14. MATERIAL ASSETS

Material Assets are defined in the '*Advice Notes for Preparing Environmental Impact Statements'* (EPA, Draft 2015) as '*resources that are valued and that are intrinsic to specific places'*. They may be either of human or natural origin. The cultural assets of Archaeology and Cultural Heritage are addressed in Chapter 13 of this Environmental Impact Assessment Report (EIAR). Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in Chapter 8: Land, Soils and Geology, Chapter 9: Water, and Chapter 10: Air and Climate. Tourism and amenity resources, which are also considered material assets, are addressed in Chapter 5: Population and Human Health. The Population and Human Health chapter also addresses existing land-uses (economic assets), including forestry and agriculture.

This chapter of the EIAR addresses the likely significant effects of the Proposed Development on transportation infrastructure (Section 14.1 Traffic and Transport) and on Telecommunications and Aviation (Section 14.2), which are economic assets of human origin.

14.1 Traffic and Transport

14.1.1 Introduction

14.1.1.1 Background and Objectives

The purpose of this section is to assess the effects on traffic and transport of the traffic movements that will be generated during the construction, operational and decommissioning phases of the Proposed Development. A full description of the Proposed Development, including construction phasing details, is provided in Chapter 4 of this EIAR.

In this chapter we refer to the Wind Farm Site (15 no. turbines, access roads, onsite substation borrow pit, temporary construction compound, forestry felling and all associated works), and the Grid Connection Route (26km long running from the proposed wind farm site to Mullingar substation where upgrade works are proposed). Where the Proposed Development is referenced this includes all elements of the project (15 no. turbines, access roads, onsite substation, borrow pit, temporary construction compound, forestry felling and all associated works, 26km long underground grid connection route running from the Wind Farm Site to Mullingar substation where upgrade works are proposed). Other elements of the Proposed Development are referenced accordingly (i.e. replacement planting lands).

For developments of this nature, the construction phase is the critical period with respect to the traffic effects experienced on the surrounding road network in terms of both the additional traffic volumes that will be generated on the road network, and the geometric requirements of the abnormally sized large loads associated with the wind turbine plant. The requirements of the additional traffic and abnormal-sized loads generated during the construction stage were assessed on both the external highway network and at the proposed junctions that will provide access to the site. Locations where remedial measures are required to accommodate the abnormal-sized loads are identified.

It should be noted that abnormal weight loads are not a feature of the turbine delivery vehicles. They are abnormal in size only. All construction and delivery vehicles for the Proposed Development will be subject to the standard axle weight requirements set out under Road Traffic Regulations and therefore the loadings from construction traffic will not exceed the relevant standards. Notwithstanding the need to use some specialist vehicles to facilitate turbine delivery, it should be noted that the number of load-bearing axles for any specialist vehicles carrying large loads are designed to ensure that the load on any one axle does not exceed acceptable load bearing statutory limits.

The magnitude of the increase in traffic volumes experienced on the surrounding network is identified during the various construction stages of the Proposed Development. A preliminary traffic management plan is also provided in Sections 14.1.7 and 14.1.10.6 aimed at minimising the traffic impact on the local highway network. Refer also to Section 4.12 of the Construction and Environmental Management Plan (CEMP – see Appendix 4-8) for the Traffic Management Plan.

14.1.1.2 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 the West of 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, including many wind farm developments including the following; Ardderoo, Derryadd, Derrinlough, Knocknamork, Shehy More, Cloncreen, Derrykillew, Coole, Ballyhorgan, Cahermurphy, Lettergull, Barnadivane, Cleanrath and Knocknalough.

Alan has a BEng (hons) Degree in Transportation Engineering (Napier University, Edinburgh, 1989), is a member of Engineers Ireland and of the Institute of Highways and Transportation and is a TII accredited Road Safety Audit Team Member.

14.1.1.3 Guidance and Legislation

This section of the EIAR has been completed in accordance with the 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 1.7.2 of this EIAR.

14.1.1.4 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as summarised in Section 2.5 of Chapter 2 of the EIAR. The relevant consultee responses are summarised below:

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to Scoping on the 30th September 2020 and 22nd January 2021 advising that it is not in a position to engage directly with planning applications in respect to proposed developments however their approach will seek to uphold official policy and guidelines. TII did however provide 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, May 2019
- DN-GEO-03060, Geometric Design of junctions, Transport Infrastructure Ireland, April 2017

- TII Automatic Traffic Count Data, N4

A highway improvement scheme is being progressed by Westmeath County Council, Longford County Council and TII, on the N4 between Mullingar and Longford (Roosky). The project is at the Public Consultation 2 stage (programmed for February / March 2021) and considers various on-line and off-line alignments on the N4 corridor. It is noted that both the delivery route for turbine components and general construction traffic, and a 3 km section of the Grid Connection Route coincide with the section of the N4 being considered in this improvement scheme. With a proposed construction year of 2025 for the Proposed Development it is considered unlikely that the construction phase for the Proposed Development will overlap with the construction of the N4 improvement scheme. This will, however, require to be monitored as both proposals progress.

Westmeath County Council

As detailed in Section 2.6.1 in Chapter 2 of this EIAR, consultations were had also with Westmeath County Council Roads Section regarding the identification of areas of roads on bog ramparts proposed to accommodate the underground electrical grid connection. As detailed in Section 4.3.13.1 in Chapter 4 of this EIAR, a peat stability assessment of sections of public roads built on bog ramparts was carried out by Applied Ground Engineering Consultant (AGEC) in April 2017 and is included as Appendix 4-4. The purpose of this assessment was to establish the ground conditions in three priority sections of road (as identified by Westmeath County Council) with respect to construction of the underground cables and the potential effects on the structural integrity of the roads.

As detailed in Section 2.6.1 in Chapter 2 of this EIAR , during the pre-planning meetings held with Westmeath County Council in November 2016 and February 2017, the proposed Turbine Delivery Route was discussed and it was agreed that the proposed haul route via the L5828 is the preferred option to use for the Proposed Development. Meetings were held with An Bord Pleanála on 1st October 2020 and Westmeath County Council on 13th November 2020 where details of the Proposed Development including haul routes were discussed. No issues were raised regarding the original haul route proposed for the Proposed Development.

14.1.1.5 Methodology and Section Structure

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland, or TII, in the document 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 Proposed Development, including an assessment of 2016 traffic flows and traffic forecasts during an assumed construction year of 2025 *(Sections 14.1.2 - Receiving Environment and 14.1.3 – Existing Traffic Volumes)*,
- A description of the nature of the Proposed Development and the traffic volumes that it will generate during the different construction stages and when it is operational *(Section 14.1.4 – Proposed Development and Traffic Generation)*,
- A description of the abnormally large loads and vehicles that will require access to the site *(Section 14.1.5 – Construction Traffic Design Vehicles)*,
- A review of the effects of development generated traffic on links and junctions during construction and when the facility is operational *(Section 14.1.6 –Traffic effects during construction and during operation)*,
- A geometric assessment of the route and its capacity to accommodate the abnormal loads associated with the Proposed Development *(Section 14.1.8 – Route Assessment)*,
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) *(Section 14.1.9 – Provision for Sustainable Modes of Travel)*,

The description of likely significant effects is provided in Section 14.1.10.

14.1.2 Receiving Environment

14.1.2.1 Site Location

The Wind Farm Site is located in north Co. Westmeath, approximately 2.4 kilometres north of Coole village (distance from Wind Farm Site boundary). The town of Castlepollard is located approximately 6.7 kilometres southeast of the Wind Farm Site, at its nearest point. The townlands in which the Proposed Development site is located, including the Grid Connection Route and ancillary works, are listed in Table 1-1 in Chapter 1 of this EIAR.

The location of the Wind Farm Site is shown in the context of the national and local highway network in Figure 14-1a. The site is currently accessed from the west, in the townland of Monktown, via an existing entrance off the R396 Regional Road, which travels in a southeast-northwest direction between Coole village and Granard. It is proposed to upgrade this existing entrance as part of the Proposed Development. The northern area of the Wind Farm Site is also currently accessed from the L57671 local road, which adjoins the R394 Regional Road. Note however the L57971 will not be used as an access route for the Proposed Development. The local road L5755 crosses the site in an east-west direction, linking the R395 to the R394 Regional Road.

14.1.2.2 Proposed Turbine Delivery Route

As detailed in Section 4.3.17 in Chapter 4 of this EIAR. a Delivery Route Selection and Assessment Report was prepared in 2020 by Exceptional Load Services (ELS) a specialist in route surveys, permitting and traffic management. The report determined the preferred route for turbine component delivery and identified the critical nodes along the route where accommodation and preparatory works will be required. A copy of the ELS report is provided in Appendix 4-7 of this EIAR and the proposed turbine delivery route (TDR) for the Proposed Development is presented in Figure 14-1b.

It is proposed that the large wind turbine plant will be delivered via the N4 before turning north onto local L1927 in the townland of Joanstown, approximately 800 metres east of Rathowen village. The route heads north on the L1927 for approximately 8 kms, crossing a railway level crossing 2 kms north of the N4 and then turns east in the townland of Boherquill, onto the L5828 local road for 2 kms, which links into the R395. From here, the delivery vehicles head east on the R395 for 2 kms before turning left onto a purpose-built access road which bypasses the village of Coole, exiting onto the R396 just north of the village. The route then heads north on the R396 for 2 kms before turning right off the R396 to access the Wind Farm Site. The route then travels through the southern part of the Wind Farm Site before crossing the local road L5755 to access the northern part of the Wind Farm Site, and turning right onto the L5755 to access to turbines T14 and T15

The route assessment, which is discussed in Section 14.1.8, covers the following locations on the delivery route as shown in Figure 14–2a;

- Locations 1 to 3 on the route from the right turn off the N4 onto the L1927 at Rathowen, over the railway line level crossing on the L1927 and the right turn off the L1927 onto the L5828 identified as requiring geometric checks with respect to accommodating the large wind turbine vehicles;
- Location 4, the gentle right turn from the L5828 onto the R395 regional road;
- Locations 5 and 6 – Site access junctions A and B that will provide access/egress onto the proposed access road that bypasses Coole to the west linking the R395 and the R396;
- Location 7 – Site access junction C that provides access to the Wind Farm Site from the R396 north of Coole;

- Location 8 – Site access junction D which crosses the L5755 that passes through the Wind Farm Site, and provides access to turbines 1 to 9 to the north of the L5755 and turbines T14 and T15 to the east on the L5755;
- Location 9 – Site access junction E, which provides access to turbine T14 located south of the L5755;
- Location 10 – Access junction off the L5755 to / from the proposed borrow pit for standard trucks only (see 14.1.2.3); and,
- Location 11 - Site access junction G which provides access to turbine T15 situated to the north of the L5755.

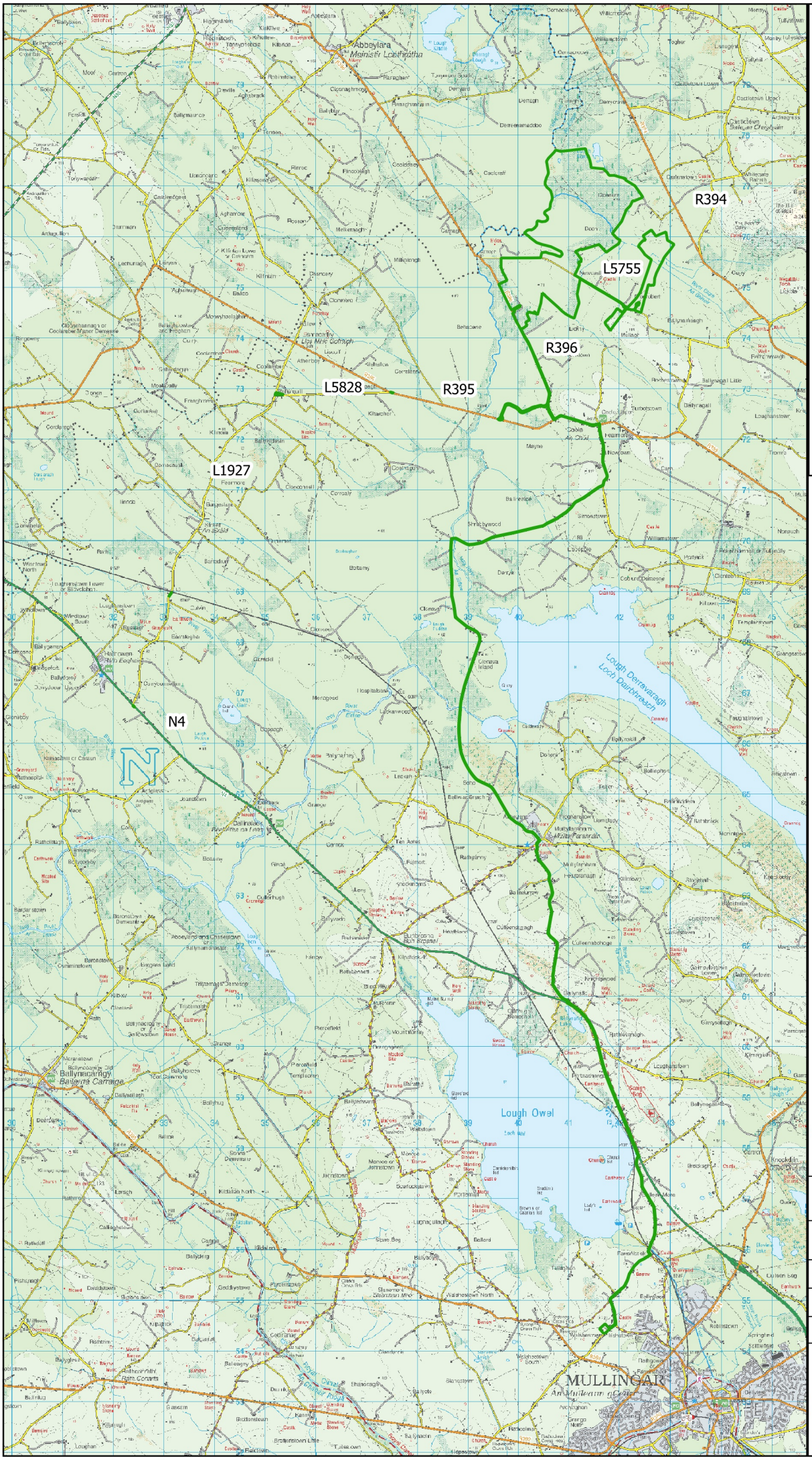
14.1.2.3 Proposed Construction Traffic Haul Route

The proposed route for general HGV construction traffic is as per the route proposed for the turbine plant traffic. General HGV construction traffic will also use other Regional roads in the area surrounding the site, as shown in Figure 14-1b. It is proposed that only borrow-pit related traffic will utilise the section of the local road L5755, located between the borrow pit and the wind farm access roads off the L5755, which measures approximately 1.5 kilometres. The borrow pit will be accessed via Location 10 – Site access junction F, which is the access junction off the L5755 to / from the proposed borrow pit (for standard trucks).

14.1.3 Existing Traffic Volumes

It should be noted that traffic volumes are discussed in terms of vehicles and passenger car units, or PCUs, where each vehicle is expressed in terms of its demand on the network relative to the equivalent number of cars. For example, an articulated HGV was given a factor of 2.4 passenger car units (PCUs) (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 counts were undertaken in 2016 as part of the EIAR prepared for the permitted Coole Wind Farm, as detailed in Section 2.5.1 in Chapter 2 of this EIAR. Due to Covid-19 travel restrictions in place during the preparation of this assessment no additional traffic counts were undertaken, as traffic levels would be far lower than normal and would therefore not be representative of expected 2020 traffic levels. For example the automatic traffic count maintained by TII on the N4 just to the north Rathowen reveals a 24% reduction in traffic volumes between 2020 and 2019 (AADT down from 13,260 to 9,774), when according to TII growth forecasts a 1.61% increase would have been expected. It is therefore considered that the 2016 traffic counts remain the most valid base data set to adopt for this assessment. As described subsequently in Section 14.1.3.2 the traffic counts observed in 2016 were factored to a forecast construction year of 2025 using TII traffic growth forecasts. It is noted that should the actual construction year be sooner than the year 2025, the background traffic flows adopted for the assessment will be slightly less but the effects of the Proposed Development generated traffic largely the same.



Map Legend

EIAR Site Boundary

Drawing Title: Site Location

Project Title: Coole Wind Farm

Drawn By	Checked By
EC	MW
Project No. 200445	Drawing No. Figure 14-1a
Scale 1:100000	Date 11.02.2021

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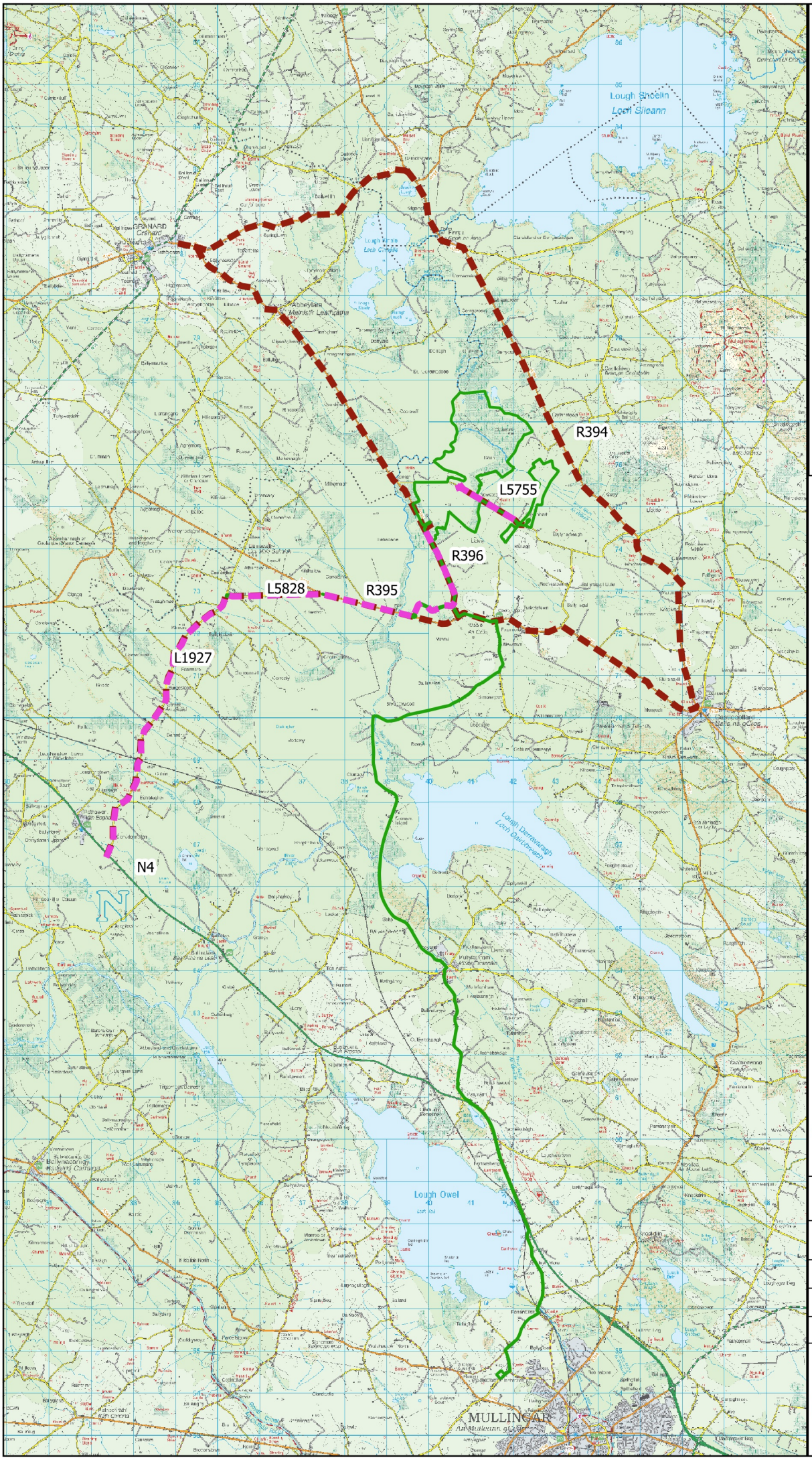

Map Legend

- EIAR Site Boundary
- Proposed Turbine Delivery Route
- HGV Construction Traffic

Drawing Title
Site Location and Delivery Routes

Project Title
Coole Wind Farm

Drawn By	Checked By
EC	MW
Project No.	Drawing No.
200445	Figure 14-1b
Scale	Date
1:120000	11.02.2021

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14.1.3.1 Background Traffic Flows

A continuous traffic counter is maintained by the TII on the N4 to the west of Rathowen. This information, together with short term traffic counts undertaken on various links on the delivery route, as shown in Figure 14-2b, on typical weekdays in February and September 2016 (between the hours of 09:00 – 10:00 and 17:00 - 18:00), was used to provide sample background traffic volumes on the study road network.

Daily flow profiles were applied to the short period traffic counts using the data from the continuous traffic counter site on the N4 which shows that the average annual daily traffic flow, or AADT, is 19.59 times the flow observed during the hour of 09:00 to 10:00 and 12.01 times the flow observed during the hour of 17:00 to 18:00. Existing traffic volumes on the delivery route are shown in Table 14-1 and range from 793 vehicles per day on the L5828 approaching the site, to 12,406 on the N4 approaching Rathowen.

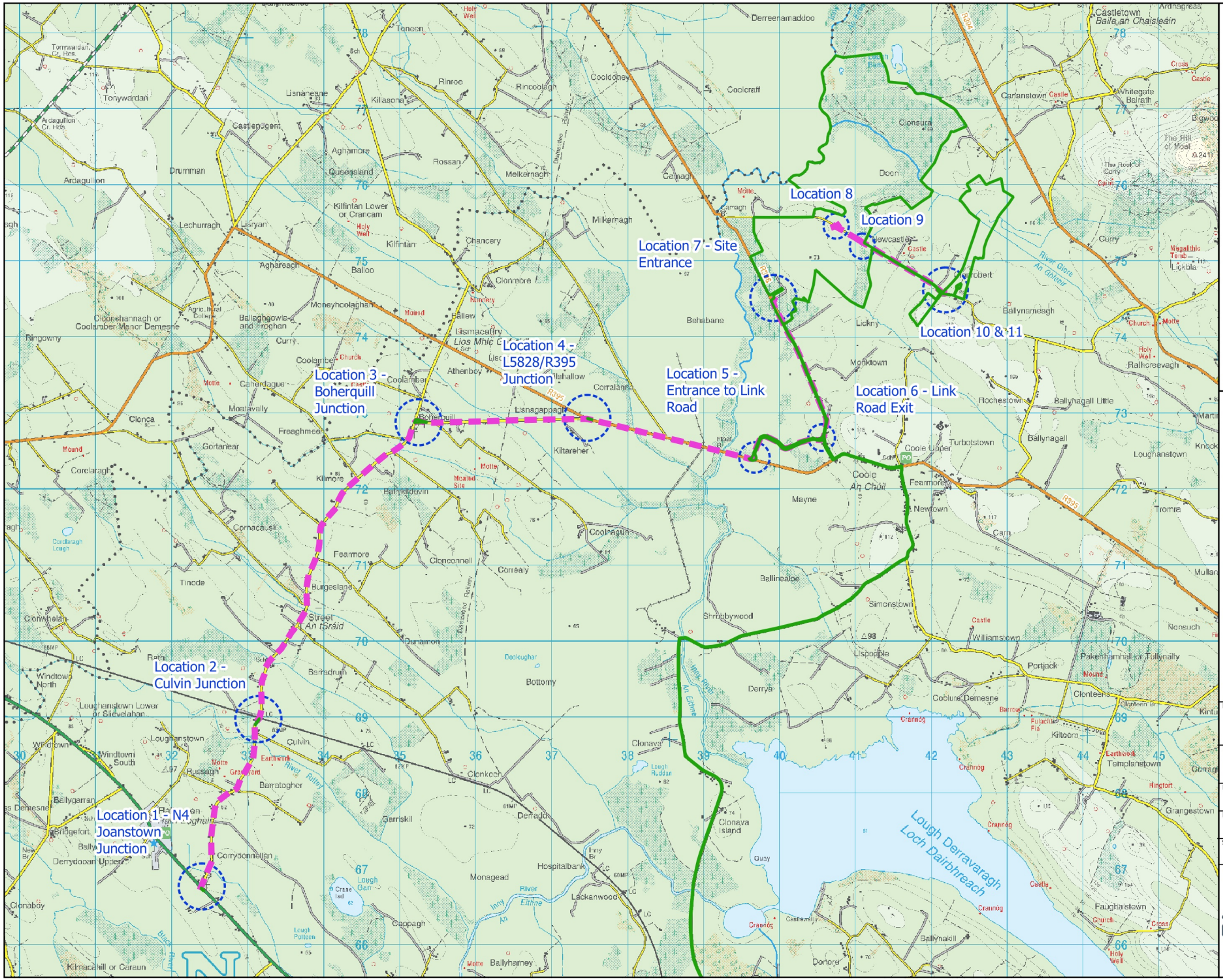
Table 14-1 Observed PM peak and all day flows, 2016 (2-way vehicles)

Link	Observed flow (one hour)	Observed hour	AADT factor	All day flow
1 R396 towards site	71	09:00 – 10:00	19.59	1,391
2 R395 west of Coole	130	09:00 – 10:00	19.56	2,547
3 L5628	66	17:00 – 18:00	12.01	793
4 L1927 south of L5628	98	17:00 – 18:00	12.01	1,177
5 L1927 north of Rathowen	110	17:00 – 18:00	12.01	1,321
6 N4 south of Rathowen	1,033	17:00 – 18:00	12.01	12,406

14.1.3.2 Future Background Traffic Volumes

Revised guidelines for forecasting annual growth in traffic volumes were produced by TII in May 2019, as set out by county in the Project Appraisal Guidelines (Unit 5.3). The annual growth rates for light vehicles for County Westmeath, and factors for the years relevant to this study, are shown in Tables 14-2 and 14-3, with traffic volumes forecast to increase during the period from 2016 to 2025 (the assumed construction year) by 15.5%, assuming a medium growth scenario. Year 2016 and 2025 AADT flows on the study area network are compared in Table 14-4.

