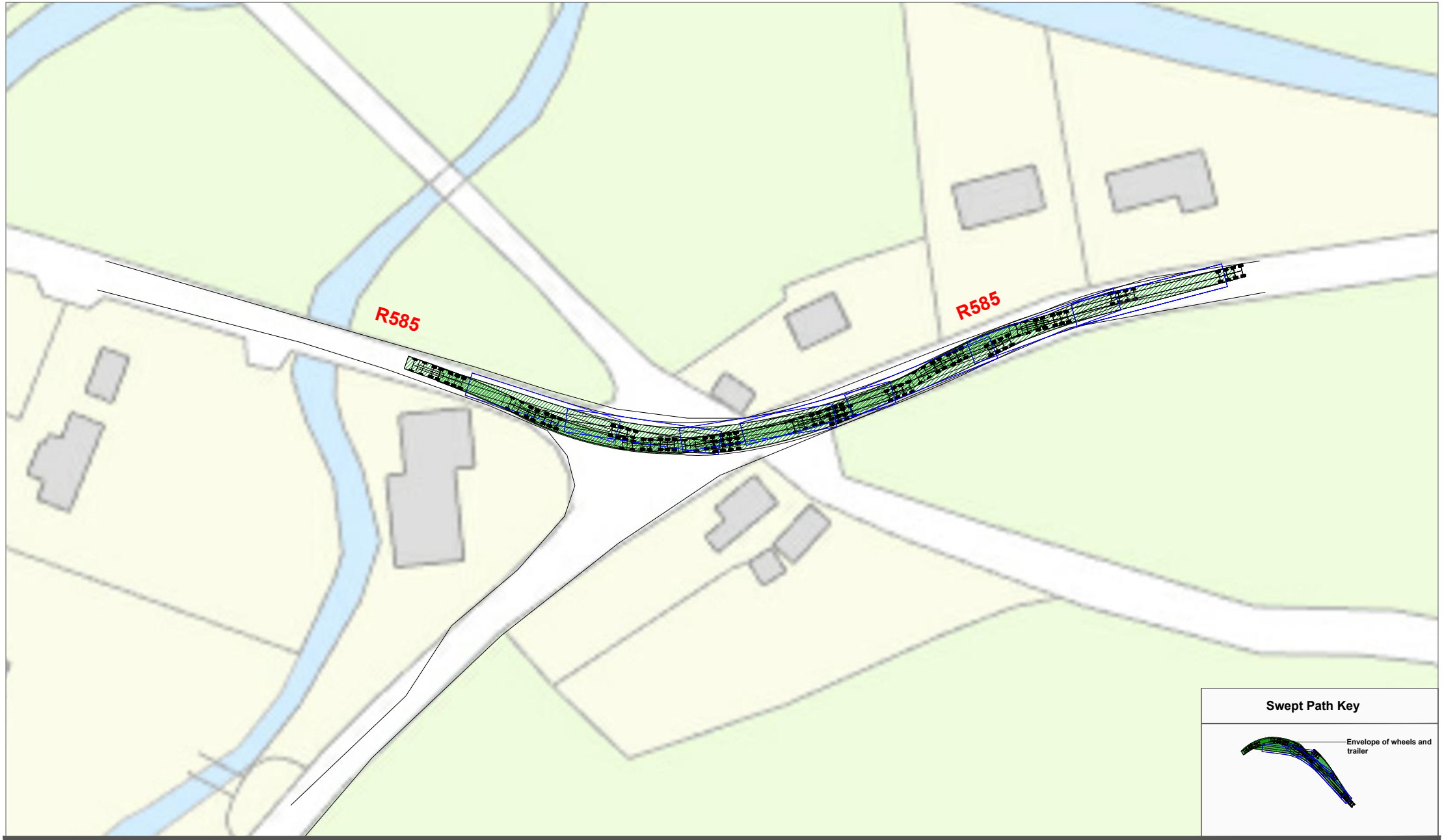

NOTES:

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Figure 11.17 Location 6 - R585 through Bealnablath, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 23.01.23	DRAWN BY:	AL

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Location 7 Right turn from R585 onto L6008

Enabling works required to accommodate the turbine vehicles was granted at this location by Cork County Council as part of PL Ref. 14/6803. It is proposed that these vehicles will cut the corner through existing Coillte lands as shown in Figures 11.18 and 11.19.