It is noted that while the assumed construction year of 2025 may vary slightly (for example to 2026), this will not alter the forecast outcomes and effects presented in this section of the EIAR.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Delivery Route
- Turbine Delivery Route Junction Works Locations

Drawing Title
Turbine Delivery Route Junction Works Locations

Project Title
Coole Wind Farm, Co. Westmeath

Drawn By	Checked By
EC	MW
Project No.	Drawing No.
200445	Figure 14-2a
Scale	Date
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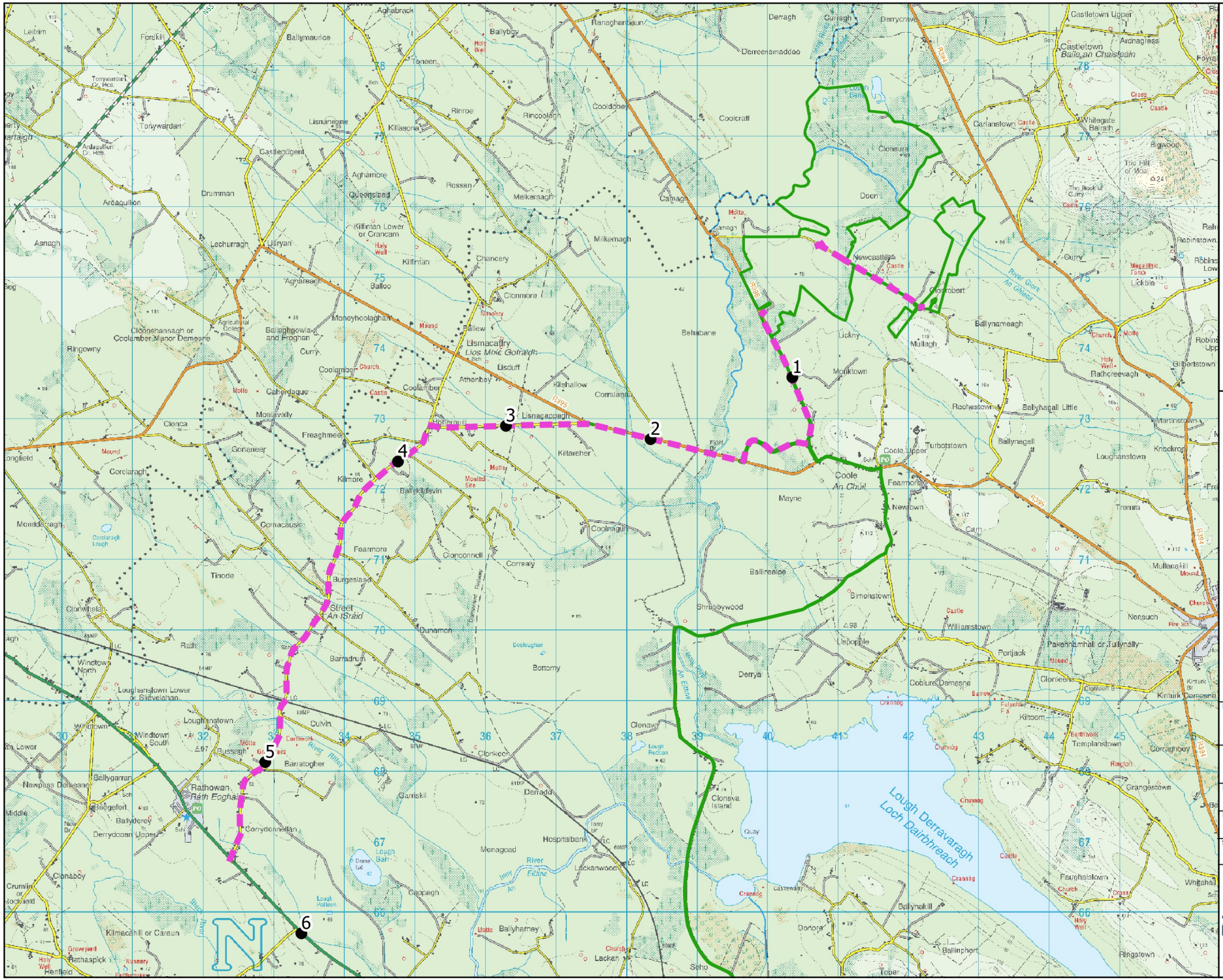

Map Legend

- EIAR Site Boundary
- Assessment Count Locations
- Proposed Turbine Delivery Route

Drawing Title
Turbine Delivery Route Junction Works Locations

Project Title
Coole Wind Farm, Co. Westmeath

Drawn By	Checked By
EC	MW
Project No.	Drawing No.
200445	Figure 14-2b
Scale	Date
1:70000	11.02.2021

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Table 14-2 TII Traffic Growth Indices for County Westmeath

Year	Lights – Annual Factor			Lights – Cumulative Index		
	Low	Medium	High	Low	Medium	High
2016	1.0145	1.0161	1.0194	1.000	1.000	1.000
2017	1.0145	1.0161	1.0194	1.015	1.016	1.019
2018	1.0145	1.0161	1.0194	1.029	1.032	1.039
2019	1.0145	1.0161	1.0194	1.044	1.049	1.059
2020	1.0145	1.0161	1.0194	1.059	1.066	1.080
2021	1.0145	1.0161	1.0194	1.075	1.083	1.101
2022	1.0145	1.0161	1.0194	1.090	1.101	1.122
2023	1.0145	1.0161	1.0194	1.106	1.118	1.144
2024	1.0145	1.0161	1.0194	1.122	1.136	1.166
2025	1.0145	1.0161	1.0194	1.138	1.155	1.189

Source: TII Project Appraisal Guidelines – Unit 5.3, May 2019

Table 14-3 TII traffic growth rates by growth scenario

Period	New Factors		
	Low	Medium	High
2016 – 2025	1.138	1.155	1.189

Table 14-4 Average all day flows by location and year (2-way vehicles)

Link	2016	2025
1 R396 towards site	1,391	1,606
2 R395 west of Coole	2,547	2,941
3 L5628	793	916
4 L1927 south of L5628	1,177	1,359
5 L1927 north of Rathowen	1,321	1,526
6 N4 south of Rathowen	12,406	14,329

The TII traffic count data recorded on the N4 was also used to estimate the existing percentage of HGVs on the study area network. The observed percentage of HGVs was 9% with volumes on the study network shown in Table 14-5.

Table 14-5 All day flows, percentage HGVs and flows by vehicle type, year 2025

Link	All day flow (vehs)	% HGV's	Vehicles		PCUs		
			HGVs	Cars / lgvs	HGVs	Cars / lgvs	Total
1 R396 towards site	1,606	9.0%	145	1,462	347	1,462	1,809
2 R395 west of Coole	2,941	9.0%	265	2,677	635	2,677	3,312
3 L5628	916	9.0%	82	833	198	833	1,031
4 L1927 south of L5628	1,359	9.0%	122	1,237	294	1,237	1,531
5 L1927 north of Rathowen	1,526	9.0%	137	1,389	330	1,389	1,718
6 N4 south of Rathowen	14,329	9.0%	1,290	13,040	3,095	13,040	16,135

14.1.4 Proposed Development and Traffic Generation

14.1.4.1 Development Trip Generation – During Construction

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

- Stage 1 – Site preparation and groundworks, and,
- Stage 2 – Turbine construction.

For the purpose of the traffic impact assessment, assumptions based on typical wind farm construction projects regarding the length of the construction phases and work periods etc. must be made to inform the assessment. These assumptions allow for a worst-case scenario assessment but should not be inferred as prescriptive limitations to the construction phase. There are numerous variables which can affect a construction project programme such as weather. The construction phase of the Proposed Development will be carried out in accordance with the CEMP, which is submitted as Appendix 4-8 of this EIAR. The CEMP will be agreed with the Planning Authority prior to construction commencing.

14.1.4.1.1 *Stage 1 – Site Preparation and Ground Works*

The construction phase of the Proposed Development is expected to last between approximately 12-18 months. For assessment purposes 255 working days have been assumed for the site preparation and ground works stage with the total numbers of deliveries made to the site during that period shown in Table 14-6.

During this construction phase there will be two distinct types of days with respect to trip generation. A total of 15 days will be used to pour the 15 concrete wind turbine foundations. Foundations will likely be poured one per day, with circa 60 concrete loads required for each turbine delivered to the site over a 12-hour period, resulting in 5 HGV trips to and from the site per hour. On all of the 255 working days

for this stage (including the days that concrete will be delivered to the site), other general materials will be delivered to the site.

During all of Stage 1 it is estimated that 3,818 two-way trips will be made to the site by trucks and large articulated HGVs, as set out in Table 14-6, with the daily effect on the local road network shown in Tables 14-7 and 14-8. The figures show that on the 15 days that concrete will be delivered to the site an additional 288 two-way PCUs will be added to the network (comprising 144 two-way HGV trips with 2.4 PCUs per movement), as shown in Table 14-7. Similarly, on all 255 days when other materials will be delivered to the site, traffic volumes on the local network will increase by an average of 54.9 PCUs, as set out in Table 14-8.

Table 14-6 Site preparation and groundworks – total movements

Material	Total no. Truck Loads	Truck type
Concrete	900	Trucks
Steel	30	Large artic
Sand / binding/stone	2,692	Truck
Ducting	6	Large artic
Cabling	9	Large artic
Tree felling	115	Large artic
Coms / ducting	9	Large artic
Plant / fencing / compound set-up	24	Large artic
Cranes	11	Large artic
Refuelling / maintenance / waste / misc	22	Large artic
Total	**3,818**	

Table 14-7 Stage 1 – Concrete foundation pouring – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2- way PCUs/day
Concrete	900	Truck	2.4	2,160	144.0	288.0
* Estimation based on 15 concrete pouring days						

Table 14-8 Site preparation and groundworks – total movements and volumes per delivery day

Material	Total Truck Loads	Truck type	PCU Value	Total PCUs	PCU Movements /day*	2- way PCUs/day
Steel	30	Large artic	2.4	72	0.3	0.6
Sand/bind/stone	2,692	Truck	2.4	6,461	25.3	50.7
Ducting	6	Large artic	2.4	14	0.1	0.1
Cabling	9	Large artic	2.4	22	0.1	0.2
Tree felling	115	Large artic	2.4	276	1.1	2.2
Coms ducting	9	Large artic	2.4	22	0.1	0.2
Plant / fencing / compound set-up	24	Large artic	2.4	58	0.2	0.5
Cranes	11	Large artic	2.4	27	0.1	0.2
Refuelling / maintenance / waste / misc	22	Large artic	2.4	53	0.2	0.4
Total	**2,918**	**-**		**7,003**	**27.5**	**54.9**
* Estimation based on ground work period of 255 working days						

14.1.4.1.2 Stage 2 – Turbine Construction

During the turbine construction stage, including delivery and assembly, there will be deliveries to the site made by abnormally large vehicles, referred to in this section as extended artics, transporting the component parts of the turbines (nacelles, blades and towers) and there will be deliveries made by normal 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 14-9, which summarises that a total of 135 trips will be made to and from the site by extended artics, with a further 45 trips made by conventional large articulated HGVs.

Table 14-9 Stage 2 – Wind turbine plant – total movements

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Nacelle	15	1	15	1	5	Extended Artic
Blades	15	3	45	1	45	Extended Artic

Material	Units	Quantity per Unit	Total Quantity	Quantity per Truck	Total Truck Loads	Truck type
Towers	15	5	75	1	75	Extended Artic
Sub total					135	
Cables/ controllers	15	1	15	1	15	Large Artic
Blade hub	15	1	15	1	15	Large Artic
Tools and generator	15	1	15	1	15	Large Artic
Sub total					45	
Total					**180**	

For the purposes of this assessment an assumed delivery period is provided. This delivery period may be subject to change. It is assumed that the turbine delivery element will progress at the rate of approximately 5 extended artic trips made by convoy to the site on approximately 2 days per week, resulting in this stage taking approximately 27 days spread over an assumed 14 week period. On a further two days per week, lasting for approximately 8 weeks, the remaining equipment required during this phase will be delivered to the site. The additional traffic movements for these 2 types of days are summarised in Tables 14-10 and 14-11. In Table 14-10 a PCU equivalent value of 10 was allocated to each extended artic movement, resulting in an additional 100 PCUs on the study network on these 2 days per week, while an additional 14.4 PCUs are forecast to be on the network on two other days per week, as shown in Table 14-11, during the turbine construction phase.

Table 14-10 Stage 2 – Wind turbine plant, extended artics – total movements and volumes per delivery day

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
Nacelle	1	Extended Artic	10	10.0	20.0
Blades	3	Extended Artic	10	30.0	60.0
Towers	5	Extended Artic	10	50.0	100.0
Total per turbine	**9**	**Extended Artic -**	**10**	**90.0**	**180.0**
Total per delivery day	**5**	**Extended Artic**	**10**	**50**	**100.0**

Material	Units	Truck Type	PCU Value	Total PCUs	2-way PCUs/ day
* Estimation based on 5 abnormal sized loads being delivered per day on 2 days per week (total 135 loads will take 27 nights spread over 14 weeks)					

Table 14-11 Stage 2 - Wind turbine plant, normal artic HGVs - total movements and volumes per delivery day

Material	Quantity per Unit	PCU Value	2-way PCUs / day
Cables / controllers	1	2.4	4.8
Blade hub	1	2.4	4.8
Tools and generator	1	2.4	4.8
Total	-	-	14.4
* Estimation based on equipment for 2 turbines being moved per week spread over 2 days			

14.1.4.1.3 *Construction Employee Traffic*

It is estimated that a maximum of 70 staff members will be employed on the site at any one time during the site preparation and groundworks stage of construction, reducing to a maximum of 45 staff at any one time during the 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 PCU movements (each trip is two way) will be added to the network during the groundworks stage of the Proposed Development, reducing to 45 PCU trips during the turbine construction stage.

14.1.4.2 Development Trip Generation – During Operation

It is estimated that the Proposed Development will be unmanned once operational and will be remotely monitored. Traffic associated with the operational phase of the Proposed Development will be from the wind farm developers, ESB/Eirgrid personnel visiting the substation, and maintenance personnel who will visit individual turbines.

It is estimated that the traffic volumes that will be generated by the Proposed Development once it is operational will be minimal, with a likely maximum of 2 staff employed on site at any one time. The impact on the network of these trips during the operational stage is discussed in Section 14.1.6.

14.1.5 Construction Traffic Design Vehicles

14.1.5.1 Construction Traffic Vehicle Types

The delivery of turbine components including blades, tower sections and nacelles is a specialist operation owing to the oversized loads involved. The blades are the longest turbine component and in the case of the Proposed Development, 77.5m blades have been considered for the purposes of this assessment.

The actual turbine to be installed on the site will be the subject of a competitive tender process, and could include turbines not amongst those originally considered as part of this assessment because they are not yet available on the market. Regardless of the make or model of the turbine eventually selected for installation onsite, a detailed delivery assessment and program will be carried out by the turbine

delivery company and a similar methodology will be adopted as set out here to ensure the findings of this assessment remain valid for whatever model of turbine is selected. Any references to the turbine dimensions in the text below must be considered in the context of the above, and should not be construed as meaning it predetermines the dimensions of any wind turbine that could be used on the site.

The key dimensions are as follows:

Transport of Blades – Articulated HGV with blade

Total length	83.5 m
Length of blade	77.5 m
Inner radius	25.0 m

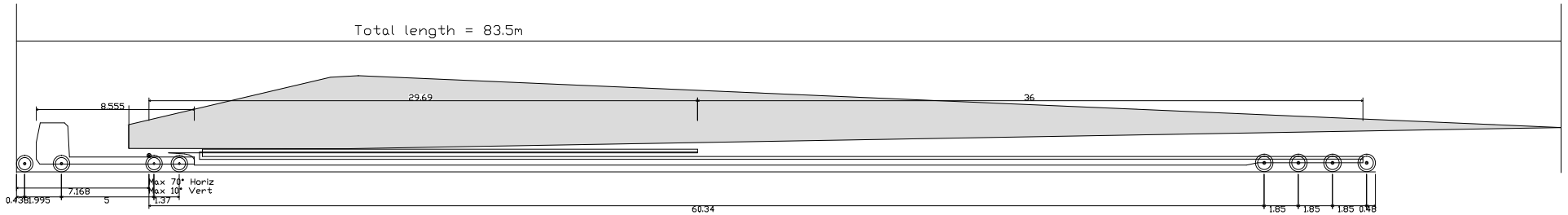
Transport of Tower – Using low-bed or drop deck trailers

Total length (with load)	46.7 m
Length of load	37.9 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 14.1.8 are the blade transporter and the tower transporter with the geometry of each shown in Figures 14-3 and 14-4 respectively.

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 standard HGVs and will be significantly smaller than the design test vehicles.



77.5 m blade

Overall Length	83.5m
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:

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Figure 14-3 Design blade extended artic profile

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	NTS
PROJECT NO: 4860	DATE: 04.01.21	DRAWN BY:	AL

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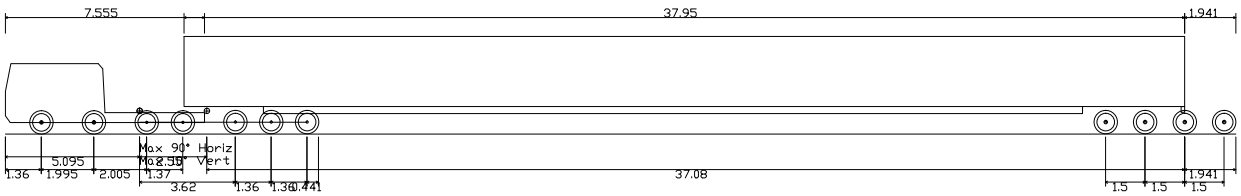

Tower 46.75m)

Overall Length	46.666m
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 14-4 Design tower extended artic profile

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	NTS
PROJECT NO: 4860	DATE: 04.01.21	DRAWN BY:	AL

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14.1.6 Traffic Effects During Construction and During Operation

14.1.6.1 Traffic Effect During Construction and During Operation

Effect on Link Flows – During Construction

Background traffic volumes and development generated traffic volumes are shown for the various typical construction days in Tables 14-12 to 14-15 and are summarised in Tables 14-16 to 14-19. The actual figures presented in the tables will be subject to change however they are considered a robust estimation of likely effects.

In terms of daily traffic flows the potential effects as presented in the tables may be summarised as follows:

During Stage 1 – Concrete Pouring

For 15 days when the concrete foundations are poured simultaneously to general site preparation and groundworks being undertaken on the site, an additional 413 PCUs will travel on the study network. On these days the percentage increase in traffic volumes experienced on the study network will be between 2.6% on the N4 approaching Rathowen, and 40.1% on the L5828 approaching the site.

During Stage 1 - Site Preparation and Groundworks

For 240 days, an additional 125 PCUs will travel on the local highway network resulting in a percentage increase in traffic volumes of between 0.8% on the N4 approaching Rathowen, and 12.1% on the L5828 approaching the site.

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

An additional 145 PCUs (made up of cars and large extended artics) will appear on the study network for 27 days. On the days this impact occurs, volumes will increase by 0.9% on the N4 approaching Rathowen and by 14.1% on the L5828 approaching the site.

The most significant traffic impact may be experienced during these days primarily due to the slow speeds, size and geometric requirements of these vehicles. The provision of traffic management measures, included in Sections 14.1.6 and 14.1.10.6 and included in the CEMP, will be required to minimise the impact of Proposed Development traffic on the study network on these days.

During Stage 2 - Turbine Construction Stage – Other deliveries using conventional articulated HGVs

For 15 days on the delivery route 60 additional PCUs (made up of cars and normal articulated HGV movements to the site and back) will travel on the study network. On these days the percentage increase on the study network will be between 0.4% (on the N4 approaching Rathowen) and 5.8% (on the L5828).

In addition to the above impacts there will be additional traffic generated on the section of the L5755 between the borrow pit and the site as gravel/ aggregate is delivered from the former to the latter. During the construction stage it is estimated that 19,230 truck loads will be delivered from the borrow pit to the site, equating to 75 2-way trips per day, or an additional 362 PCUs for the 255 days of the construction stage. This is a worst case scenario as an additional 25% contingency has been provided for when estimating the volume of material required.