Plate 11-6: Location 7 – Right turn of the R585

NOTES:

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Figure 11.18 Location 7 - Right turn from R585 onto L6008, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd		SCALE: 1:1000
PROJECT NO: 3790	DATE: 16.02.23		DRAWN BY: AL

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NOTES:

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Figure 11.19 Location 7 - Right turn from R585 onto L6008, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd		SCALE: 1:1000
PROJECT NO: 3790	DATE: 16.02.23		DRAWN BY: AL

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Location 8 Bends on L6008

The swept path requirements for the design vehicles passing through this location on the L6008 are shown in Figures 11.20 and 11.21. The figures indicate that existing geometry will accommodate all wind farm transport vehicles.

NOTES:

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Figure 11.20 Location 8 - Bends on L6008, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 16.02.23	DRAWN BY:	AL

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Figure 11.21 Location 8 - Bends on L6008, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd		SCALE: 1:1000
PROJECT NO: 3790	DATE: 16.02.23		DRAWN BY: AL

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Plate 11-7: Location 8 -Series of bends on L6008

Location 9 Left turn off the L6008 at Lackereagh onto the L6007

The existing geometry at this location will not accommodate the wind turbine design vehicles. It is proposed that these vehicles will cut the south west corner of the junction at a location within the development red line boundary, as shown in Figures 11.22 and 11.23.

Plate 11-8: Location 9 – Left turn off the L6008

NOTES:

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Figure 11.22 Location 9 - Left turn from L6008 onto L6007, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd		SCALE: 1:1000
PROJECT NO: 3790	DATE: 20.02.23		DRAWN BY: AL

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NOTES:

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Figure 11.23 Location 9 - Left turn from L6008 onto L6007, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 21.02.23	DRAWN BY:	AL

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Location 10 Access into site at Lackareagh off the L6007

The proposed access into the site is shown in Figure 11.24 and involves the construction of a new access route heading in a western direction, while the existing road heads south. STOP junction markings and a stop sign will be implemented at the junction in accordance with Figure 7.35 of the Traffic Signs Manual. The swept path requirements of the design vehicles are shown for the blade and tower transporters in Figures 11.25 and 11.26 respectively.

Plate 11-9: Location 8 – Access into Site at Lackareagh

NOTES:

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Figure 11.24 Location 10 - Access onto site off L6007, visibility splay

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:2000
PROJECT NO: 3790	DATE: 16.02.23	DRAWN BY:	AL

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NOTES:

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Figure 11.25 Location 10 - Access into site off L6007, blade extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 16.02.23	DRAWN BY:	AL

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NOTES:

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Figure 11.26 Location 10 - Access into site off L6007, tower extended artic

PROJECT:	Barnadivane Wind Farm & Substation		
CLIENT:	Barna Wind Energy Ltd / Arran Windfarm Ltd	SCALE:	1:1000
PROJECT NO: 3790	DATE: 16.02.23	DRAWN BY:	AL

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Locations 11, 12 and 13 are bends within the site boundary with autotrack assessments for these locations provided in Figures 11.27 to 11.32, which are included as Appendix 11.4

11.7 Traffic Management of Abnormally Sized Deliveries

The greatest impact on the road network may be experienced on the 10 days during which the 5 abnormally large loads comprising the tower sections, the blades and the nacelles are delivered to the site.

Prior to the construction stage a detailed traffic management plan will be prepared by the haulage company and submitted to Cork County Council for approval. The plan will include:

- A delivery schedule,
- Details of the alterations required to the infrastructure identified in this report and any other minor alteration identified (hedge rows etc.),
- Details of a dry run of the route using vehicles with similar dimensions.

It is proposed that deliveries will be made to the site in convoys of 5 vehicles at a time with escorts at the front and rear operating a “stop and go” system.

It is now common practice that deliveries of the abnormally sized loads are made during night time hours when impacts to the existing traffic is significantly reduced.

11.8 Provision of Sustainable Modes of Travel

11.8.1 Walking and Cycling

The provision for these modes is not relevant during the construction stage of the development and travel distances will likely exclude any permanent employees walking or cycling to work.

11.8.2 Public Transport

There are no public transport services that currently pass the site although mini buses may be considered for transporting staff to and from the site in order to minimise traffic generation and parking demand on site.

11.9 Likely and Significant Effects and Associated Mitigation Measures

11.9.1 Do Nothing Scenario

If the Proposed Development were not to proceed, no changes would be made to the current land-use.

There would also be no additional traffic generated or accommodation works carried out on the local road network and therefore no direct or indirect effects on roads and traffic.

11.9.2 Construction Phase

During Stage 1 – foundation concrete pouring

During the 6 weekdays that the concrete foundations are poured an additional 358 PCU's per day will appear on the study network. On these days, the percentage increase in traffic volumes experienced on the study network will be between +2.2% (on the N22 at Castlemore), to +6.3% on the R585 through Crookstown, to +9.2% on the R585 leading to the L6008. On the L6008 approaching the site, which for the do-nothing scenario is forecast to provide for just 123 pcu's per day in the construction year of 2028, it is forecast that on these busiest 6 days traffic volumes will increase by a factor of less than 4 (or +273.0%). On these days the direct effect will be temporary, and will be slight.

During Stage 1 - Site Preparation and Groundworks and substation

For 227 weekdays an additional 163 PCU's per day will travel on the study network. On these days, the percentage increase in traffic volumes experienced on the study network will be between +1.0%, on the N22 at Castlemore, to +2.9% on the R585 through Crookstown, to +4.2% on the R585 leading to the L6008. On the L6008 approaching the site, it is forecast that traffic volumes will increase by +124.3%. On these days, the direct effect on the surrounding road network will be temporary and will be slight.

In the event that the AGCR option is pursued and the construction of the substation is not required it is considered that the daily impacts on traffic flows will be as above but the construction time for this stage will reduce by 5 days, from 227 days to 222 days.

During Stage 2 - Turbine Construction Stage – Delivery of large equipment using extended articulated vehicles

For 16 weekdays an additional 100 PCU's per day will travel on the study network when it is forecast that the percentage increase in traffic volumes experienced on the study network will be between +0.6% on the N22 at Castlemore, to +1.8% on the R585 through Crookstown, to +2.6% on the R585 leading to the L6008. On the L6008 approaching the site, it is forecast that traffic volumes will increase by +76.3%.

The traffic impact during these days will be the most significant during the construction of the Proposed Development, primarily due to the slow speeds, size, and geometric requirements of these vehicles. The provision of traffic management measures, addressed at a preliminary level in Section 11.5, will be required to minimise the impact of development traffic on the study network on these days. Undertaking these deliveries during night time hours will significantly reduce the impact during these deliveries. Due to the potential disruption to general traffic it is considered that if these deliveries are undertaken during the day the potential effects would be moderate. The direct effects can be reduced to slight if the delivery of the large plant is done at night, as is proposed.

During Stage 2 - Turbine Construction Stage – Other deliveries using conventional articulated HGV's

For 6 weekdays in one year, approximately 2 days per week for 3 weeks, an additional 59 PCU's per day (comprising of cars and standard articulated HGV movements to and from the site) will travel on the study network.

On these days the percentage increase on the study network will increase by between 0.4% on the N22 at Castlemore) to +1.1% on the R585 through Crookstown, to +1.5% on the R585 leading to the L6008. On the L6008 approaching the site, it is forecast that traffic volumes will increase by +45.0%). The direct effect during this period will be temporary and will be slight.

11.9.3 Operational Phase

During the operational phase the direct effect on the surrounding local highway network will be neutral and long term given that there will be approximately 3 maintenance staff travelling to the site at any one time.

11.9.4 Decommissioning Phase

The design life of the Proposed Wind Farm is 25 years after which point it will be decommissioned and cranes will disassemble each turbine tower and all equipment.