Table 14-12 Effects of development traffic during concrete pouring

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 R396 towards site	1,462	347	1,809	70	343	413	1,532	690	2,222
2 R395 west of Coole	2,677	635	3,312	70	343	413	2,747	978	3,725
3 L5628	833	198	1,031	70	343	413	903	541	1,444
4 L1927 south of L5628	1,237	294	1,531	70	343	413	1,307	637	1,944
5 L1927 north of Rathowen	1,389	330	1,718	70	343	413	1,459	673	2,131
6 N4 south of Rathowen	13,040	3,095	16,135	70	343	413	13,110	3,438	16,548

Table 14-13 Development traffic during site preparation and groundworks

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 R396 towards site	1,462	347	1,809	70	55	125	1,532	402	1,934
2 R395 west of Coole	2,677	635	3,312	70	55	125	2,747	690	3,437
3 L5628	833	198	1,031	70	55	125	903	253	1,156
4 L1927 south of L5628	1,237	294	1,531	70	55	125	1,307	349	1,656
5 L1927 north of Rathowen	1,389	330	1,718	70	55	125	1,459	385	1,843
6 N4 south of Rathowen	13,040	3,095	16,135	70	55	125	13,110	3,150	16,260

Table 14-14 Development traffic during turbine construction - extended artics

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
1 R396 towards site	1,462	347	1,809	45	100	145	1,507	447	1,954
2 R395 west of Coole	2,677	635	3,312	45	100	145	2,722	735	3,457
3 L5628	833	198	1,031	45	100	145	878	298	1,176
4 L1927 south of L5628	1,237	294	1,531	45	100	145	1,282	394	1,676
5 L1927 north of Rathowen	1,389	330	1,718	45	100	145	1,434	430	1,863
6 N4 south of Rathowen	13,040	3,095	16,135	45	100	145	13,085	3,195	16,280

Table 14-15 Effect of development traffic during turbine construction – other deliveries

Link	Background PCUs			Development PCUs			Total PCUs (Background + Development)		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
1 R396 towards site	1,462	347	1,809	45	15	60	1,507	362	1,869
2 R395 west of Coole	2,677	635	3,312	45	15	60	2,722	650	3,372
3 L5628	833	198	1,031	45	15	60	878	213	1,091
4 L1927 south of L5628	1,237	294	1,531	45	15	60	1,282	309	1,591
5 L1927 north of Rathowen	1,389	330	1,718	45	15	60	1,434	345	1,778
6 N4 south of Rathowen	13,040	3,095	16,135	45	15	60	13,085	3,110	16,195

Table 14-16 Summary effect of development traffic during concrete pouring

Link	Background	Development	Total	% increase	Estimated No. of days
1 R396 towards site	1,809	412	2,222	22.8%	15
2 R395 west of Coole	3,312	412	3,725	12.5%	15

Link	Background	Development	Total	% increase	Estimated No. of days
3 L5628	1,031	412	1,444	40.1%	15
4 L1927 south of L5628	1,531	412	1,944	27.0%	15
5 L1927 north of Rathowen	1,718	412	2,131	24.0%	15
6 N4 south of Rathowen	16,135	412	16,548	2.6%	15

Table 14-17 Summary effect of development traffic during site preparation and ground works

Link	Background	Development	Total	% increase	Estimated No. of days
1 R396 towards site	1,809	125	1,934	6.9%	240
2 R395 west of Coole	3,312	125	3,437	3.8%	240
3 L5628	1,031	125	1,156	12.1%	240
4 L1927 south of L5628	1,531	125	1,656	8.2%	240
5 L1927 north of Rathowen	1,718	125	1,843	7.3%	240
6 N4 south of Rathowen	16,135	125	16,260	0.8%	240

Table 14-18 Summary effect of development traffic during turbine construction – extended artics

Link	Background	Development	Total	% increase	Estimated No. of days
1 R396 towards site	1,809	145	1,954	8.0%	27
2 R395 west of Coole	3,312	145	3,457	4.4%	27
3 L5628	1,031	145	1,176	14.1%	27
4 L1927 south of L5628	1,531	145	1,676	9.5%	27
5 L1927 north of Rathowen	1,718	145	1,863	8.4%	27
6 N4 south of Rathowen	16,135	145	16,280	0.9%	27

Table 14-19 Summary effect of development traffic during turbine construction – other deliveries

Link	Background	Development	Total	% increase	Estimated No. of days
1 R396 towards site	1,809	60	1,869	3.3%	30

Link	Background	Development	Total	% increase	Estimated No. of days
2 R395 west of Coole	3,312	60	3,372	1.8%	30
3 L5628	1,031	60	1,091	5.8%	30
4 L1927 south of L5628	1,531	60	1,591	3.9%	30
5 L1927 north of Rathowen	1,718	60	1,778	3.5%	30
6 N4 south of Rathowen	16,135	60	16,195	0.4%	30

An assessment of the impact on link capacities in the study area was undertaken for the various construction stages as set out in Tables 14-20 to 14-22. The capacity for each link in the study area is shown in Table 14-20. The capacities range from a daily flow of 5,000 vehicles on most of the delivery route to 11,600 vehicles on the N4 approaching Rathowen, and are based on road widths and capacities set out in the Transport Infrastructure Ireland Standards document DN-GEO-03031 Road Link Design, Table 6/1. Background, or do nothing traffic flows, are compared to flows forecast for the various construction delivery stages in Table 14-21 with the percentage capacity reached for each link and stage shown in Table 14-21. Based on this assessment the following points should be noted;

- With the exception of the N4, all links for all stages are forecast to operate within capacity,
- The figures suggest that a section of the N4 approaching Rathowen will operate over capacity (for a level of service D) for the do-nothing scenario (139%), with traffic generated during the various construction phases resulting in a marginal increase for a set number of days. For the worst case construction days, it is forecast that on the 15 days that concrete will be poured and other site and groundworks will also be undertaken, this link will operate at 143% of capacity i.e. a 4% increase, which is considered marginal.

Table 14-20 Carriageway width, link type and link capacity

Link	Width (m)	Link type	Link capacity
1 R396 towards site	6.0	Type 3 single	5,000
2 R395 west of Coole	6.0	Type 3 single	5,000
3 L5628	6.0	Type 3 single	5,000
4 L1927 south of L5628	6.0	Type 3 single	5,000
5 L1927 north of Rathowen	6.0	Type 3 single	5,000
6 N4 south of Rathowen	7.3	Type 1 single	11,600

Table 14-21 Link capacity and summary of link flows by construction delivery stage

Link	Link capacity	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
1 R396 towards site	5,000	1,809	2,222	1,934	1,954	1,869
2 R395 west of Coole	5,000	3,312	3,725	3,437	3,457	3,372
3 L5628	5,000	1,031	1,444	1,156	1,176	1,091
4 L1927 south of L5628	5,000	1,531	1,944	1,656	1,676	1,591
5 L1927 north of Rathowen	5,000	1,718	2,131	1,843	1,863	1,778
6 N4 south of Rathowen	11,600	16,135	16,548	16,260	16,280	16,195

Table 14-22 Link capacity and % of link capacity by construction delivery stage

Link	Link capacity	Construction delivery stage				
		Background traffic	Concrete pour	Other site works	Turbine plant	Turbine equipment
1 R396 towards site	5,000	36%	44%	39%	39%	37%
2 R395 west of Coole	5,000	66%	75%	69%	69%	67%
3 L5628	5,000	21%	29%	23%	24%	22%
4 L1927 south of L5628	5,000	31%	39%	33%	34%	32%
5 L1927 north of Rathowen	5,000	34%	43%	37%	37%	36%
6 N4 south of Rathowen	11,600	139%	143%	140%	140%	140%

Effect on Link Flows – During Operation

Once the Proposed Development is operational it is estimated that there will be approx. 2 staff members employed on site with a similar number of vehicle trips. It is considered that the traffic impact during this phase will be imperceptible.

Effect on Junctions – During Construction

The capacity of the study area junction most affected 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 Ration 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 minutes, this gives an indication of the forecast average delay during the time period modelled for each movement.

Scenarios Modelled

While other junctions and links on the network will experience an increase in traffic volumes passing through them, as discussed previously and as set out in Tables 14-16 to 14-19 above, the worst-case effect will be experienced during peak hours at the junction between the N4 and the L1927, when, during peak construction periods, up to 70 workers (35 cars) will pass through it. It is noted that deliveries of materials to the site will take place during the day after the workers have arrived on site, and before they leave at the end of the day, and will therefore not occur at the same time.

N4 / L1927 Junction Capacity Test Results

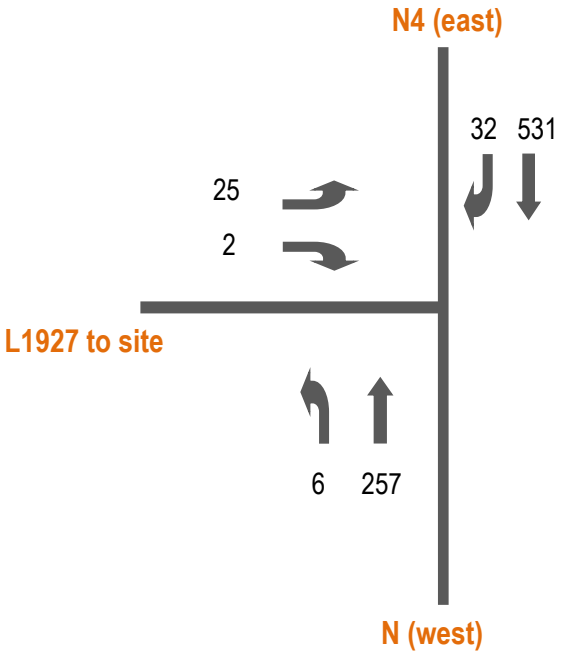
The PM peak hour traffic flows for the year 2025 without and with construction workers passing through this junction are shown in Figure 14-5, with the capacity results shown in Table 14-23. The results show that additional car trips passing through the junction will have a minor effect, increasing the maximum ratio of flow to capacity (RFC) at the junction from 5.5% to 14.5% for the exit from the local L1927 road onto the N4, which is well within the acceptable limit of 85%.

Table 14-23 Junction capacity test results, N4 / L1927 junction, PM peak hour, without and with construction staff, year 2025

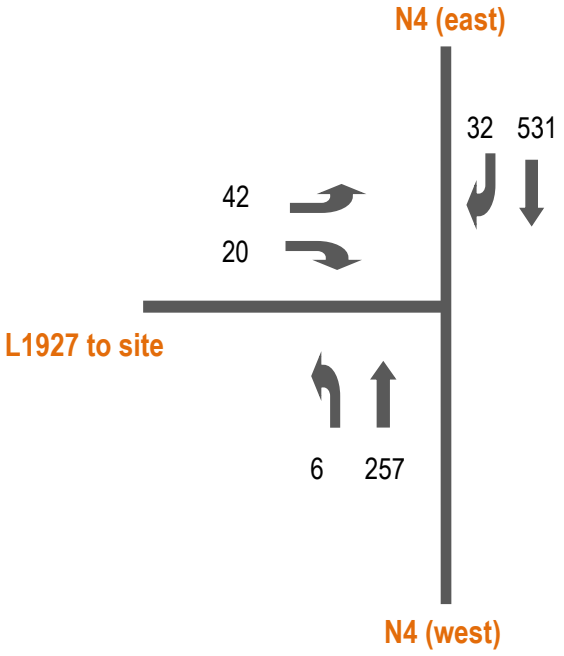
Period	Location	Without construction traffic			With construction traffic		
PM		RFC	Queue (vehicles)	Delay (minutes)	RFC	Queue (vehicles)	Delay (minutes)
	Exit from L1927	5.5%	0.06	0.12	14.5%	0.17	0.15
	Right turn into L1927	9.5%	0.19	0.07	9.5%	0.19	0.07

Effect on Junctions – During Operation

As discussed in Section 14.1.6 it is forecast that once operational, the Proposed Development will generate a maximum of 2 trips per day for maintenance purposes. It is therefore concluded that the Proposed Development will have a negligible effect on the local network once constructed.



PM PEAK HOUR



PM PEAK HOUR

With construction workers

FIGURE 14-5 N4 / L1927 junction turning flows, PM Peak hour, without and with construction workers, 2025

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Project:	Coole Wind Farm	Date:	14.01.21
		Drawn by:	AL
Client:	Coole Wind Farm Ltd	Project No.:	4860

14.1.6.1.2 Effect on Network of Grid Connection Route

A detailed assessment of the Grid Connection Route including: receiving environment, existing traffic volumes on the route, traffic volumes that will be generated during cable construction (including the upgrade required to the existing substation in Mullingar), proposed methods of traffic management together with an estimate of the likely and significant impacts of the cable route construction are set out in detail in Appendix 14-1. A summary of the assessment is presented in the following text.

The Proposed Development will connect to the national electricity grid via Mullingar 110 kV substation. The Grid Connection Route measures approximately 26km from the Wind Farm Site to the existing substation near Mullingar, and is shown in Figure 14-6. The grid connection cable between the site and the substation will be installed in a trench to the side or within the roadway of the approximately 19 kms of local road, 3 kms of regional road and 3.5 kms of national road that separate the sites.

There are a total of 16 no. watercourse crossings along the public road section of the Grid Connection Route, the locations of which are shown in Figure 4-26 in Chapter 4 of this EIAR. There are 7 no. river/stream crossings (Locations No. 2, 3, 4, 10, 14, 15 & 16), with the remaining crossings being classified as culverts. The Grid Connection Route will traverse one Irish Rail level crossing in the townlands of Farranistick and Culleen More adjacent to water course crossing No 16.

The connection will typically be installed by 2 construction teams, typically commencing at one end and approximately mid way along the Grid Connection Route, with each team laying approximately 150 metres of cable per day in the same direction, equating to a total of 300 metres per day. Based on this it is estimated that the construction of the cable will take 117 days or 5.5 months (233 days working days split between 2 teams). On the majority of these days traffic will be controlled with a local “stop – go” system to ensure that all roads remain open at all times. Road closures will, however, be required for an estimated 39 of the 233 working days on sections of the L-5703 (9 days), L-1773 (9 days), L-1826 (14 days) and the R396 (7 days) during the construction on narrow sections of road or water crossings. The required road closure locations are shown in Figure 14-7.

In terms of traffic effects, it is forecast that on average an additional 40 vehicle trips will be generated on the roads forming the Grid Connection Route resulting in increases in traffic volumes on the Grid Connection Route ranging from +0.2 % on the N4 (Section 4), to +7.5% on the L-1801 (Section 1).

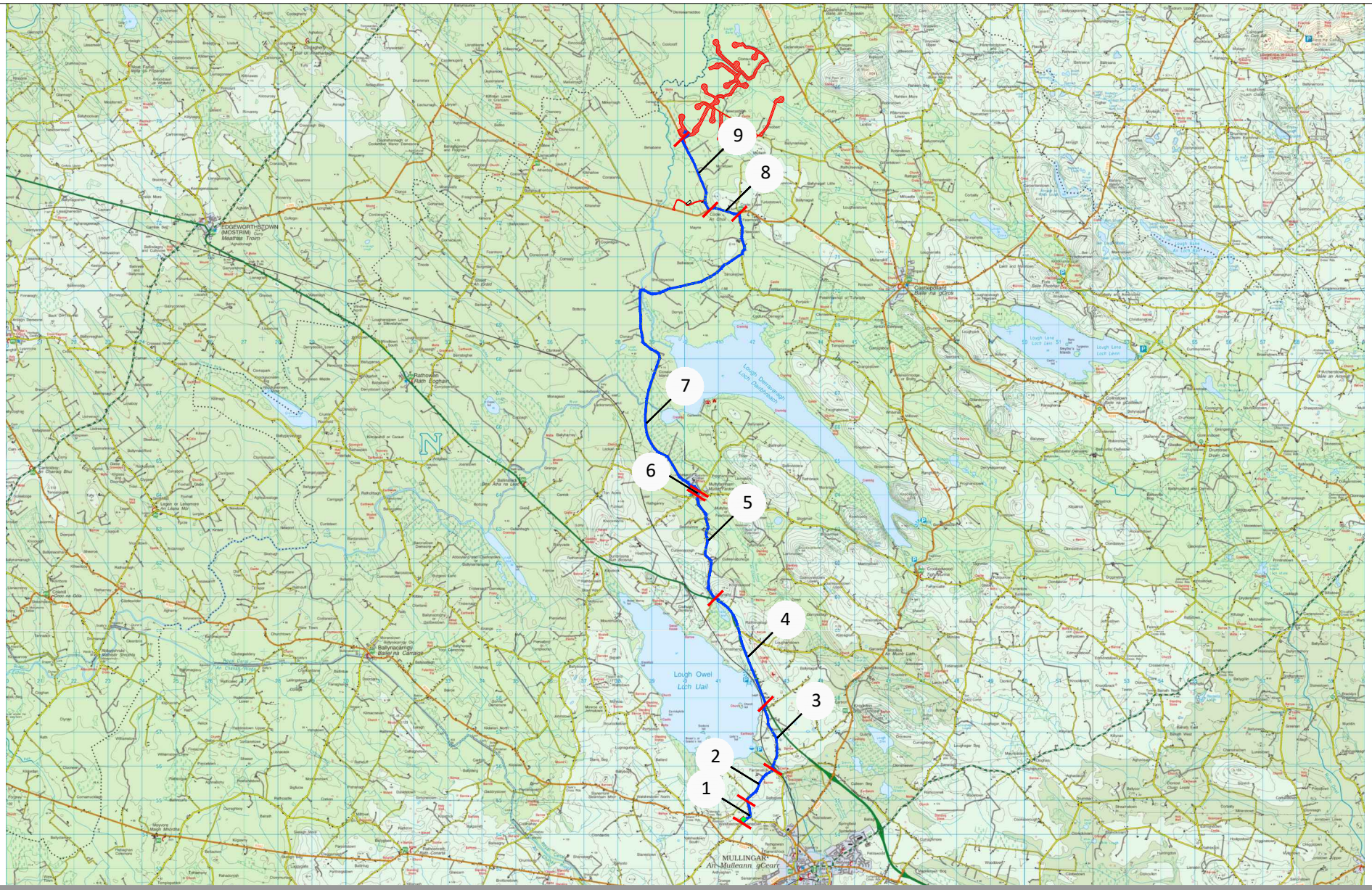
The following delays / detours are forecast to apply to existing traffic during the construction of the Grid Connection Route:

- While the majority of trips will experience an additional average delay of 10 seconds a maximum increase in journey time of 5 minutes will be experienced by traffic on the R396 during construction traversing a watercourse.
- In terms of distance travelled, while the majority of trips will not experience any diversion, a maximum diversion of 3.6 kms will be experience by traffic on the R396 during construction traversing a watercourse.

While construction of the Grid Connection Route will take place at the same time as the general construction of the Proposed Development it is noted that only a short section of the Grid Connection Route (Section 9 on the R396 leading to the site as shown in Figure 14-6) is also common to the delivery route proposed for the general construction traffic for the Proposed Development. Construction of Section 9 of the Grid Connection Route will be coordinated to occur during a period when deliveries to the Wind Farm Site are at a minimum. If this is done the impact will be temporary, slight negative lasting for approximately 20 days.

A comprehensive set of traffic management measures are set out in Appendix 14-1 in order to mitigate the impacts experienced by local traffic during the construction of the Grid Connection Route.

Slight increases in traffic delays will be incurred along the Grid Connection Route resulting in a slight / medium, temporary impact on local traffic, and potentially on local businesses.



NOTES:

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Figure 14-6 Cable route - link sections for traffic assessment

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	NTS
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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NOTES:

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Figure 14-7 Cable route - temporary road closure locations

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	NTS
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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14.1.7 Traffic Management of Large Deliveries

The greatest effect on the road network will likely be experienced on the approximately 27 days during which the 5 very large loads comprising the tower sections, the blades and the nacelles are delivered to the site.

Traffic management measures are included in Section 14.1.10.6 and include the following:

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

The transport of large components is challenging and can only be done following extensive route selection, route proofing and consultation with An Garda Síochána, the local authority and its road section and roads authorities. Turbine components are often transported at night when traffic is lightest and this is done in consultation with the road's authorities, An Garda Síochána Traffic Corp and special permits are generally required.

In some cases, temporary accommodation works are required along the turbine delivery route (TDR) such as hedge or tree cutting, temporary relocation of powerlines/poles, lampposts, signage and local road widening. Any updates to the road will be carried out in advance of turbine deliveries and following consultation and agreement with Westmeath County Council.

It is not anticipated that any sections of the local road network will be closed, although there may be delays to local traffic at various locations if the deliveries are made during daylight hours. During these periods it may be appropriate to operate local diversions for through traffic. The effect of this stage may be minimised by the deliveries of the abnormally large loads taking place during the night. This will be undertaken in consultation with An Garda Síochána and roads authorities.

At a minimum, all of the deliveries comprising abnormally large loads will be made outside the normal peak traffic periods to avoid disruption to work and school related traffic.

14.1.8 Route Assessment

As detailed above in Section 14.1.2.2, a Delivery Route Selection and Assessment Report was prepared by Exceptional Load Services (ELS). The report determined the preferred route for turbine component delivery and identified the critical nodes along the route where accommodation and preparatory works will be required.

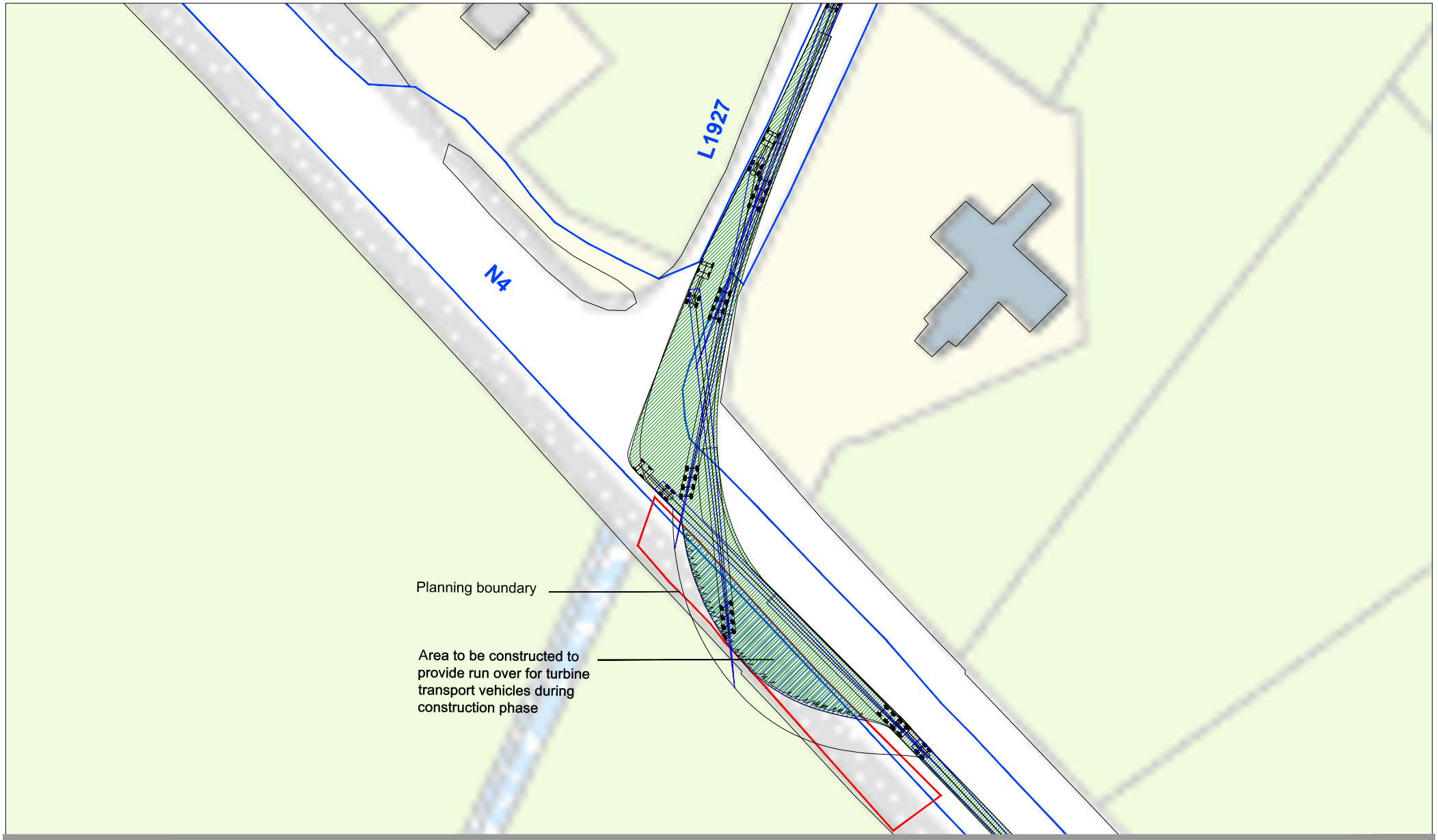
The route assessment carried out by Alan Lipscombe Traffic and Transport Ltd was based on locations identified from the ELS Report and confirmed from site visits along the route. The critical nodes assessed are indicated in Figure 14-2a. For these locations road and junction alignments based on OS mapping or site survey data were supplied by the project team. A preliminary swept path analysis was then undertaken using Autotrack in order to establish the locations where the Turbine delivery vehicles will be accommodated, and the locations where some form of remedial measure may be required.