All turbine infrastructure including turbine components will be separated and removed off-site for re-use, recycling and waste disposal. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. It is proposed to leave the access roads and hardstanding areas in situ at the decommissioning stage for use by the landowner. Leaving the turbine foundations, access tracks and hardstanding areas in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environment nuisances such as noise, dust and/or vibration.

The substation will remain in-situ as it will remain an EirGrid asset with the decommissioning of the Proposed Wind Farm site.

Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential impacts. A Decommissioning Plan will be agreed with Cork County Council prior to undertaking this process.

11.9.5 Cumulative Effects

The traffic generation for the Proposed Development is set out in Section 11.3.2 while the associated traffic impacts are addressed in Section 11.5.1. The developments considered as part of the cumulative effect assessment are described in Appendix 1.2, Volume 2 of this EIAR.

The developments that were considered to have potential cumulative impacts with the Proposed Wind Farm Development in terms of traffic impacts are summarised in Table 11.26. An assessment of the potential cumulative traffic effects with the Proposed Development was based on the following criteria;

- Project status (proposed, to operational)
- Degree of overlap with the Proposed Development delivery highway network (low to high)
- Traffic volumes (low to high)

The development or activities that were considered to have potential cumulative impacts with the Proposed Development in terms of traffic impacts are summarised in Table 11.26.

All other wind farm developments located within a 20km radius are shown in Appendix 8.2 of this EIAR.

The majority of the developments listed have either a low level of the extent of the overlap of the haul routes with the Proposed Development, or have low levels of associated traffic volumes, resulting on a slight or imperceptible potential for cumulative traffic related effects.

The 2 developments with the greatest potential for cumulative impacts with the Proposed Development are the Barnadivane Turbine Delivery Route (TDR) (CCL PL Ref.14/6803), which includes the improvement works at the R585 / L6008 junction, and the AGCR (CCL PL Ref.15/730). While both developments will generate relatively low volumes of traffic, both will generate additional traffic on the same sections of the local highway network as will be impacted by the Proposed Development. It is therefore considered that the potential for cumulative traffic related effects for these developments are slight to medium. The potential for cumulative impacts will be avoided through careful scheduling of the various construction phases of the 3 developments.

Table 11-26: Summary of projects considered in cumulative assessment for traffic effects with Proposed Development

P.A Ref No	Project	Status	Degree of overlap of highway network (none / low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative effects
146803	Barnadivane Wind Farm Turbine Delivery Route (TDR) enabling works	Permitted	High	Low	Medium
15730	Alternative Grid Connection Route (AGCR) - 38kV underground cable linking proposed Barnadivane Wind Farm and Carrigarierk	Permitted	High	Low	Medium
88770	Increase in size (60m to 85m) and 1 additional turbine, Cahernafulla Wind Farm, Kilberrihert, Aghabullogue	Conditional	Low	Medium	Slight
86149	Completion of 7 wind turbine Wind Farm, Cahernafulla, Kilberrihert, Aghabullogue	Permitted	Low	Medium	Slight
184256	Extension to existing 110 kV substation	Conditional	Low	Low	Imperceptible

P.A Ref No	Project	Status	Degree of overlap of highway network (none / low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative effects
17431	110kV electricity substation and associated works, alterations to permitted borrow pit, temporary construction compound at the Carrigarierk Wind Farm.(2) 110kV underground electricity cabling connecting the proposed substation to existing Dunmanway ESB substation in the townlands of Carrigdangan, Inchincurka, Kilnadur, Aultaghreagh, Aultagh, Ardcahan, Knockduff, Gurteennasowna and Ballyhalwick; (3) 33kV underground electricity cabling connecting the proposed substation to the permitted Carrigarierk Wind Farm through the townlands of Carrigdangan and Gortatanavally and the permitted Shehy More Wind Farm through the townlands of Shehy More, Coolcaum, Coolmountain, Tullagh, Lackabaun, Clogher, Farrannahineeny, Crushterra, Gurteen and Carrigdangan. Together with all ancillary works and apparatus. Shehy More, Coolcaum, Coolmountain, Tullagh, Lackabaun,, Clogher, Farrannahineeny, Crushterra, Gurteen, Gor, Carrigdangan, Inchincurka, Kilnadur, Aultaghreagh	Conditional	Medium	Low	Slight
15730	Barnadivane Wind FarmGurteen, Clogher, Derryleigh, Gortatanavally, Carr, Inchincurka, Johnstown, Haremont, Gorteenadrolane,, Coolaclevane, Carrigboy, Cooldorragha, Deshure, Te,	Refused	NA	NA	NA