Location 1 – Right turn from N4 to L1927

It is proposed that the large turbine vehicles will turn right at this junction with the geometric requirements of the large turbine vehicles shown in Figures 14-3 and 14-4. The preliminary assessment shows that an area of grass verge on the southern side of the N4 will require hard surfacing. The hard surfacing is temporary and the verge will be reinstated to its original condition post construction.

Refer to Figures 14-8 and 14-9 which show the swept path of the turbine delivery vehicles. This junction is shown in Plate 14-1.

Plate 14-1 Location 1 – Right turn from N4 to L1927



NOTES:

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Figure 14-8 Location 1 - Right turn from N4 to L1927, blade extended artic (77.5m blade)

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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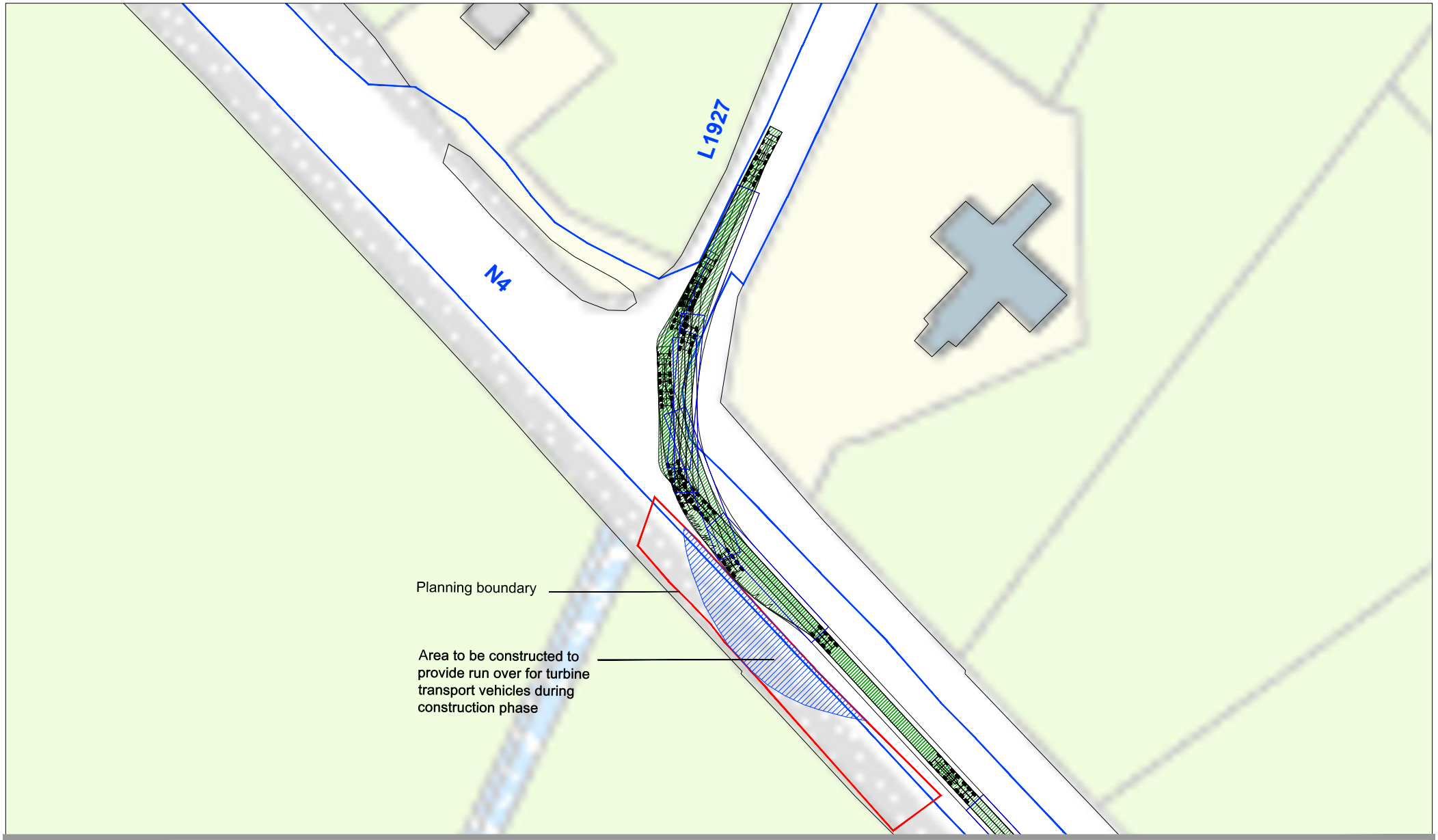

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Figure 14-9 Location 1 - Right turn from N4 to L1927, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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Location 2 – Level crossing on L1927

The swept path analysis undertaken for this location, as shown in Figures 14-10 and 14-11 indicates that the existing geometry will accommodate the design turbine vehicles with the provision of a run over area on the eastern side of the L1927. The boundary and area will be reinstated to its existing configuration post construction.

This location is shown in Plate 14-2.

Plate 14-2 Location 2 – Level crossing on L1927

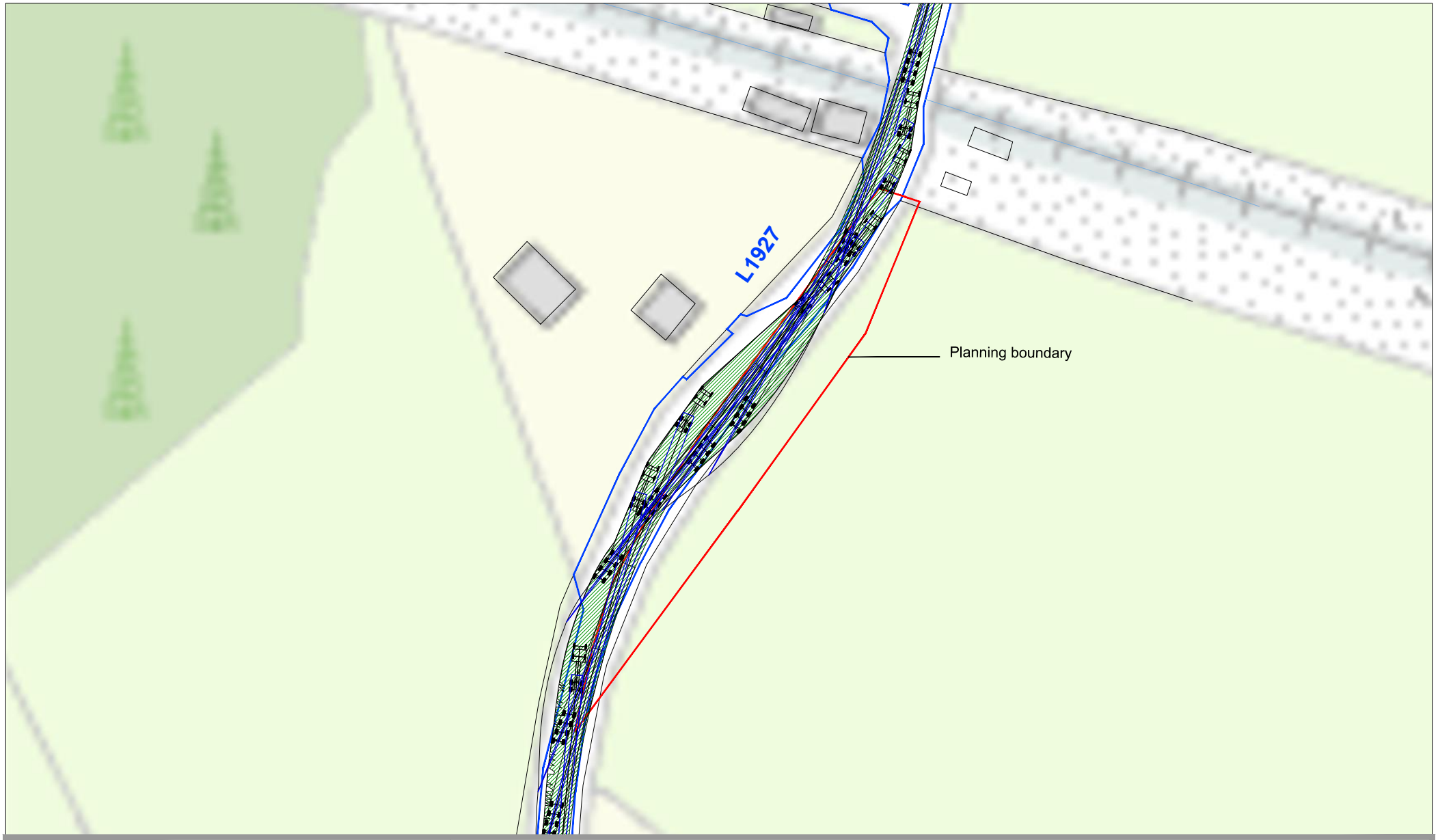

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Figure 14-10 Location 2 - Level crossing on L1927, blade extended artic (77.5m blade)

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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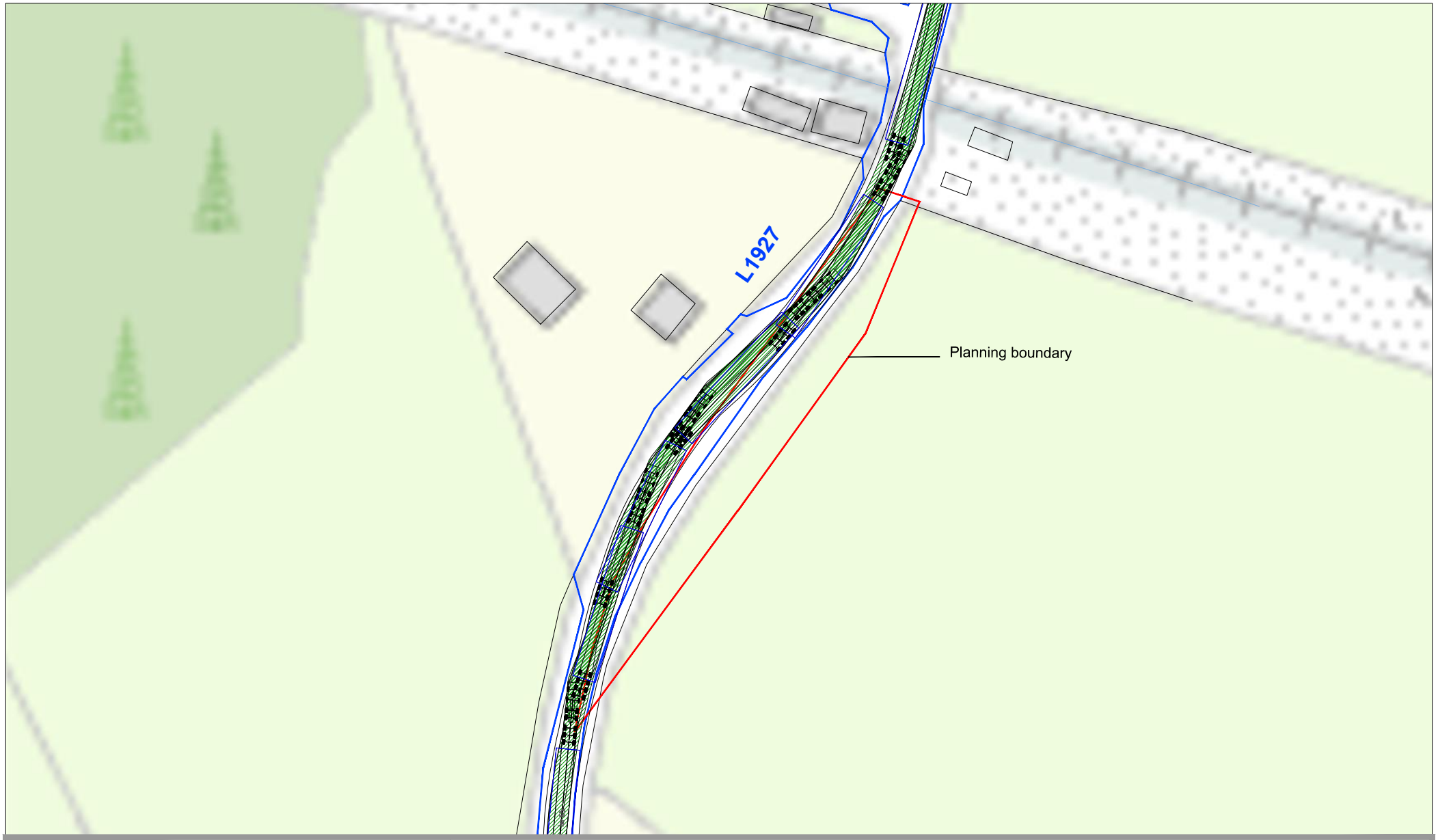

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Figure 14-11 Location 2 - Level crossing on L1927, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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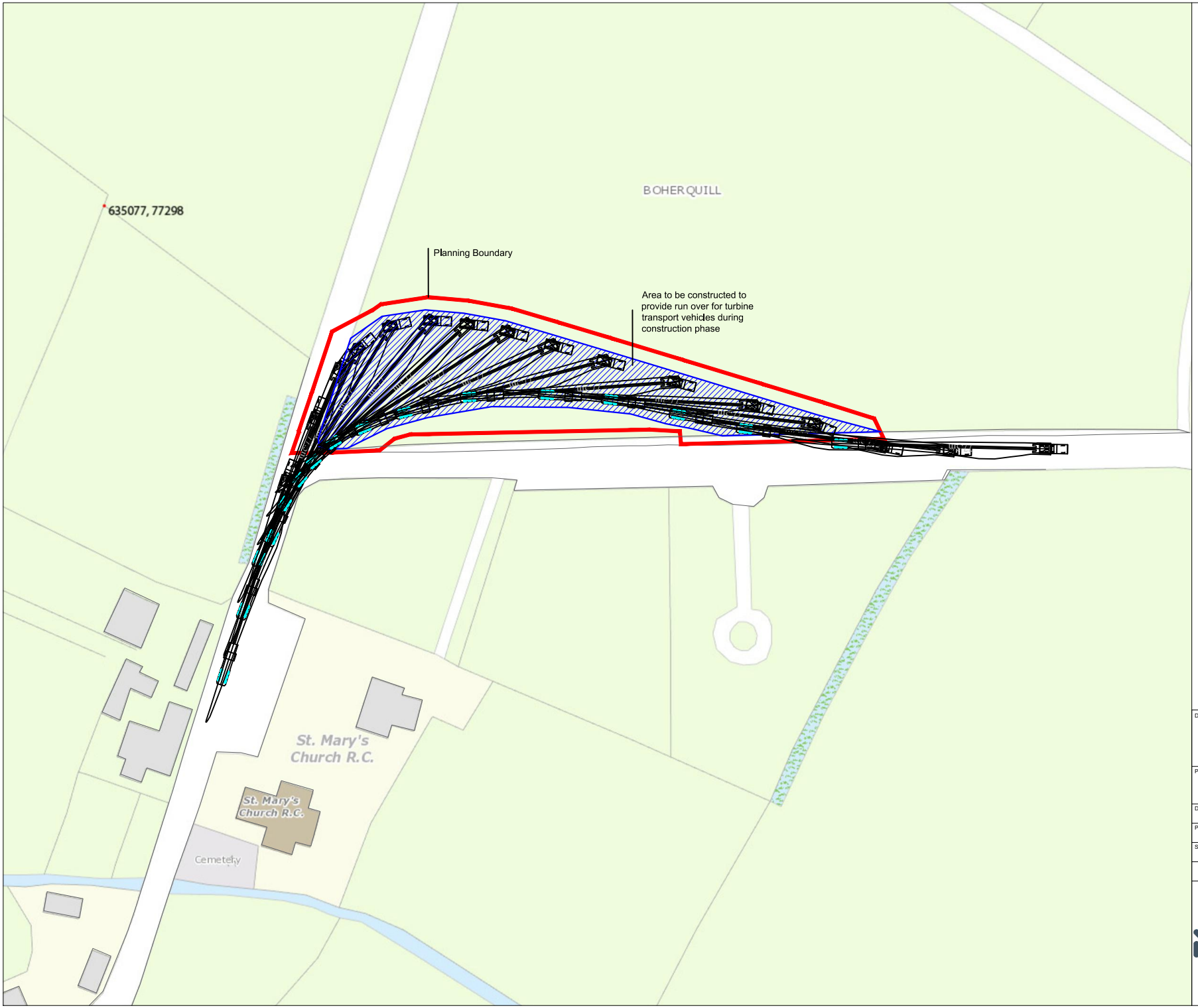
Location 3 – Right turn off L1927 onto the L5828

The assessment for this location is illustrated in Figures 14-12 and 14-13. An area of land on the north eastern corner of the junction will be required in order to accommodate the turbine plant delivery vehicles. These works will require clearing back part of the existing road verge and field vegetation at the junction, and excavation of material to allow the placing of stone/hard surfacing within the proposed area. A series of removable bollards will be placed along the existing road edge where the hedgerow has been removed in order to preserve the structure of the junction outside of those periods when deliveries of turbine components are underway. Once deliveries are completed the area and boundaries will be reinstated restoring the junction to its existing configuration with the exception of a gated access at the eastern end where the hard surfacing meets the public road.

This location is shown in Plate 14-3.

Plate 14-3 Location 3 – Right turn off L1927 onto the L5828



DRAWING TITLE:
Location 3 - Right turn from L1927 to L5828, blade extended artic

PROJECT TITLE:
Coole Wind Farm, Co. Westmeath

DRAWING BY:	CHECKED BY:
Joseph O Brien	Michael Watson
PROJECT No.: 200445	DRAWING No.: Figure 14-12
SCALE: 1,500 @ A4	DATE: 18.03.2021

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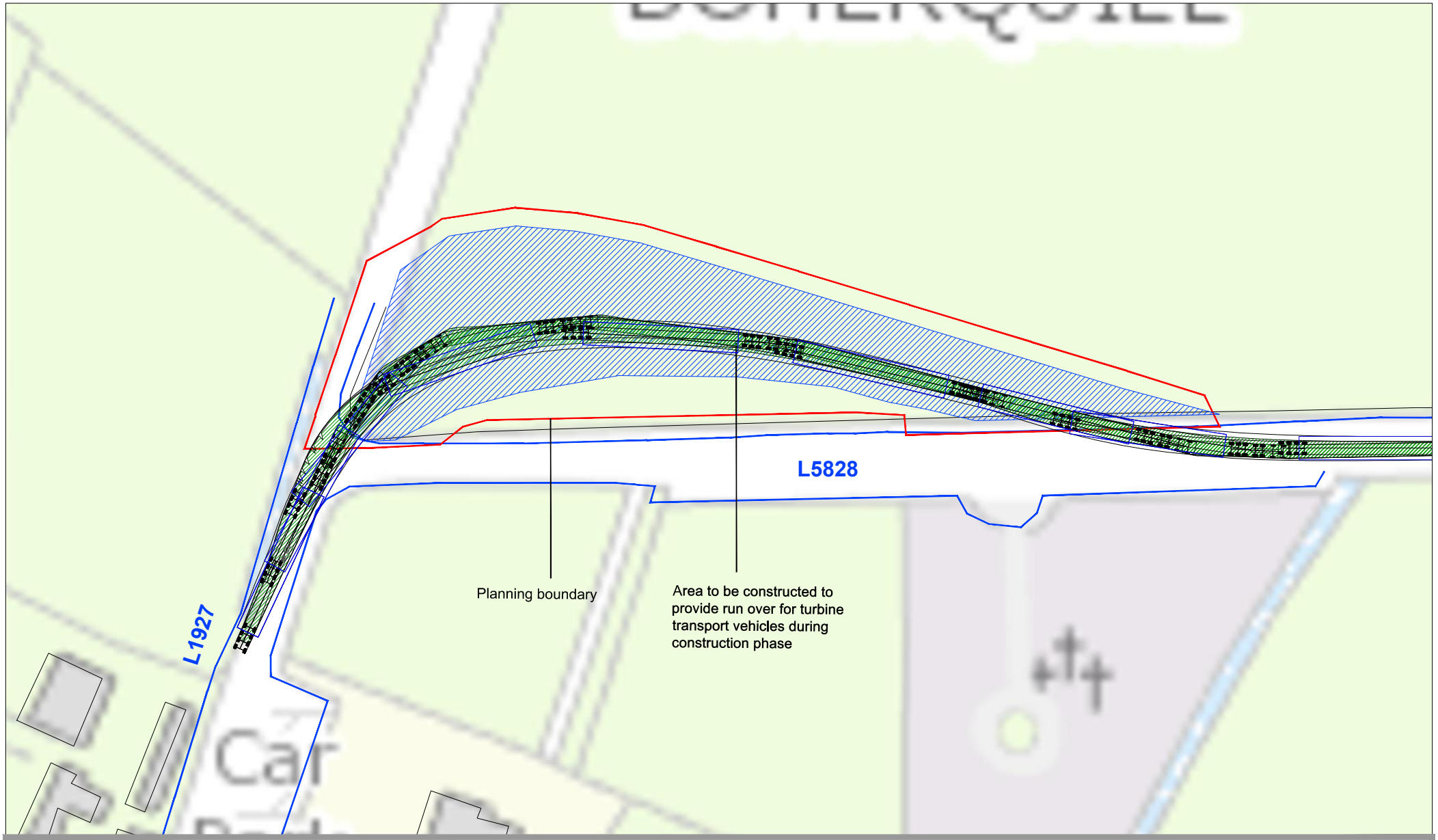

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Figure 14-13 Location 3 - Right turn from L1927 to L5828, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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Location 4 – Right turn from L5828 onto the R395

The swept path analysis undertaken for this location, as shown in Figures 14-14 and 14-15. indicates that the existing geometry will accommodate the turbine delivery vehicles with the provision of a hard surfaced area on the north side of the R395. The hard surfacing is temporary and the verge will be reinstated to its original condition.

Plate 14-4 Location 4 – Right turn from L5828 onto the R395

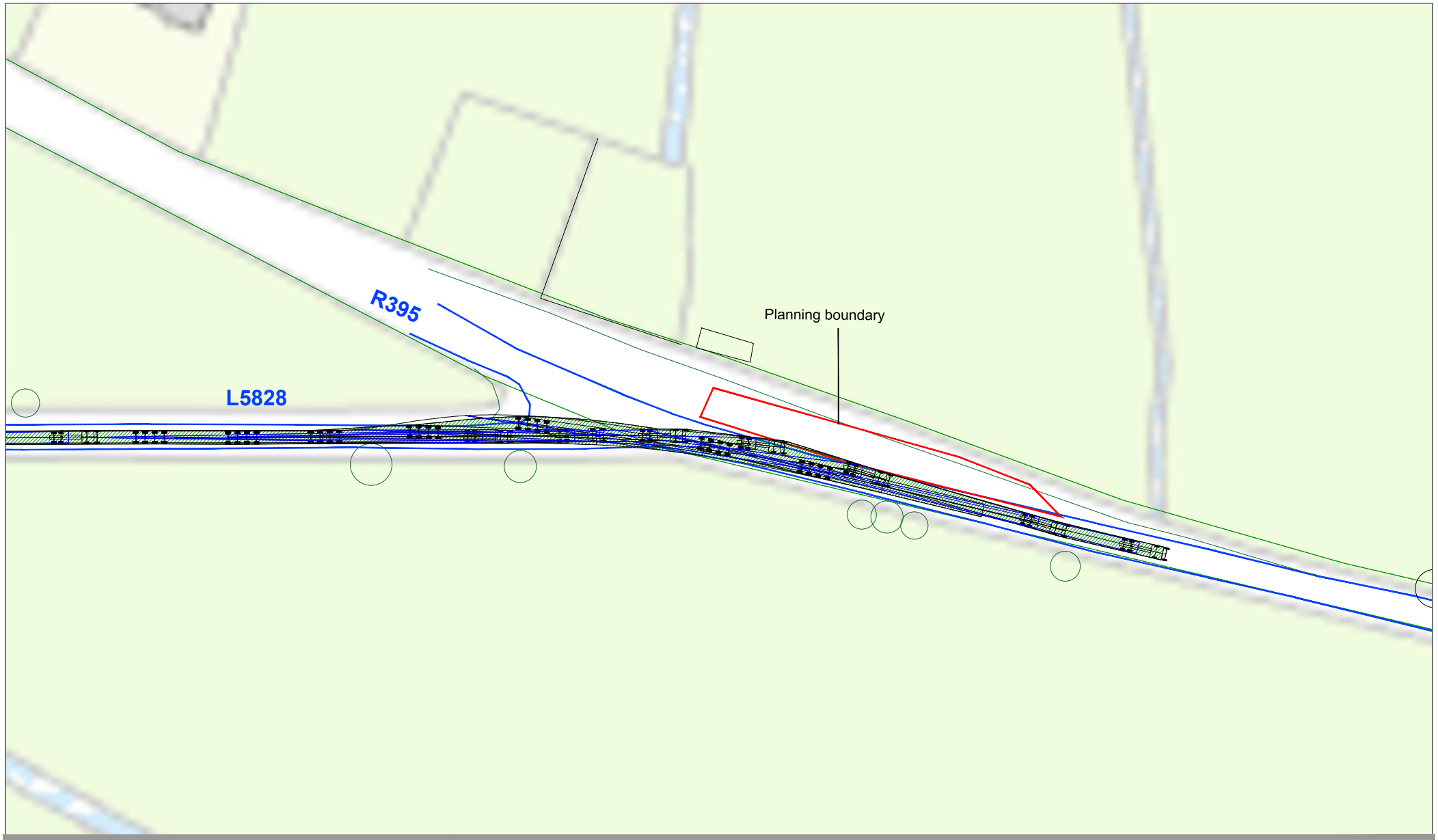

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Figure 14-14 Location 4 - Right turn from L5828 to R395, blade extended artic (77.5m blade)

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd		SCALE: 1:1000
PROJECT NO: 4860	DATE: 16.03.21		DRAWN BY: AL

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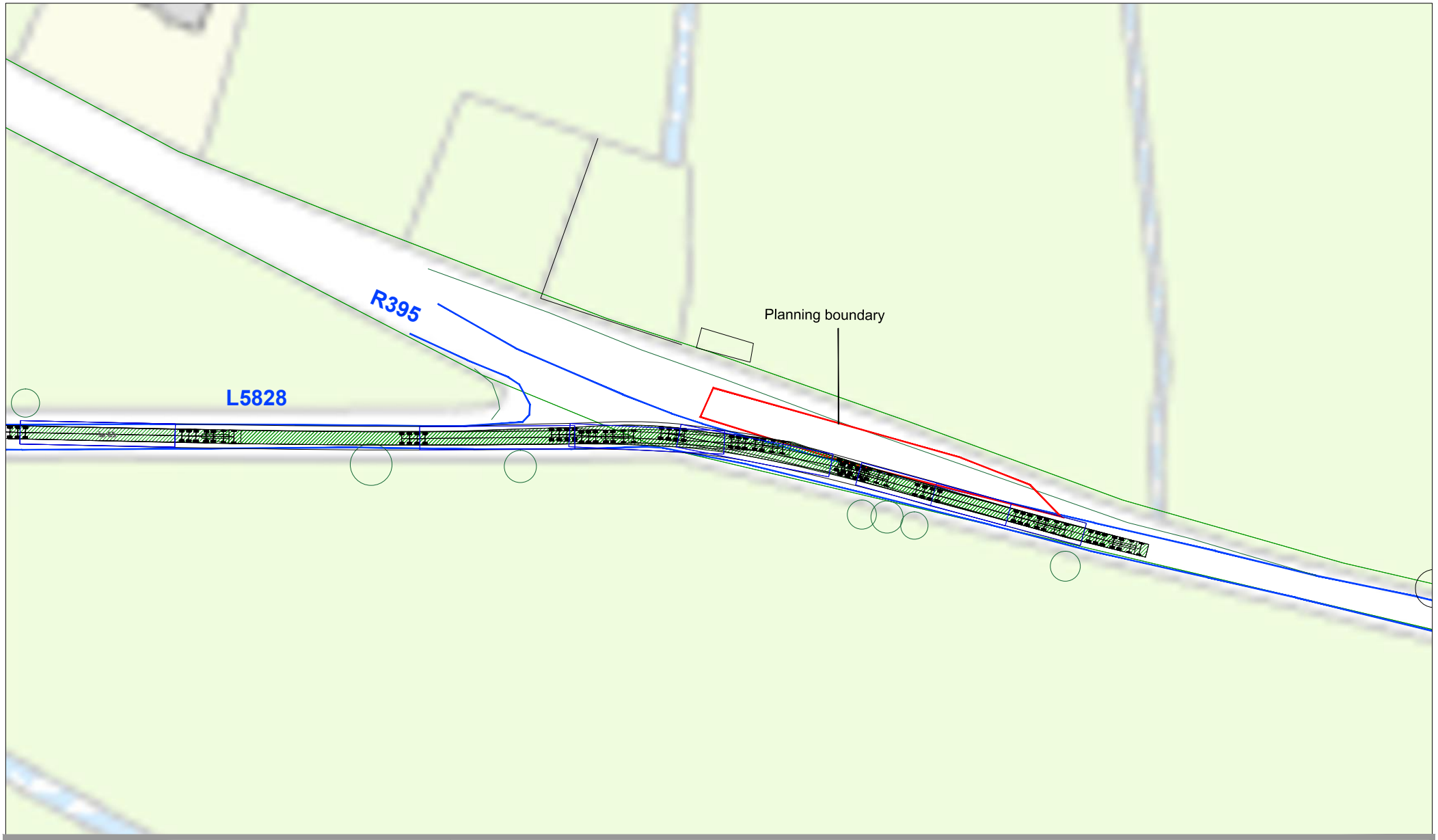

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Figure 14-15 Location 4 - Right turn from L5828 to R395, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd		SCALE: 1:1000
PROJECT NO: 4860	DATE: 16.03.21		DRAWN BY: AL

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Locations 5 – Access junction A off R395

The preliminary design of the proposed access junction off the R395 is shown in Figure 14-16. The figure shows the proposed access road (6m wide), temporary over –run areas required for the delivery of the abnormal loads, proposed junction radii and visibility splays that must be kept clear during the construction phase. Swept path assessments based on the turbine delivery vehicles, are shown in Figures 14-17 and 14-18 for the turbine blade and tower respectively. Barrier/gate to be in place at the entrance to link road and left in place post-construction.

Plate 14-5 Location 5, proposed access junction A off R395

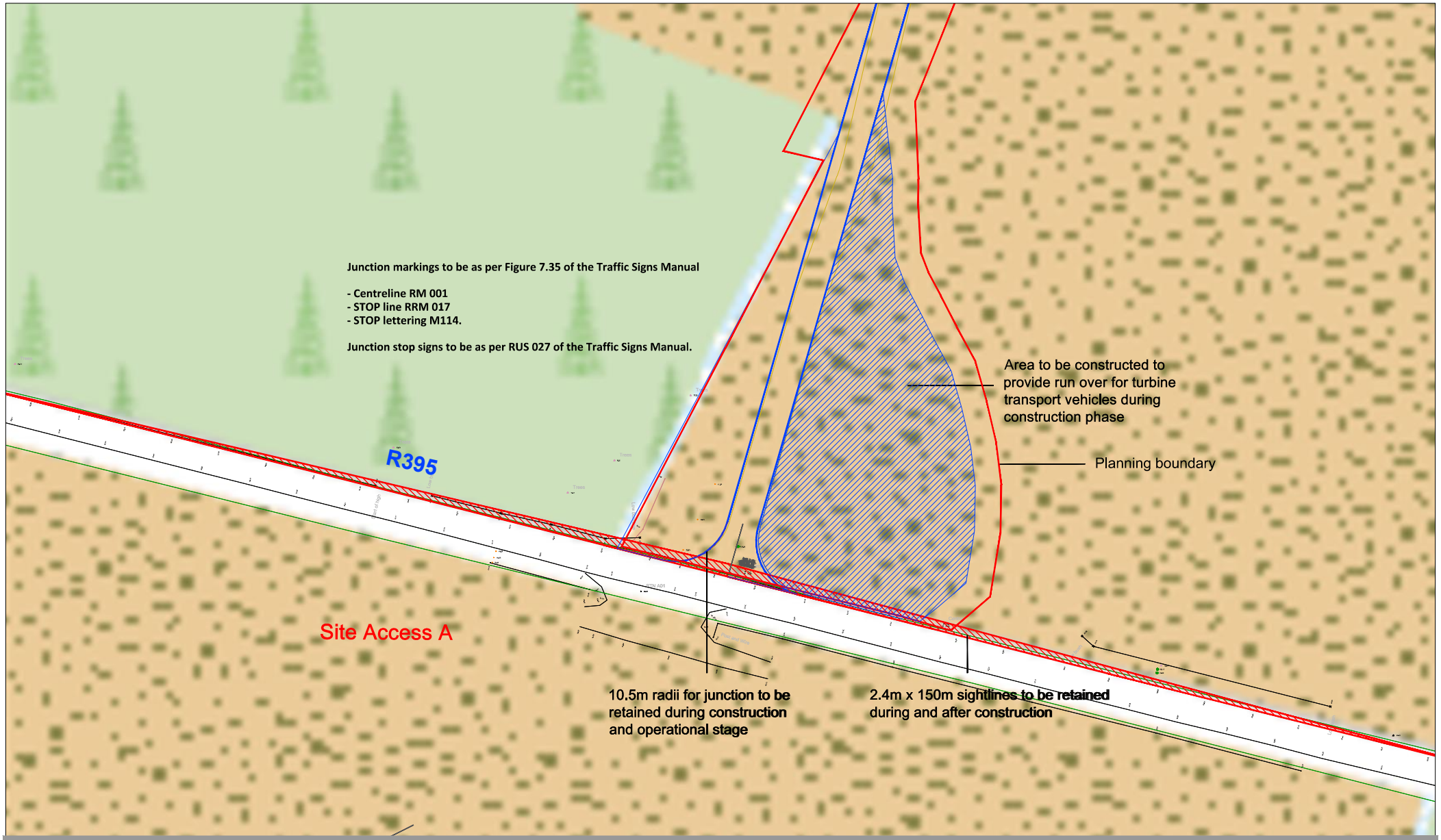

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Figure 14-16 Location 5 - Site access Junction A off R395

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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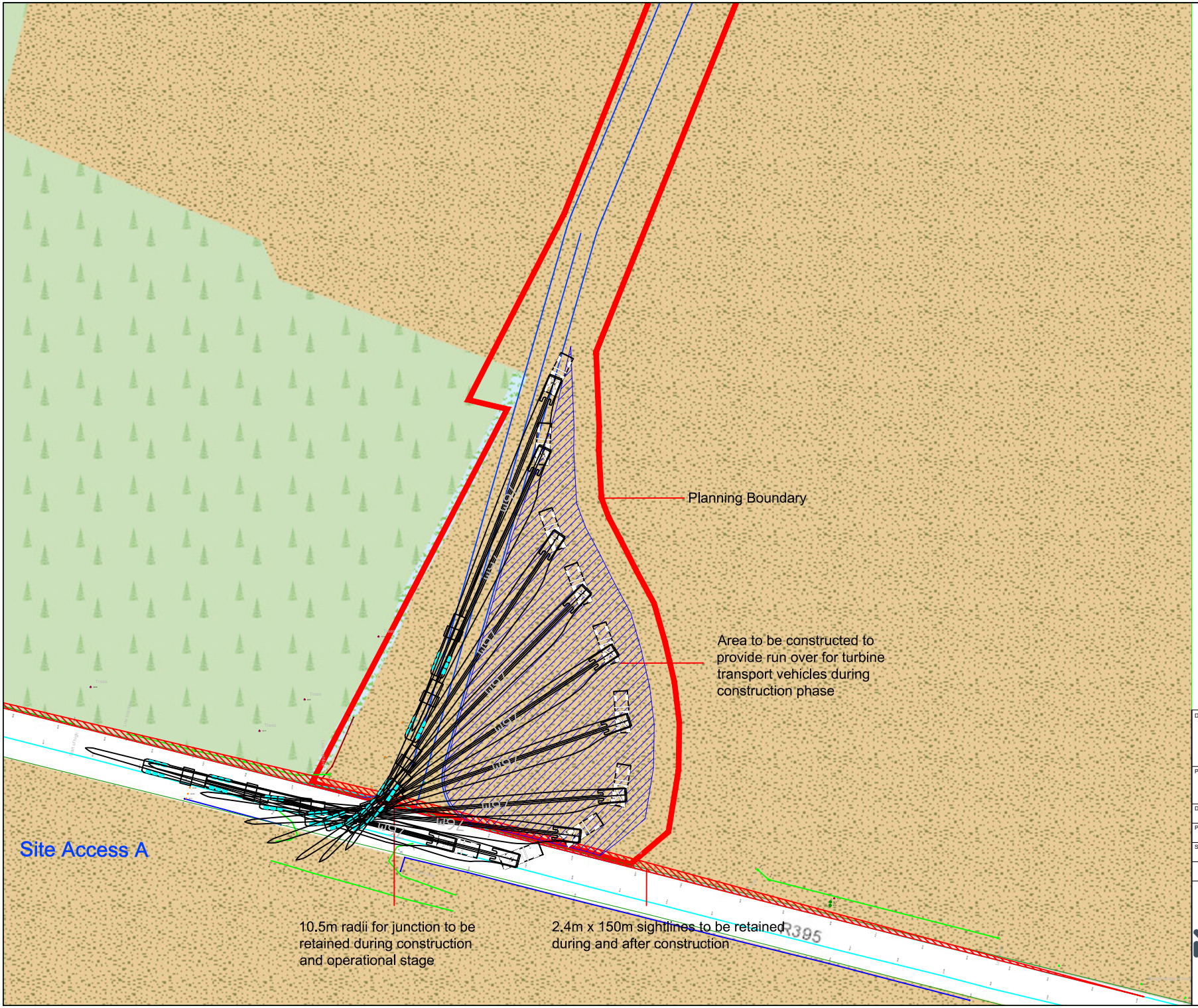

DRAWING TITLE:
Location 5 - Site Access junction A off R395, blade extended artic

PROJECT TITLE:
Coole Wind Farm, Co. Westmeath

DRAWING BY:	CHECKED BY:
Joseph O Brien	Michael Watson
PROJECT No.: 200445	DRAWING No.: Figure 14-17
SCALE: 1:1,000 @ A4	DATE: 18.03.2021

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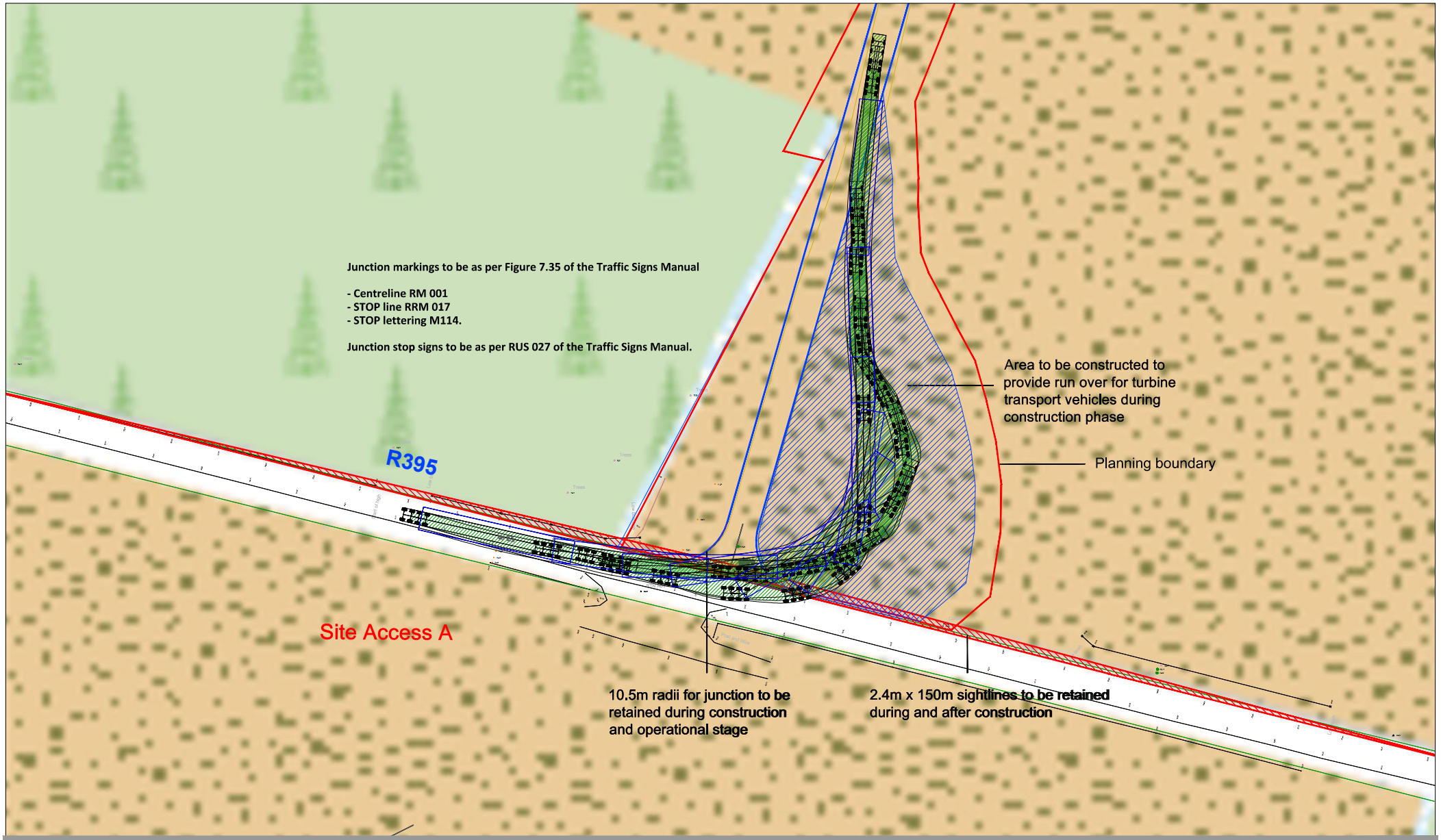

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Figure 14-18 Location 5 - Site access Junction A off R395, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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Locations 6 – Access junction B onto R396

As above the preliminary design of the proposed access junction onto the R396 is shown in Figure 14-19. The figure shows the proposed access road and junction details including temporary over –run areas, proposed junction radii and visibility splays that must be kept clear during the construction phase. It is proposed that a gate will be in place at the exit from the link road. A gate will also be in place post construction and the existing stone wall will be reinstated either side of the gate.

Swept path assessments for the abnormal loads are shown in Figures 14-20 and 14-21.

Plate 14-6 Locations 6 – Access junction B onto R396

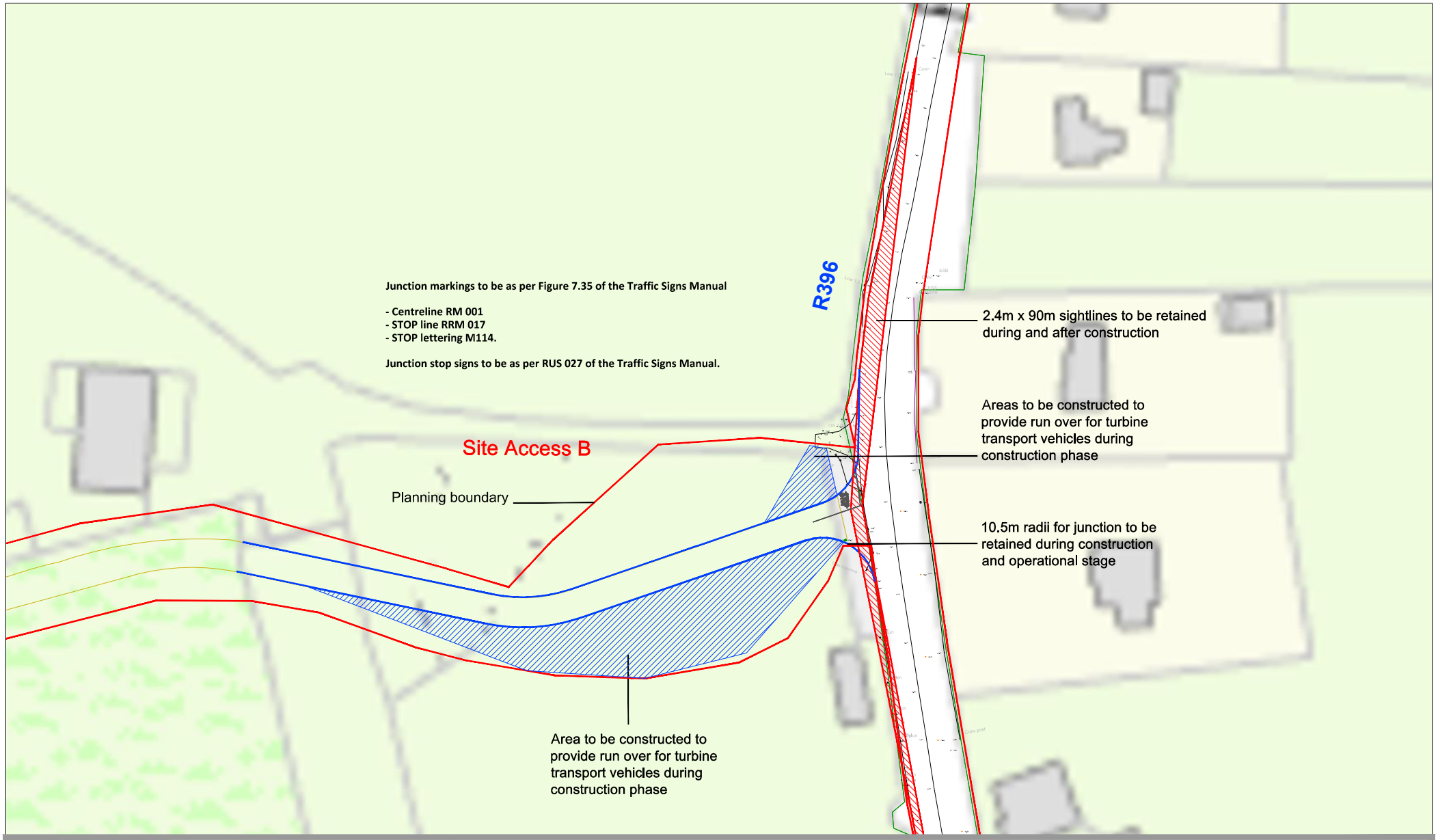

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Figure 14-19 Location 6 - Site access Junction B onto R396