P.A Ref No	Project	Status	Degree of overlap of highway network (none / low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative effects
	Reanacaheragh, Barnadivane, Barnadivane (Kneeves),				
156966	Cleanrath Wind Farm 11 no turbines, Cloontycarthy, Cleanrath North, Cleanrath South, D, Rathgaskig, Derragh, Augeris, Gorteenakilla, Carri, Co. Cork	Conditional	Low	Medium	Slight
186562	Extension to permitted solar array, Carragraigue, Inchamay North and Crinnaloo South, Near Rathcool, Co. Cork	Conditional	Low	Low	Imperceptible
204916	Solar Farm, Ballytrasna, Lissarda, Co. Cork	Permitted	Medium	Low	Slight
196847	Solar Farm, Cloghmacow, Crookstown, Co. Cork	Conditional	Medium	Low	Slight
225890	Solar Farm, Currabeha, Crookstown, Co. Cork	Proposed	Medium	Low	Slight
176111	Solar Farm, Townlands of Finnis and Mishells, Co. Cork.	Conditional	Low	Low	Imperceptible
174098	Solar Farm, Callatrim, Bandon, Co Cork	Conditional	Low	Low	Imperceptible
225234	Grid Connection, Finnis, Mishells and Bandon, Co. Cork.	Conditional	Low	Low	Imperceptible
205074	Quarry extension, Castlemore Quarry, Crookstown, Co. Cork	Conditional	Medium	Low	Slight
206446	Small scale quarry, Former O'Regan Precast Quarry, Carhoo Lower and Coolnagearagh townlands, Coachford, Co. Cork	Conditional	Medium	Low	Slight
216514	Recycling facility, Tullig More and, Knockane (townlands), Dripsey, Co. Cork	Conditional	Medium	Low	Slight
187273	Continued use if sand and gravel quarry, Tullig More and, Knockane (townlands), Dripsey, Co. Cork	Conditional	Medium	Low	Slight

P.A Ref No	Project	Status	Degree of overlap of highway network (none / low / medium / high)	Traffic volumes (low / medium / high)	Potential for cumulative effects
205438	Waste water treatment plant, Townland of Carrigleigh, Inchigeelagh, Co. Cork	Conditional	Medium	Low	Slight
225853	Replacement of single dwelling with 96 residential units, Macroom, Co Cork	Further information	Low	Low	Slight
194234 / 217385	176 residential units, Meadowlands, Kilnagurteen, Masseytown, Co. Cork	Permitted	Low	Low	Slight

11.9.6 Mitigation Measures

This section summarises the mitigation measures to minimise the effects of the Proposed Development during both the construction and operational stages.

Mitigation by Design

Mitigation by design measures includes the following;

- Selection of the most appropriate delivery route to transport the wind turbine components, requiring minimum remedial works to accommodate the vehicles as set out in Section 11.6.
- Construction of temporary improvements at locations identified in Section 11.6.
- Use of on-site borrow pit to produce materials to minimise deliveries to site during construction (a total of 1,793m^3 of soil and 9,696m^3 of rock will be won from the borrow pit),
- Use of granted grid connection between the site and the existing Carrigarierk Wind Site to alleviate requirement for construction works along regional road. It is noted that this will only be used in the eventuality that the substation included as part of the Proposed Development is not granted planning permission.

Mitigation Measures During the Construction Stage

The successful completion of the Proposed Development will require significant coordination and planning and it is therefore recommended that the following comprehensive set of mitigation measures will be put in place before and during the construction stage of the project in order to minimise the effects of the additional traffic generated by the Proposed Development.

Delivery of abnormal sized loads

The following are the main points to note for these deliveries which will take place after peak evening traffic:

- The delivery of turbine components is a specialist transport operation with the transportation of components carried out at night when traffic is at its lightest and the impact minimised.
- The deliveries will be made in consultation with the Local Authority and An Garda Síochána.
- It is estimated that 48 abnormal sized loads will be delivered to the site, comprising 10 convoys of 5, undertaken over 10 separate nights.
- These nights will be spread out over an approximate period of 5 weeks and will be agreed in advance with the relevant authorities
- In order to manage each of the travelling convoys, for each convoy there will be two police escort vehicles that will stop traffic at the front and rear of the convoy of 5 vehicles.
- There will also be two escort vehicles provided by the haulage company for each convoy.

Other traffic management measures

A **Traffic Management Plan (TMP)** has been prepared and will require to be adopted by the Contractor once engaged prior to the commencement of the construction phase of the Proposed Development. The TMP includes the following:

- **Traffic Management Coordinator** – a competent Traffic Management Co-ordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management.
- **Delivery Programme** – a programme of deliveries will be submitted to the County Council in advance of deliveries of turbine components to site. Liaison with the relevant local authorities and Transport Infrastructure Ireland (TII) will be carried out where required regarding requirements such as delivery timetabling. The programme will ensure that deliveries are scheduled in order to minimise the demand on the local network and minimise the pressure on the access to the site.
- **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. temporary lane/road closures (where required) or delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Traffic Management Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided.
- **A Pre and Post Construction Condition Survey** – Where required by the local authority, a pre-condition survey of roads associated with the Proposed Development can be carried out immediately prior to construction commencement to record an accurate condition of the road at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. Where required the timing of these surveys will be agreed with the local authority. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

- **Liaison with the relevant local authority** - Liaison with the County Council and An Garda Síochána, will be carried out during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. Once the surveys have been carried out and "prior to commencement" status of the relevant roads established, (in compliance with the provisions of the CEMP), the Roads section will be informed of the relevant names and contact numbers for the Traffic Management Co-ordinator , the Project Developer/Contractor Site Manager as well as the Site Environmental Manager.
- **Utilisation of temporary alterations to road network at critical junctions** – at locations highlighted in Section 11.6. In addition, in order to minimise the impact on the existing environment during turbine component deliveries the option of blade adaptor trailers will also be used where deemed practicable.
- **Identification of delivery routes** – These routes will be agreed with the County Council and adhered to by all contractors.
- **Delivery times of large turbine components** - The management plan will include the option to deliver the large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage.
- **Travel plan for construction workers –** While the assessment above has assumed the worst case in that construction workers will drive to the site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of routes to / from the site and identification of an area for parking.
- **Additional measures** - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on site and sweeping / cleaning of local roads as required. These are set out in the CEMP which is included as Appendix 2.2 of Volume 2 of this EIAR.
- **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

Mitigation Measures During Operational Stage

Due to the very low volumes of traffic forecast to be generated during this stage no mitigation measures are required.

Mitigation Measures During Decommissioning Stage

In the event that the Proposed Development is decommissioned after the c.25 years of operation, a decommissioning plan, including material recycling / disposal and traffic management plan will be prepared for agreement with the local authority. This plan will contain similar mitigation measures to those implemented during the construction phase.

11.9.7 Residual Impacts

Construction Stage

During the construction stage of the Proposed Development, it is forecast that the additional traffic that will travel on the delivery route indicated in Figure 11.2a will have a slight, negative and temporary impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Operational Stage

As the traffic impact of the Proposed Development will be imperceptible during the operational stage, there will be no residual impacts during this stage.

Decommissioning Stage

As stated above, in the event that the Proposed Wind Farm is decommissioned a decommissioning plan will be prepared and implemented in order to minimise the residual impacts during this stage.

FEHILY TIMONEY

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

www.fehilytimoney.ie

CORK OFFICE
Core House,
Pouladuff Road,
Cork, T12 D773,
Ireland
+353 21 496 4133

Dublin Office
J5 Plaza,
North Park Business Park,
North Road, Dublin 11, D11 PXT0,
Ireland
+353 1 658 3500

Carlow Office
Unit 6,Bagenalstown Industrial Park, Royal Oak Road,
Muine Bheag,
Co. Carlow, R21 XW81,
Ireland
+353 59 972 3800