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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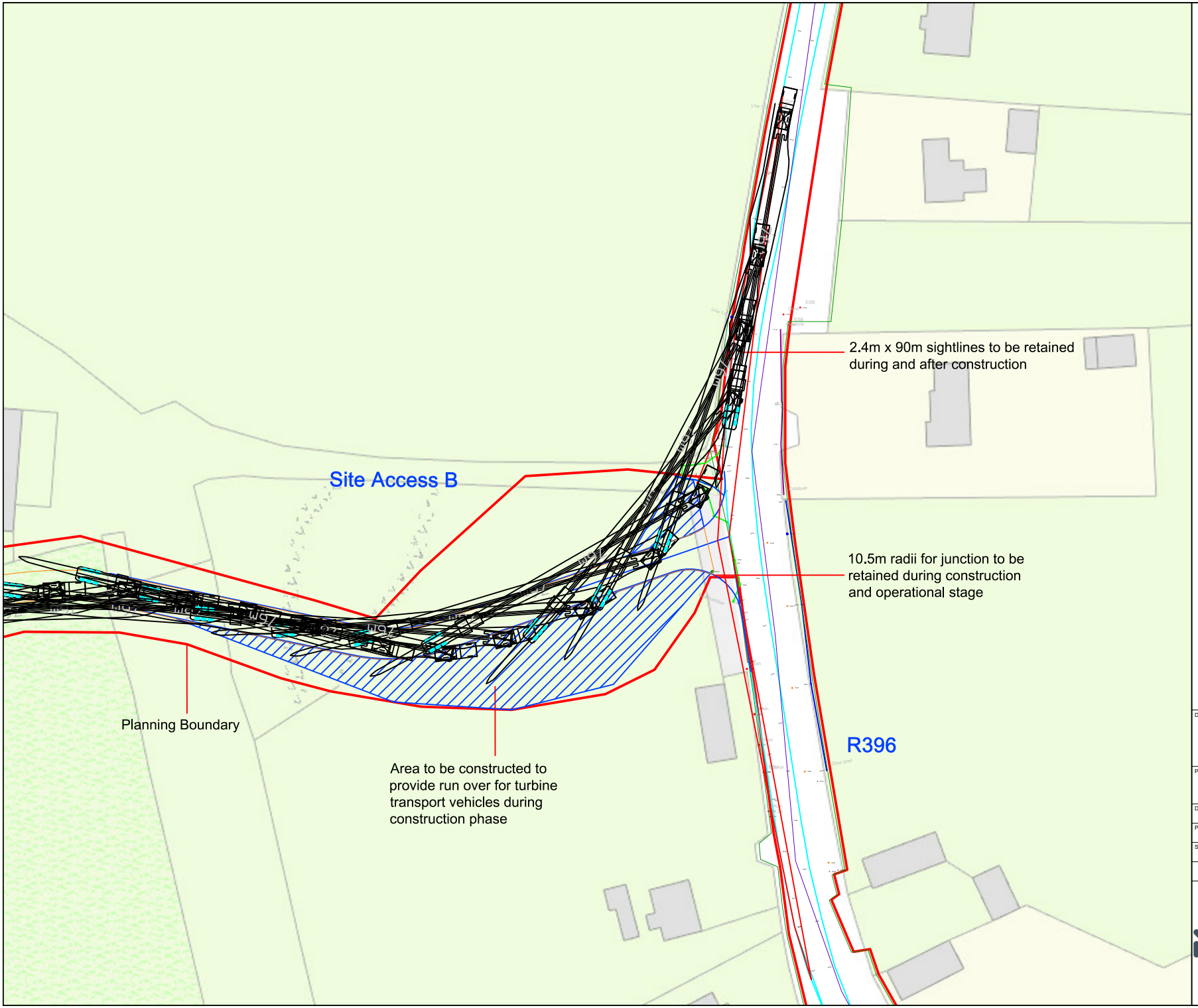

DRAWING TITLE:
Location 6 - Site Access junction B onto R396, tower extended artic

PROJECT TITLE:
Coole Wind Farm, Co. Westmeath

DRAWING BY:	CHECKED BY:
Joseph O Brien	Michael Watson
PROJECT No.: 200445	DRAWING No.: Figure 14-20
SCALE: 1:1,000 @ A4	DATE: 18.03.2021

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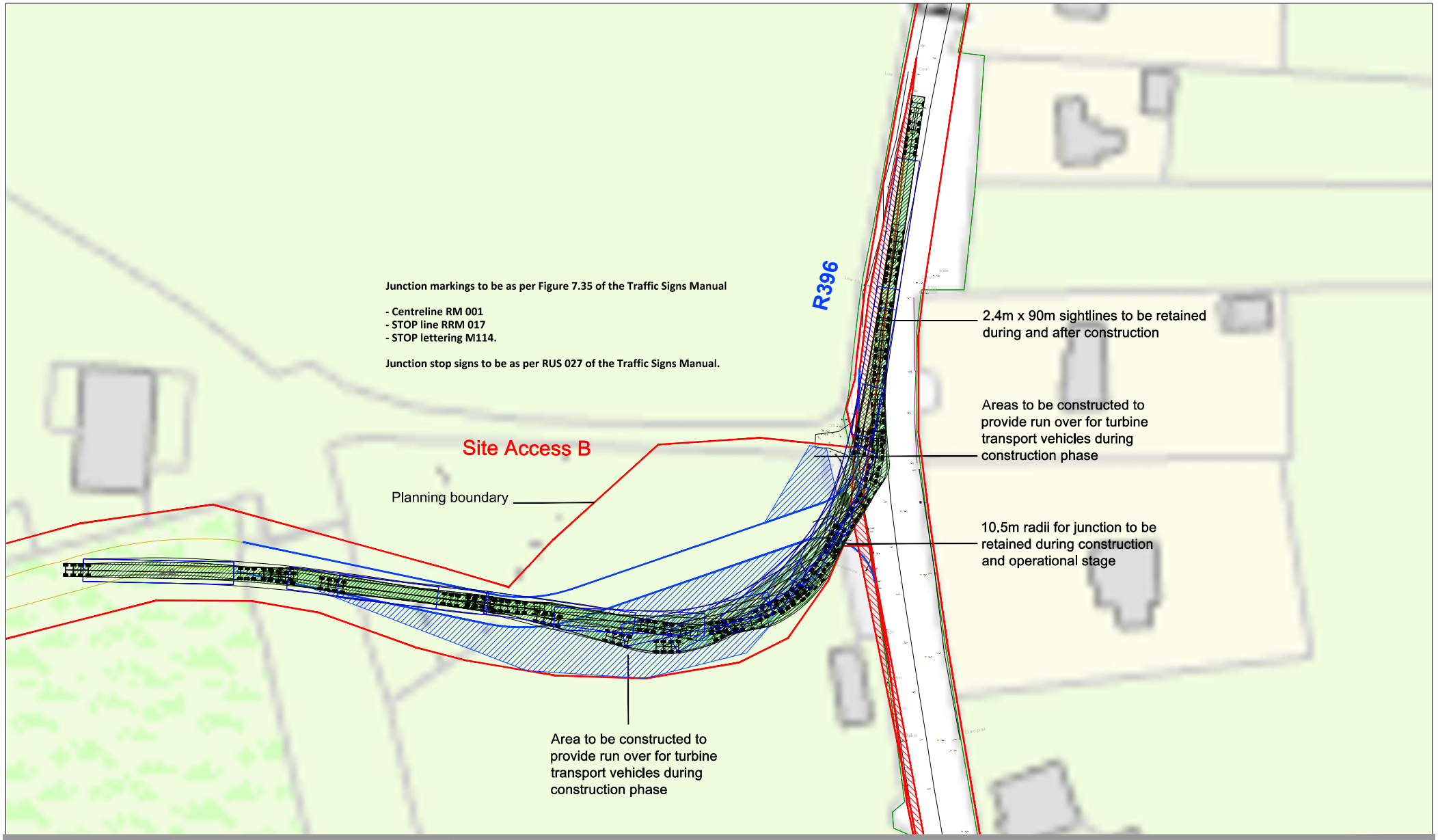

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Figure 14-21 Location 6 - Site access Junction B onto R396, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd		SCALE: 1:1000
PROJECT NO: 4860	DATE: 16.03.21		DRAWN BY: AL

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Locations 7 – Access junction C off R396

The proposed access junction off the R396 is shown in Figure 14-22a. The figure shows the proposed access road and junction details including temporary over –run areas and proposed junction radii. Visibility splays along the R396 that must be kept clear during both the construction phase and during operation are shown in Figure 14-22b. A barrier / gate will be in place at site access point off the public road during and post-construction.

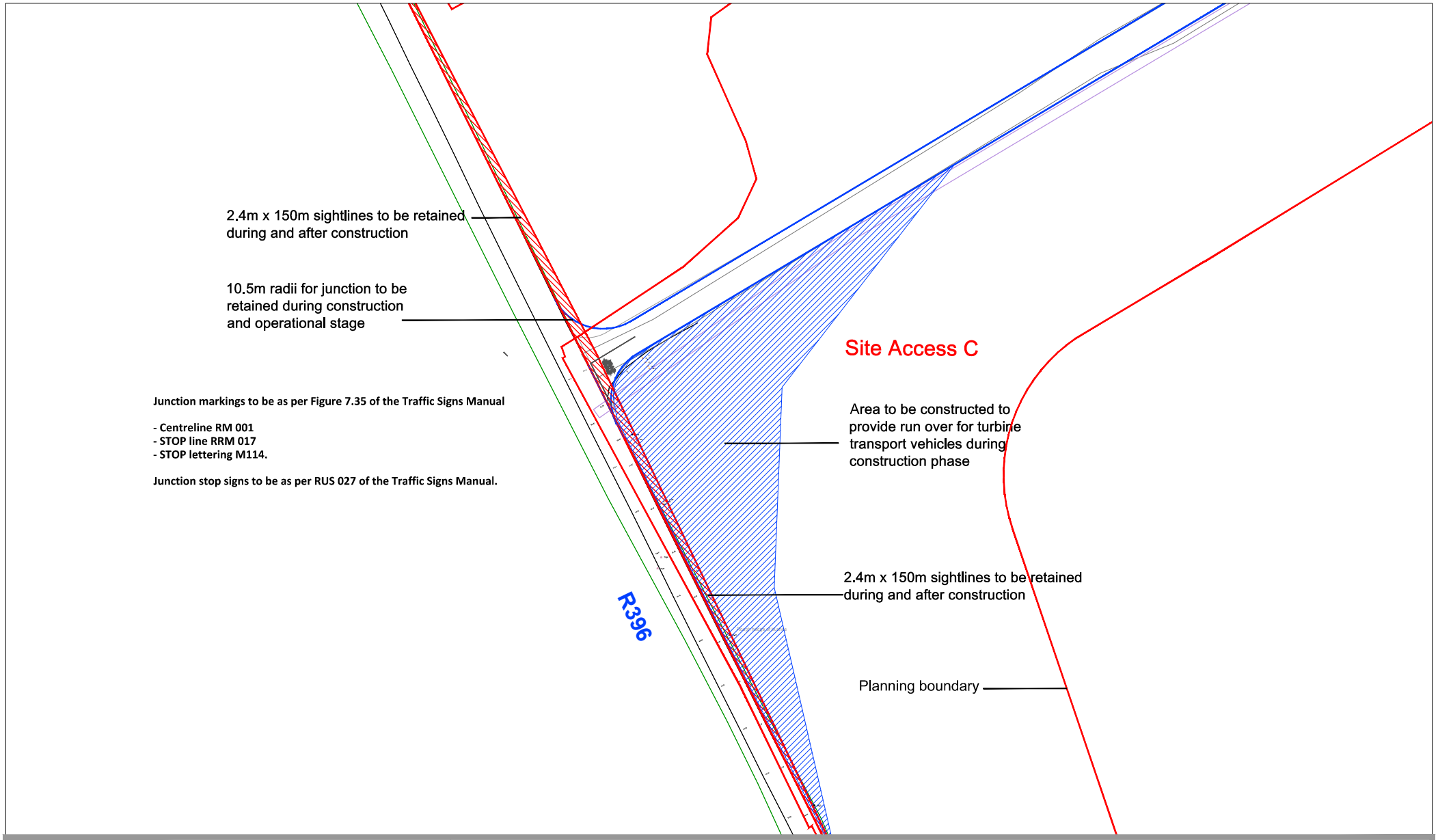
Swept path assessments for the abnormal loads are shown in Figures 14-23 and 14-24.

Plate 14-7 Locations 7 – Access junction C off R396

Locations 8 – Access junction D onto and across L5755

The proposed access junction on the L5755 that will provide access to turbines T1 to T9 to the north of the L5755, and to turbine T14 and T15 to the east along the L5755, is shown in Figure 14-25. The figure shows the proposed access road and junction details including temporary over –run areas and proposed junction radii. Visibility splays along the L5755 that must be kept clear during both the construction phase and during operation are also shown in Figure 14-25. A barrier / gate will be installed at site access / egress points off the public road and left in place post-construction.

Swept path assessments that demonstrate that the abnormal turbine loads will be accommodated at this location are shown in Figures 14-26 and 14-27.



NOTES:

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Figure 14-22a Location 7 - Site access Junction C off R396

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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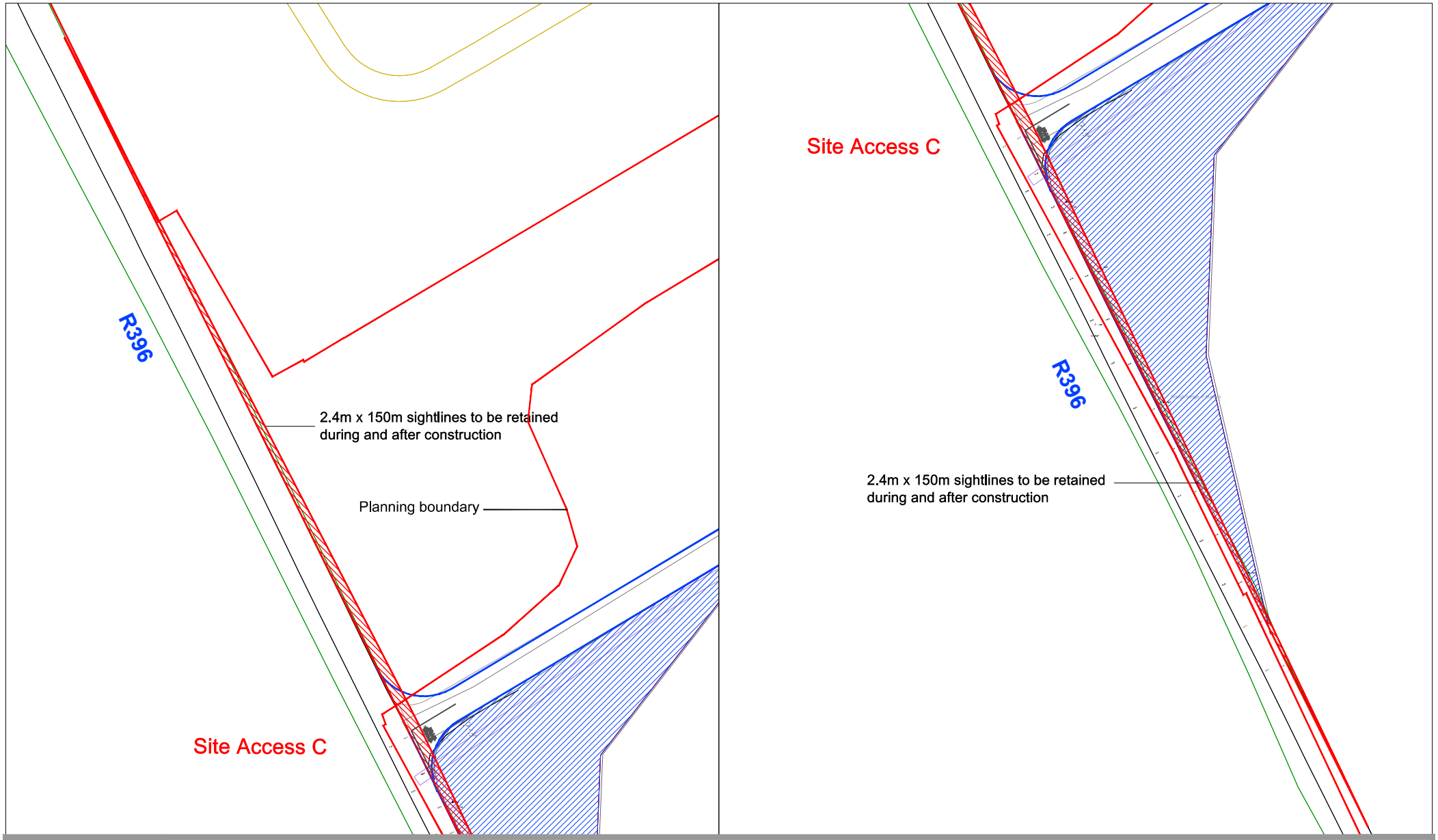

NOTES:

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Figure 14-22b Location 7 - Site access Junction C off R396, visibility splays

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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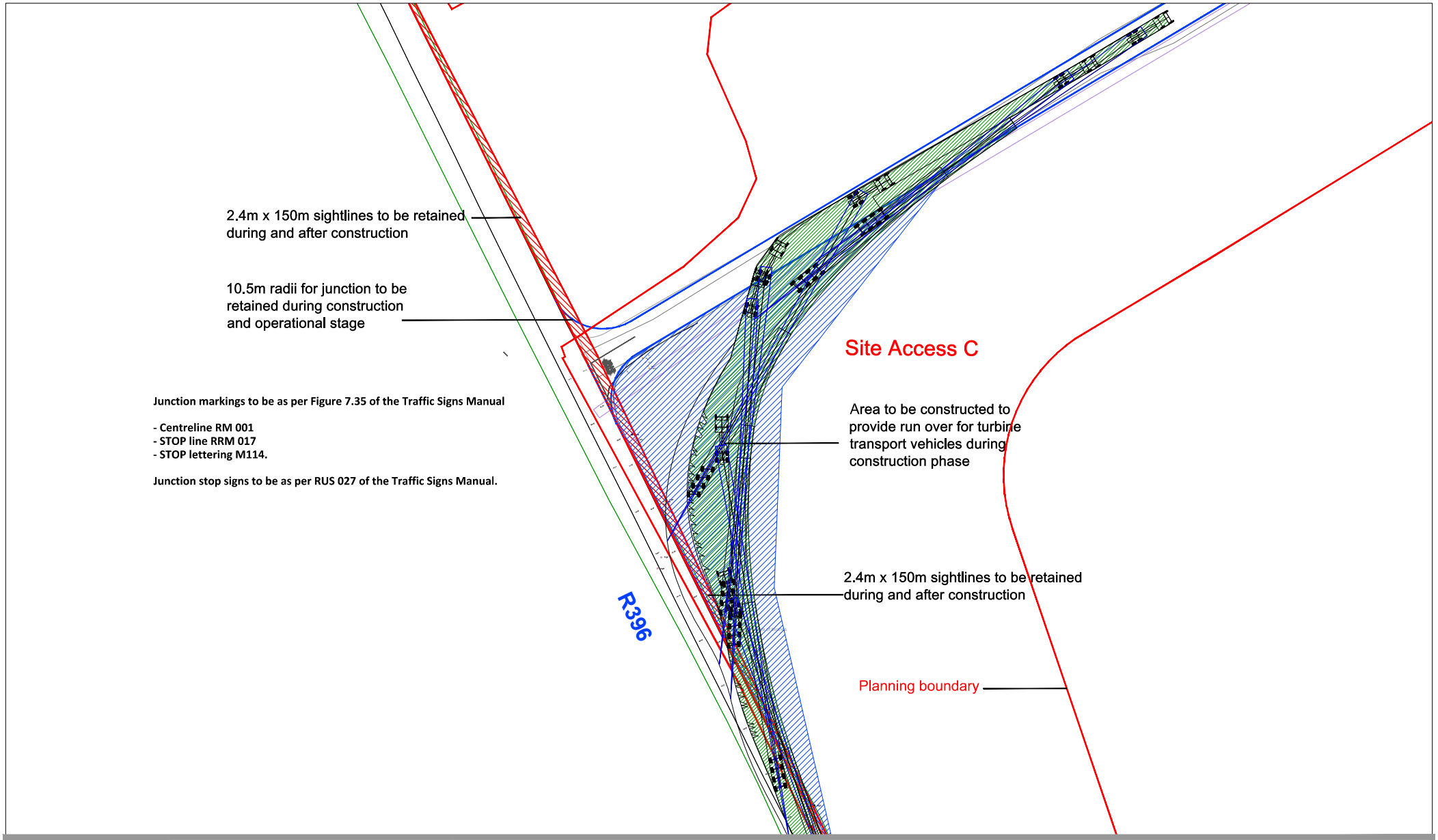

NOTES:

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Figure 14-23 Location 7 - Site access Junction C off R396, blade extended artic (77.5m blade)

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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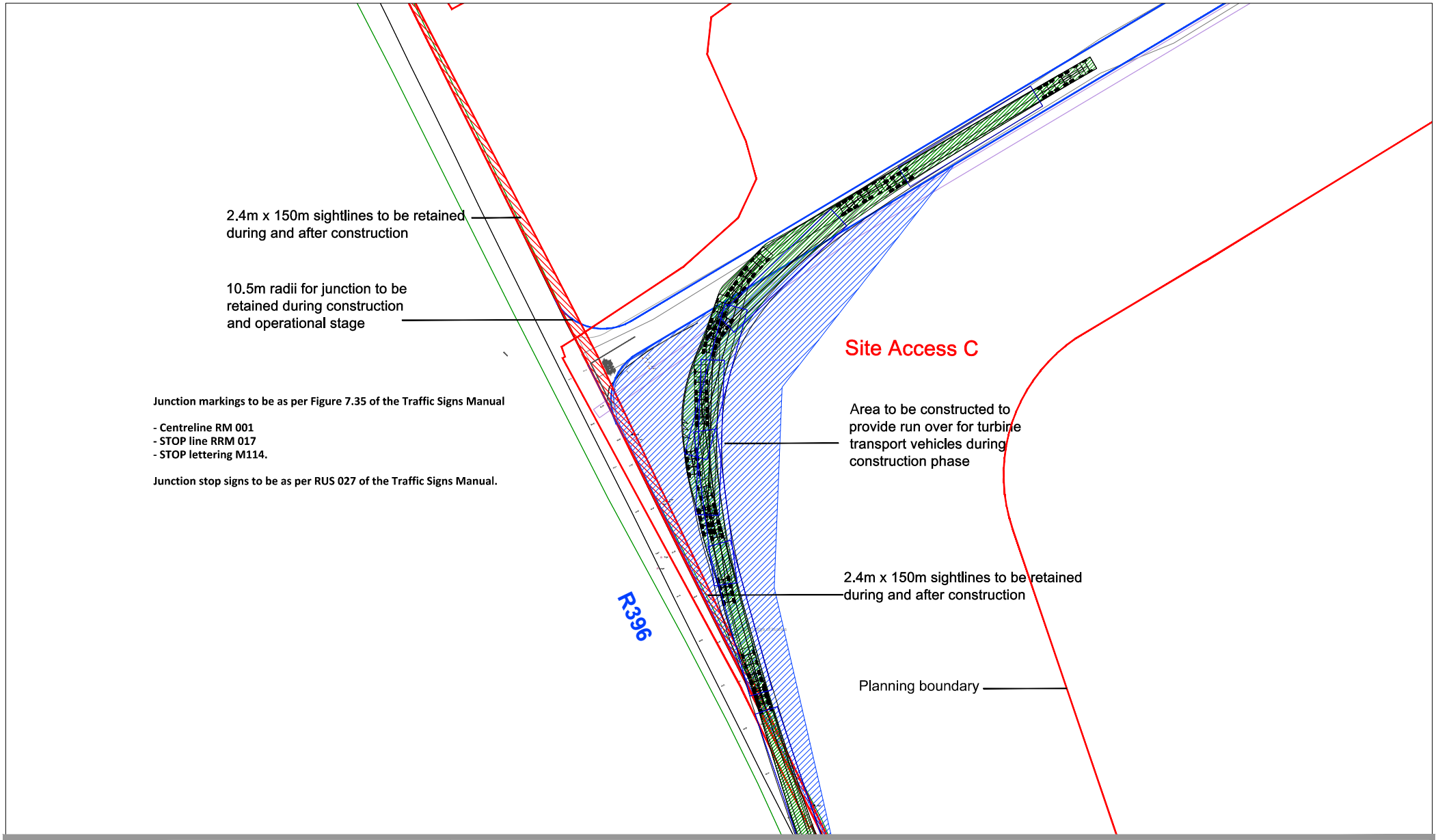

NOTES:

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Figure 14-24 Location 7 - Site access Junction C off R396, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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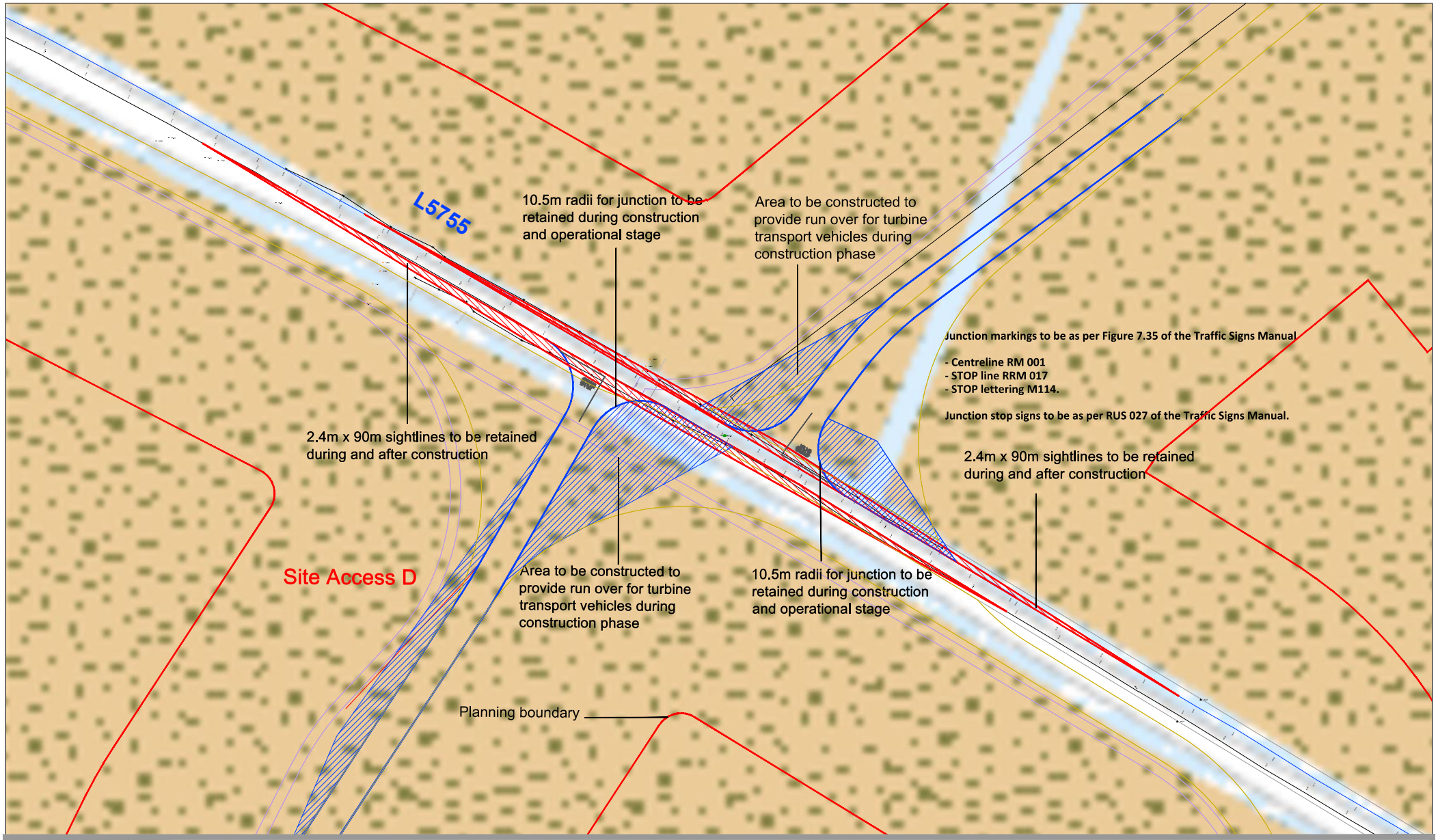

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Figure 14-25 Location 8 - Site access Junction D across L5755

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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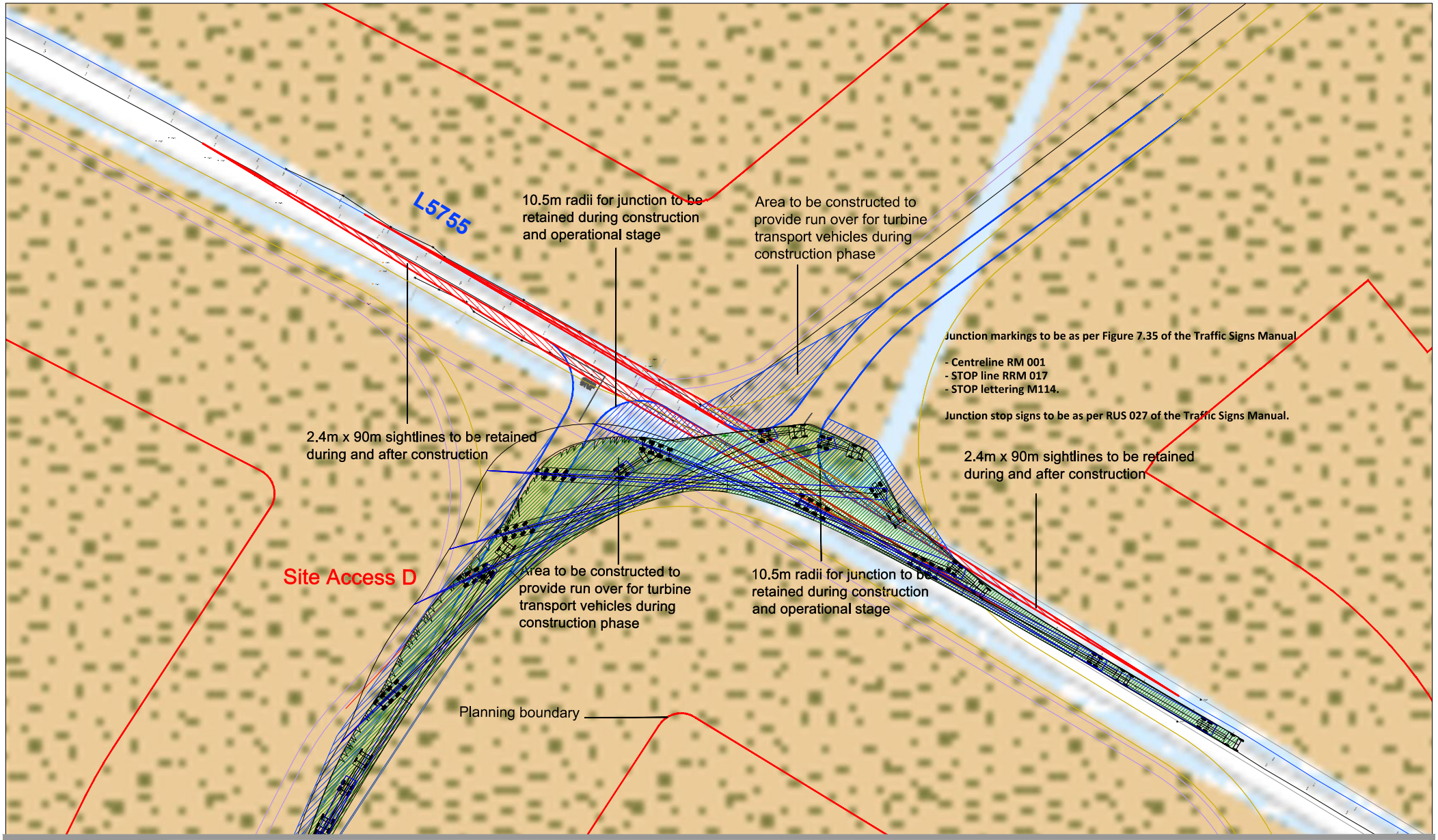

NOTES:

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Figure 14-26 Location 8 - Site access Junction D across L5755, blade extended artic (77.5m blade)

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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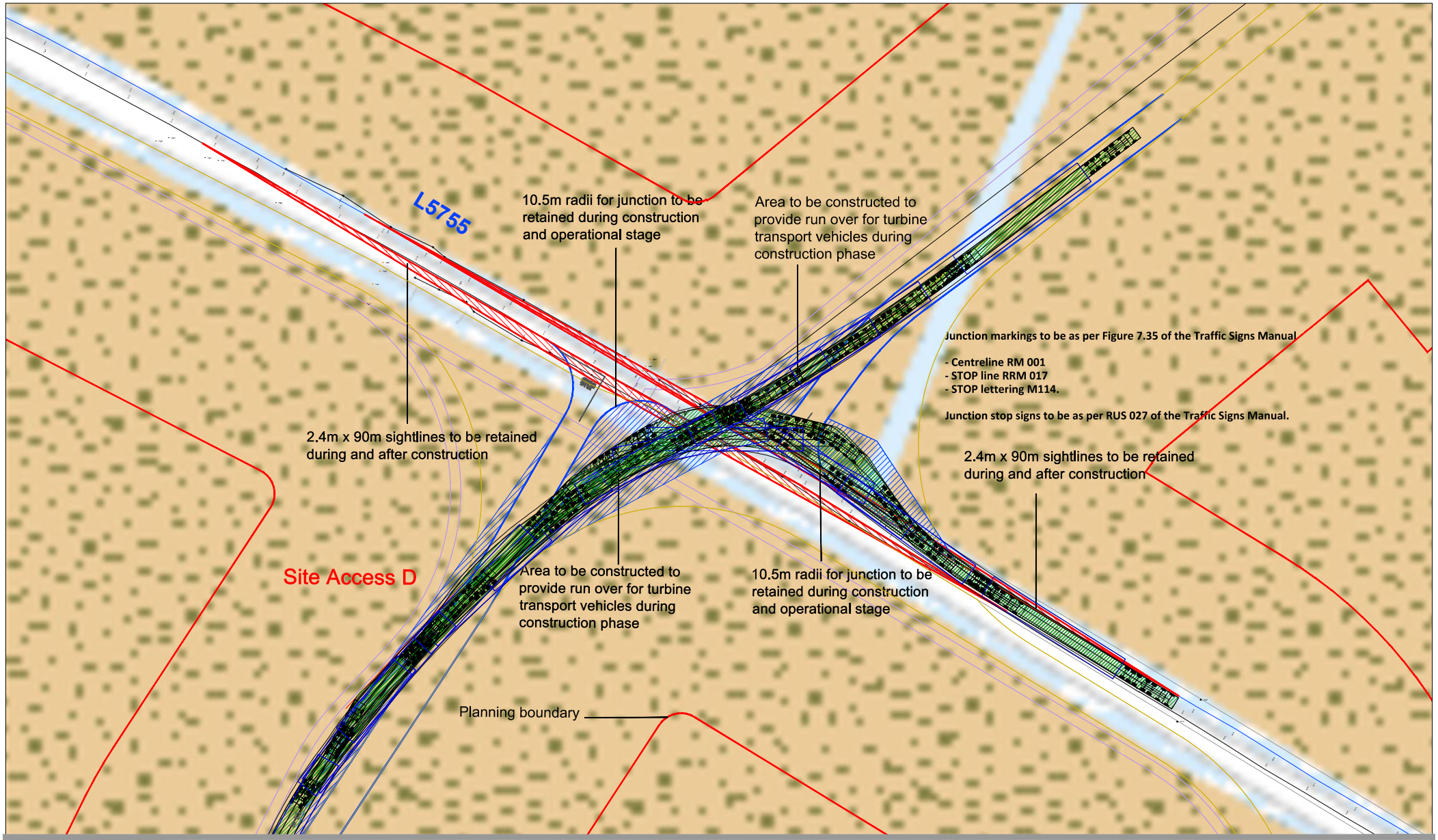

NOTES:

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Figure 14-27 Location 8 - Site access Junction D across L5755, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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Locations 9 – Access junction E off L5755

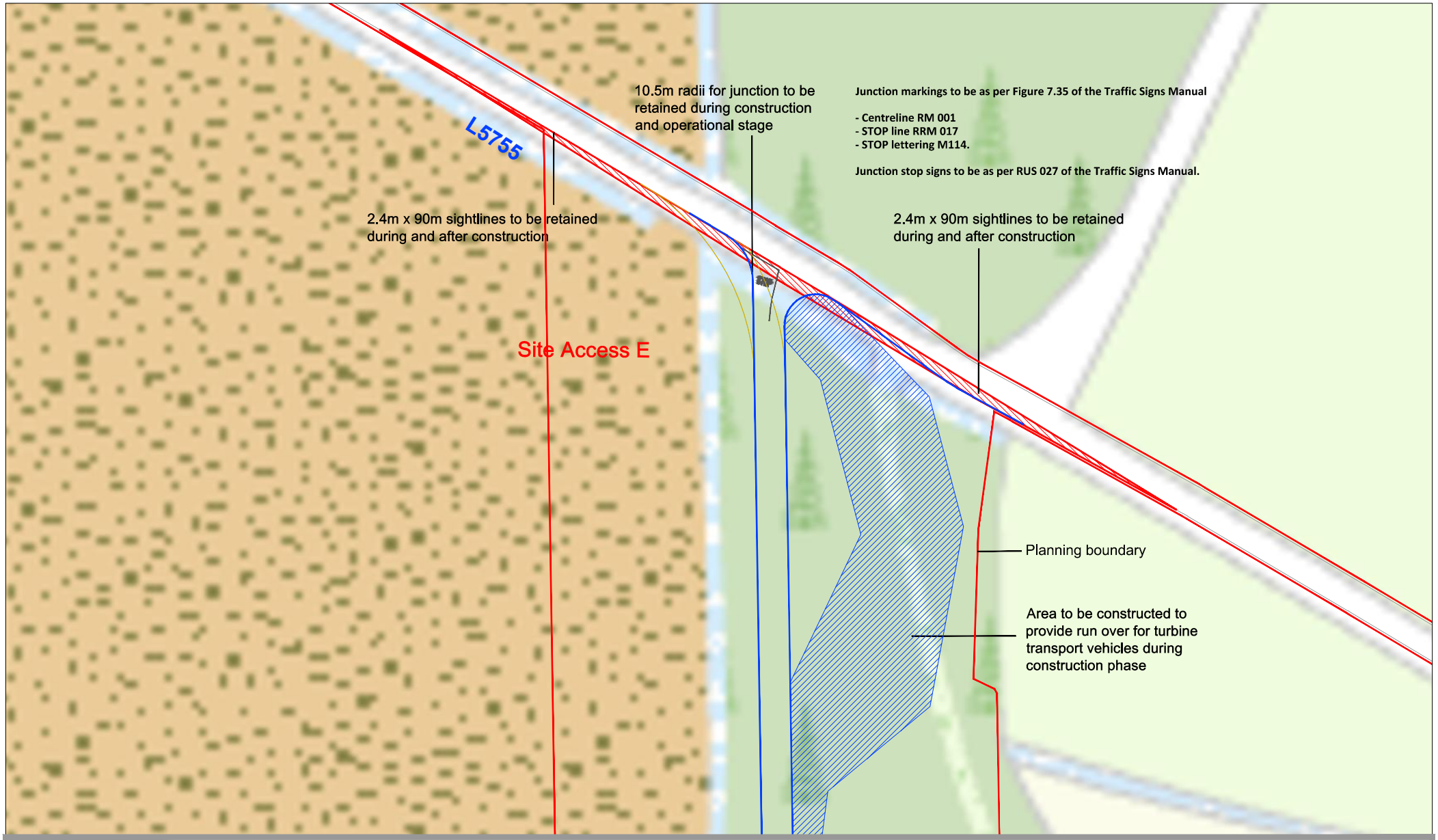
The proposed access junction off the L5755 that will provide access to turbine T14 is shown in Figure 14-28. The figure shows the proposed access road and junction details including temporary over –run areas, proposed junction radii and visibility splays along the L5755 that must be kept clear during both the construction phase and during operation. T14 access location off the public road will be gated and remain gated post construction.

Swept path assessments that demonstrate that the abnormal turbine loads will be accommodated at this location are shown in Figures 14-29 and 14-30.

Plate 14-8 Locations 9 – Access junction E off L5755

Locations 10 – Access junction F off L5755 to borrow pit

The proposed access junction off the L5755 that will provide access to the borrow pit is shown in Figure 14-31. The figure shows the proposed access road and junction details, including visibility splays along the L5755 that must be kept clear during the construction phase. The borrow pit access location off the public road will be gated post construction. A swept path assessments that demonstrate that a large truck will be accommodated at this location is shown in Figure 14-32.



NOTES:

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Figure 14-28 Location 9 - Site access Junction E off L5755

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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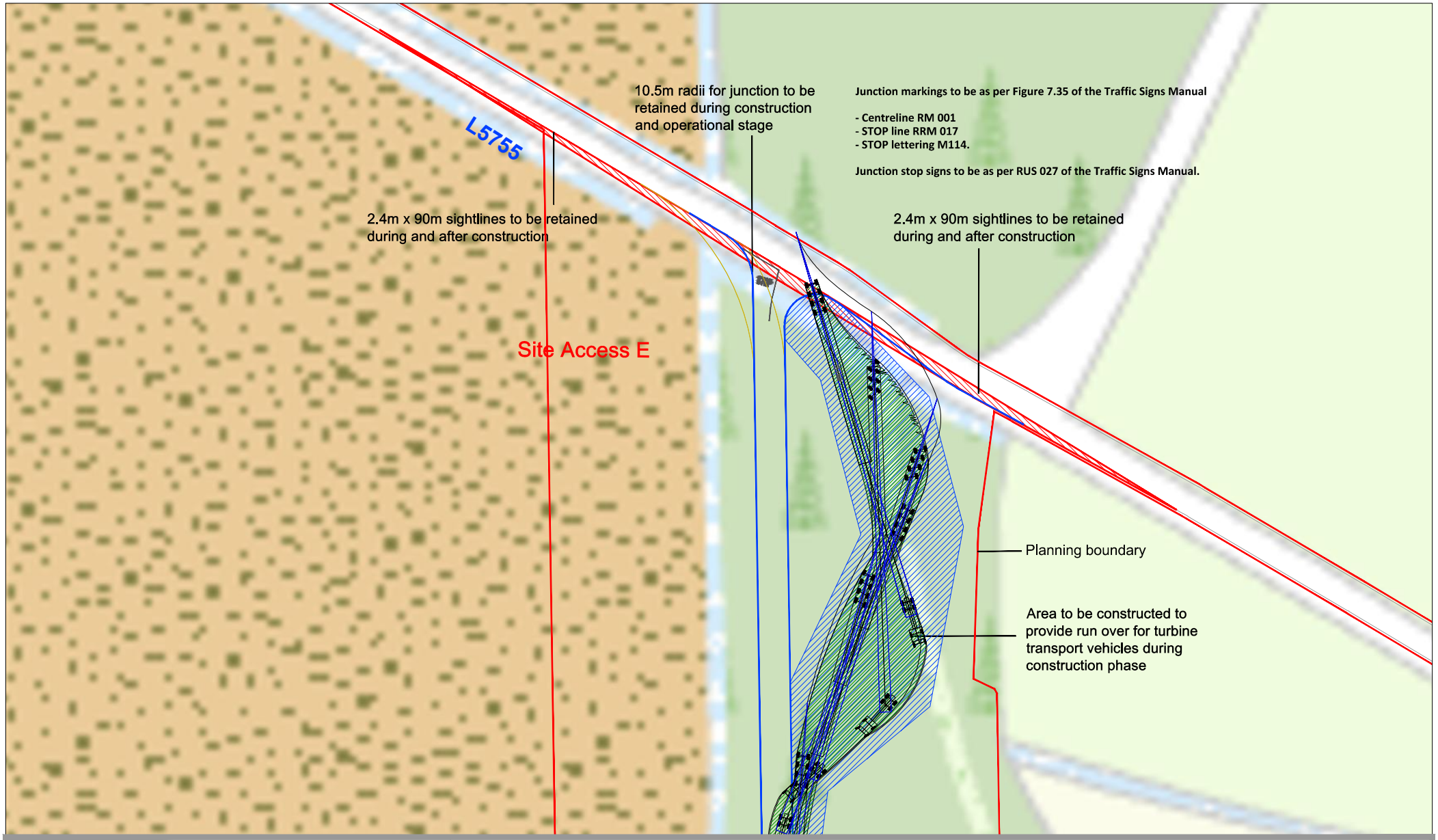

NOTES:

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Figure 14-29 Location 9 - Site access Junction E off L5755, blade extended artic (77.5m blade)

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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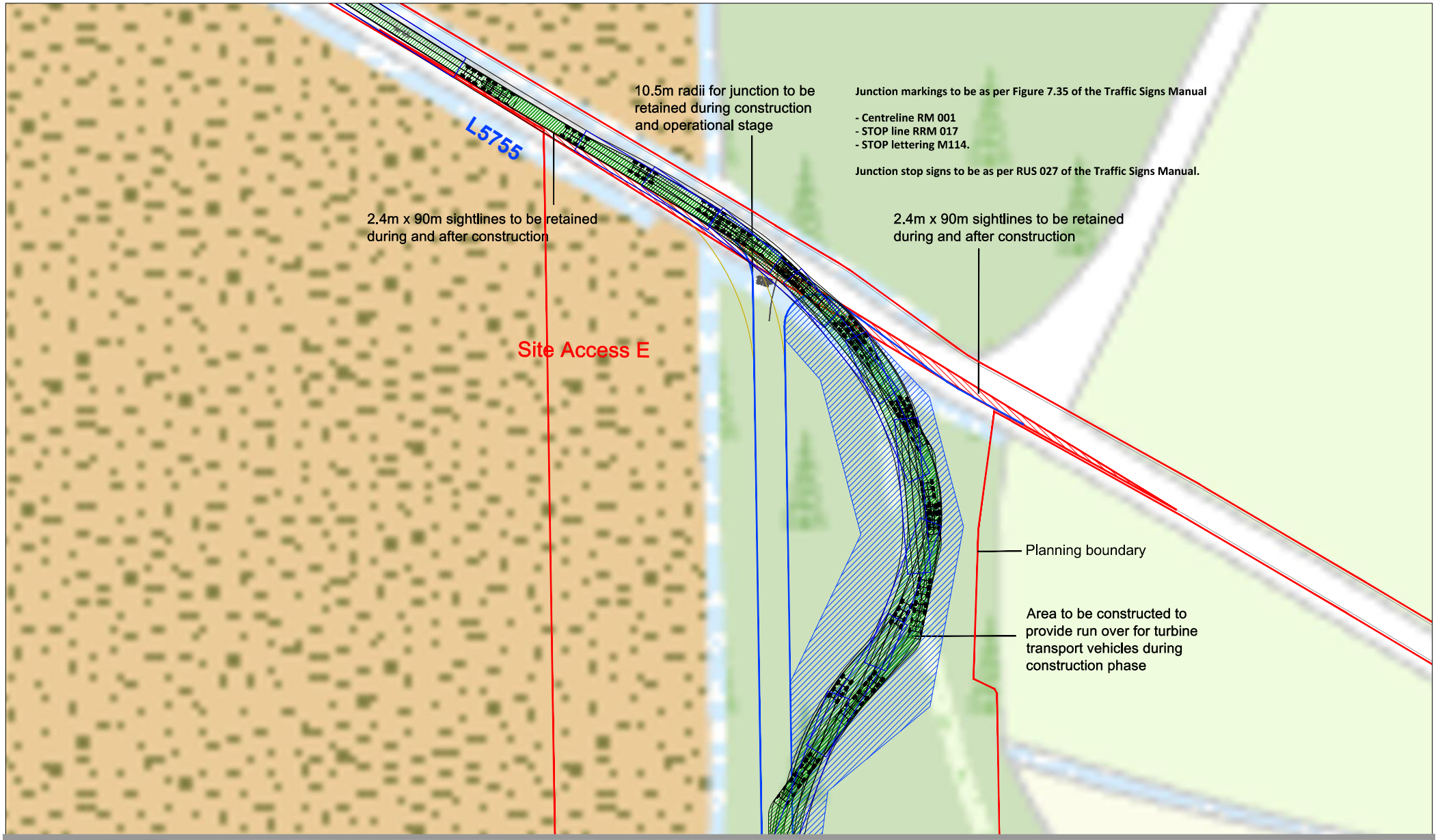

NOTES:

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Figure 14-30 Location 9 - Site access Junction E off L5755, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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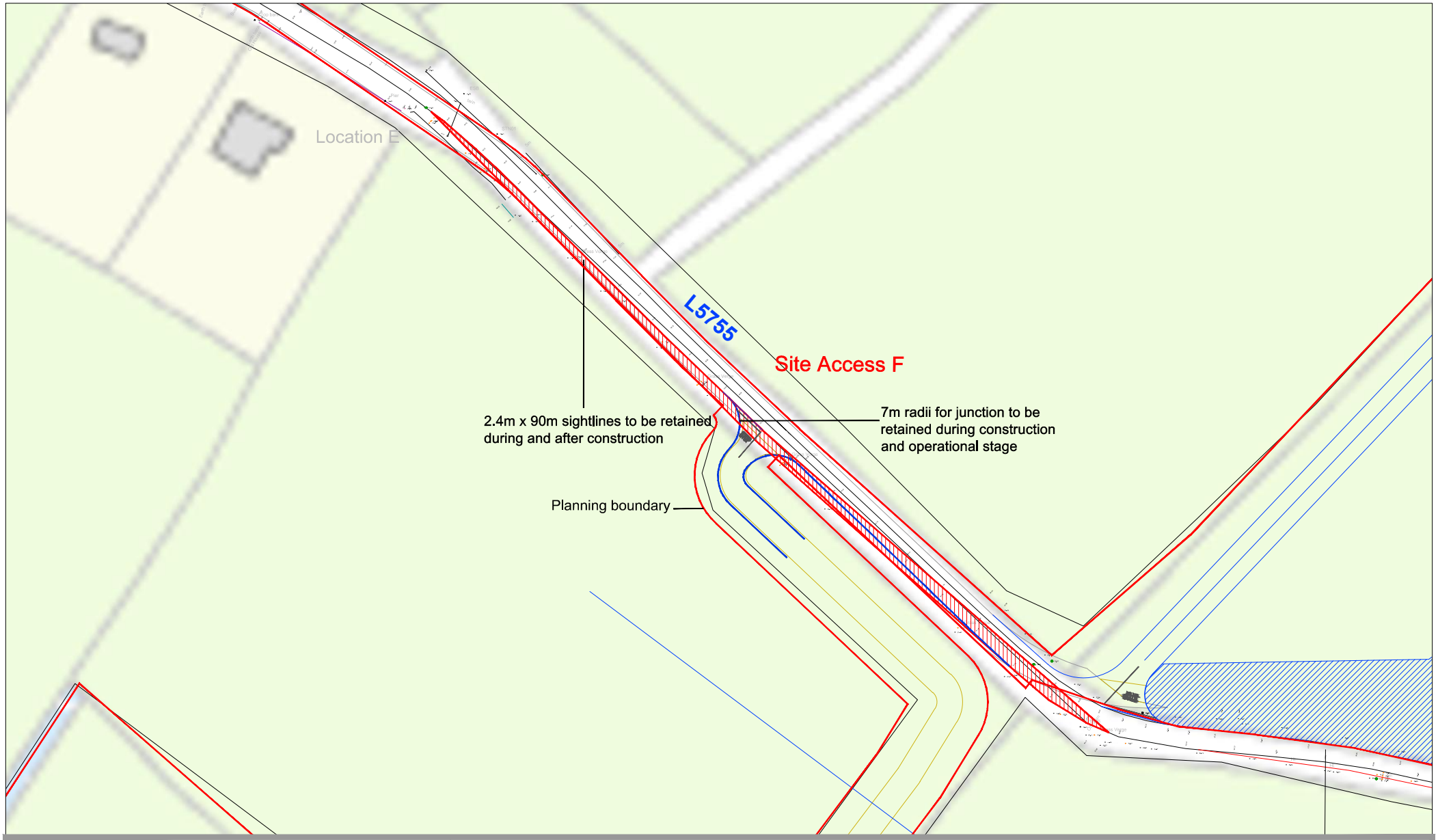

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 14-31 Location 10 - Site access Junction F, borrow pit access on L5755

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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NOTES:

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Figure 14-32 Location 10 - Site access Junction F, borrow pit access on L5755, standard truck

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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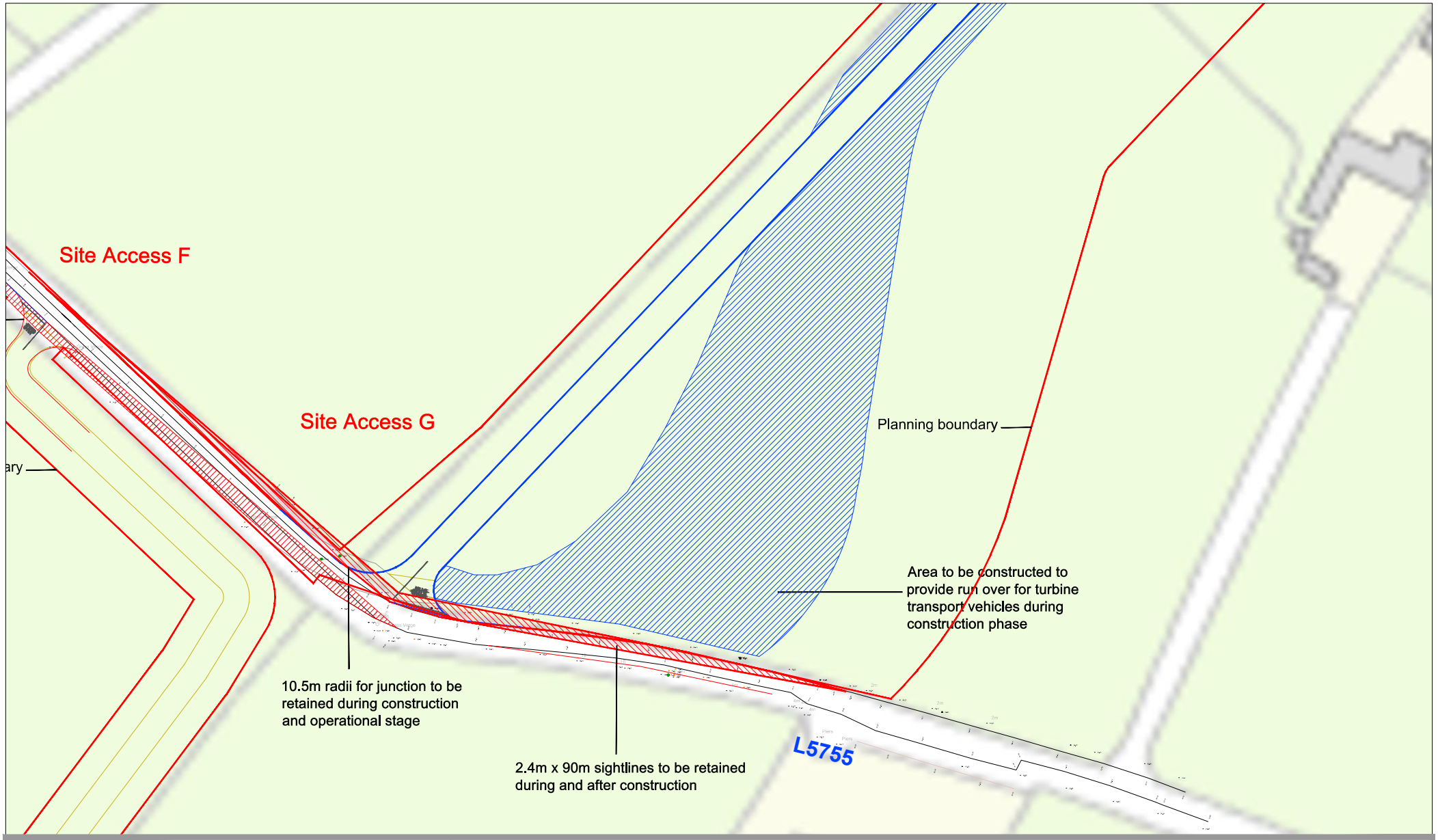
Locations 11 – Access junction G off L5755

The proposed access junction off the L5755 that will provide access to turbine T15 is shown in Figure 14-33. The figure shows the proposed access road and junction details including temporary over –run areas, proposed junction radii and visibility splays along the L5755 that must be kept clear during both the construction phase and during operation. T15 access off the public road will be gated and remain gated post construction.

Swept path assessments that demonstrate that the abnormal turbine loads will be accommodated are shown in Figures 14-34 and 14-35.

Plate 14-9 Locations 11 – Access junction G off L5755



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 14-33 Location 11 - Site access Junction G off L5755

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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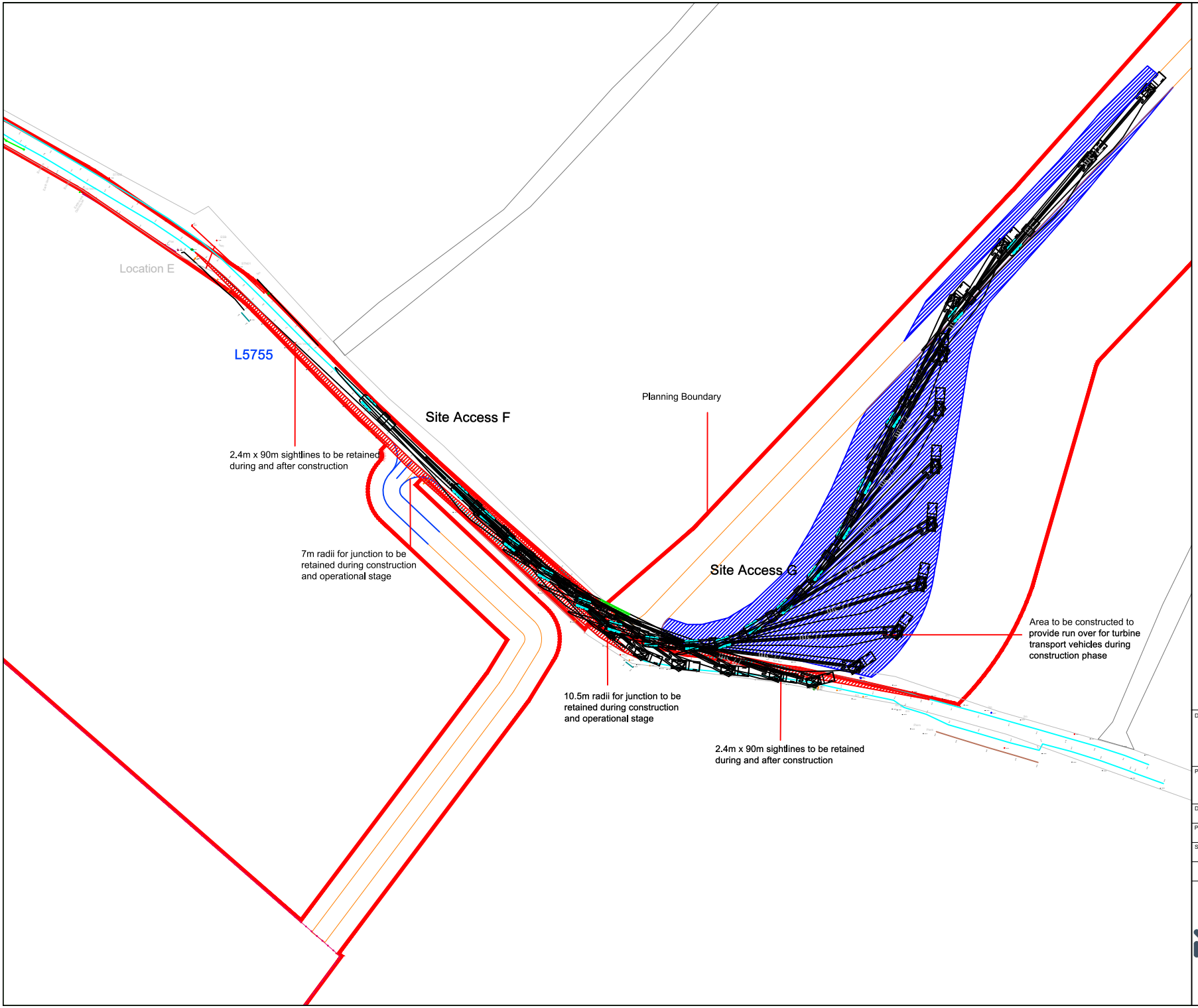

DRAWING TITLE:
Location 11 - Site access junction G off L5755, blade extended artic

PROJECT TITLE:
Coole Wind Farm, Co. Westmeath

DRAWING BY:	CHECKED BY:
Joseph O Brien	Michael Watson
PROJECT No.: 200445	DRAWING No.: Figure 14-34
SCALE: 1:1,500 @ A4	DATE: 18.03.2021

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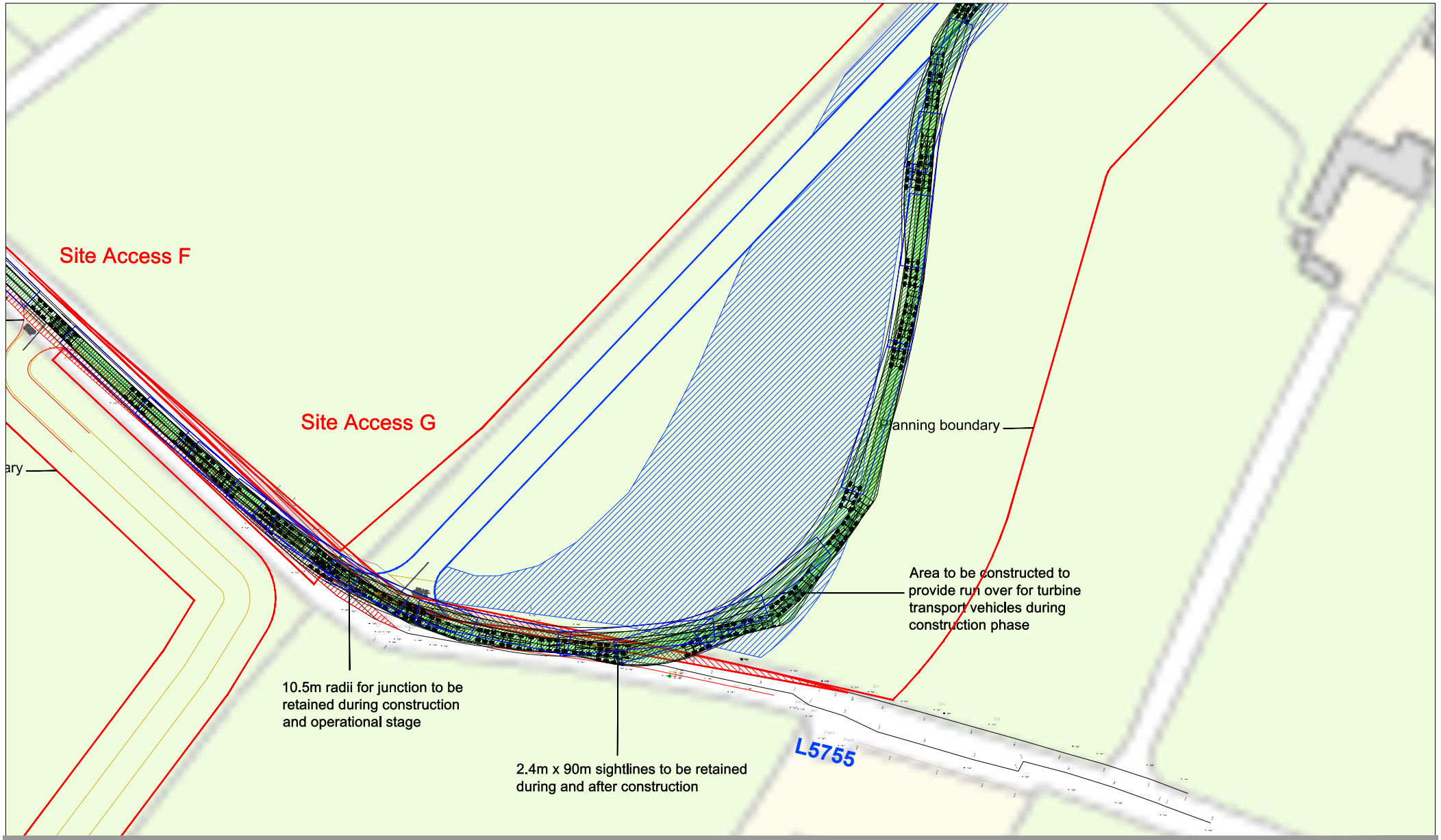

NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 14-35 Location 11 - Site access Junction G off L5755, tower extended artic

PROJECT:	Coole Wind Farm		
CLIENT:	Coole Wind Farm Ltd	SCALE:	1:1000
PROJECT NO: 4860	DATE: 16.03.21	DRAWN BY:	AL

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14.1.9 Provision for Sustainable Modes of Travel

14.1.9.1 Walking and Cycling

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

14.1.9.2 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.

14.1.10 Likely and Significant Effects and Associated Mitigation Measures

14.1.10.1 "Do Nothing" Scenario

An alternative scenario to developing the Proposed Development would be to leave the site as it is under its current planning permission. As detailed in Section 2.5.1 in Chapter 2 of this EIAR, a wind energy project comprising of 13 turbines and all associated infrastructure has current planning permission on the Proposed Development site. In this scenario the traffic effects would be similar but slightly less than those set out in this Chapter for a 15 turbine wind farm.

A second potential Do-Nothing scenario exists for this project i.e. assuming that the permitted development is not constructed. In this scenario there will be no additional traffic generated or works carried out on the road network and therefore no effects with respect to traffic.

14.1.10.2 Construction Phase

Wind Farm Site:

During the 15 days when the concrete foundations are poured at the same time as general site preparation and groundworks are progressing, the effect on the surrounding road network will be negative, resulting in an increase in traffic levels ranging from 2.6% on the N4 approaching Rathowen, to an increase of 40.1% on the L5828 leading to the site. The effect will be temporary, lasting for 15 days, and will be moderate.

During the remaining 240 days for the site preparation and ground works when deliveries to the site will take place, the effect on the surrounding road network will be negative, resulting in an increase in traffic levels ranging from 0.8% on the N4 approaching Rathowen, to an increase of 12.1% on the L5828 leading to the site. The effect will be temporary, lasting for 240 days, and will be slight to moderate.

During 255 days of the site preparation and grounds works stage there will be an impact on a short section of the L5755 between the borrow pit and the site (approximately 1.6 kms to the entrance to proposed turbines 1-13 and 0.1kms to turbine no. 15) as gravel/ aggregate is delivered to the site. During the construction stage it is estimated that 19,230 truck loads will be delivered from the borrow pit to the site, equating to 75 2-way trips per day, or an additional 362 PCUs for the 255 days of the construction stage. The effect of this will be temporary, lasting for 255 days and will be moderate. This is a worst case scenario as an additional 25% contingency has been provided for when estimating the volume of material required.

During the 15 days of the turbine construction stage when general materials are delivered to the site, the delivery of construction materials will result in a negative impact on the surrounding road network, increasing traffic levels ranging from 0.4% on the N4 approaching Rathowen, to an increase of 5.8% on the L5828 leading to the site. The effect will be temporary, and will be slight.

During the 27 days when the various component parts of the wind turbine plant are delivered to the site using extended articulated HGVs, the effect of the additional traffic on these days will be moderate due to the size of vehicles involved, resulting in increased traffic volumes of between 0.9% and 14.1%, but will be temporary. The effect may be reduced to slight if the delivery of the large plant is done at night, as is frequently the case for abnormally large loads.

It was determined that all links in the study area, with the exception of the N4, will operate within operational capacity for all days within the construction period. It is forecast that the N4 will operate over capacity for the do-nothing scenario in 2025 and will be impacted slightly during the construction stage of the proposed development.

Grid Connection Route:

A detailed assessment of the likely and significant impacts of the construction phase of the Grid Connection Route are set out in detail in Appendix 14-1. A summary of the assessment is presented in the following text.

During the construction period of the proposed grid connection the effects on the road network along the Grid Connection Route will be negative in terms of increased traffic volumes due to construction traffic and delays / detours incurred to general traffic. The effects will be temporary, and will range from negligible (on the N4) to slight on most of the route, to moderate at the following locations;

- Section 2, L-5703, for approximately 9 days when road will be closed due to duct laying,
- Section 3, L-1773, for approximately 9 days when the road will be closed due to construction of 1 water crossings,
- Section 7, L-1826, for approximately 14 days when road will be closed due to construction of 2 water crossings,
- Section 9, R396, for approximately 7 days when road will be closed due to construction of 2 water crossings.

While the construction generated traffic will be noticeable on the local highway network, the impact due to increased traffic volumes will be negative, temporary and slight.

Overall therefore the traffic effects resulting from the construction of the grid connection will be negative, temporary and will range in severity from slight to moderate.

Proposed Development

The traffic effects resulting from the construction of the Wind Farm and Grid Connection elements of the Proposed Development may occur concurrently as, in general, they will apply to different parts of the road network. The exception to this is the section of the Grid Connection Route, Section 9 on the R396, which will include a temporary road closure for 7 days. Works will be scheduled to ensure that deliveries to the site for the Wind Farm element of the Proposed Development do not take place during this period.

14.1.10.3 Operational Phase

During the operational phase the effect on the surrounding local highway network will be negative and long term, but will be imperceptible given that there will be a maximum of 2 staff members on site at

any one time, resulting in typically 2 visits to the site on any one day made by a car or light goods vehicle.

There will be no potential effects on traffic during the operational phase of the Grid Connection Route because all required works will be completed during the construction phase unless required for maintenance at substations or in the event of a fault occurring.

14.1.10.4 Decommissioning Phase

The design life of the Proposed Development is 30 years after which time a decision will be made to determine whether or not the turbines will be replaced by new turbines or if decommissioning will occur. If the site is decommissioned, cranes will disassemble each turbine tower and all equipment.

All infrastructure including turbine components will be separated and removed off-site for re-use, recycling and waste disposal.

It is proposed that turbine foundations and hardstanding areas will be left in place and covered with soil/topsoil. It is proposed to leave the access roads in situ at the decommissioning stage. It is considered that leaving the turbine foundations, access tracks and hardstanding areas in situ will cause less environmental damage than removing and recycling them. However, if removal is deemed to be required all infrastructure will be removed with mitigation measures similar to those during construction being employed.

14.1.10.5 Cumulative Effects

A detailed assessment of all developments at varying stages in the planning process (from pre-planning to operational), is set out in Section 2.7 of this EIAR, with an assessment of the potential cumulative traffic effects with the Proposed Development assessed 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 set out below and summarised in Table 14-24.

1 **Ballyjamesduff Wind Farm** – This proposed (refused but under appeal) one turbine development is located in the townlands of Cloggah and Ballyjamesduff in County Cavan. Located 16 kilometres north east of the subject site. This level of physical separation, together with traffic volumes associated with one turbine being low, it is considered that the cumulative traffic effects between it and the Proposed Development will be imperceptible, and only then, if both developments are constructed simultaneously.

2 **Ballyjamesduff Wind Farm** – This one turbine development which has been constructed is located in the townlands of Cloggah and Ballyjamesduff in County Cavan. Located 16.4 kilometres north east of the subject site. As the traffic movements associated with the construction of the turbine were included in background traffic levels, there will be no additional cumulative traffic effects between it and the Proposed Development.

3 **Peat Extraction** - As traffic movements relating to peat extraction activity were included in background traffic levels, there will be no additional cumulative traffic effects between it and the Proposed Development.

4 **Forestry / Tree Felling** – Forestry and tree felling activity takes place at present and will continue in the future. It is noted that traffic movements relating to this activity did possibly contribute to

background traffic levels, but there may be cumulative traffic effects between forestry operations locally and the Proposed Development during time periods that tree felling takes place and in particular if this occurs during the construction phase. During the operational phase, which is when most of the forestry operations will be occurring i.e. over the 30 year life of the project the effects will be imperceptible as the Proposed Development generates very low traffic numbers for the majority of its lifetime.

If it is assumed that tree felling takes place in coups of 20 hectares at a time, generating approximately 200 HGV movements over 10 working days (or 20 HGV movements daily) the cumulative impact on these days is forecast to be slight even if it occurs during the construction phase of the Proposed Development.

It should be noted that additional tree felling required for the Proposed Development site works is included in the direct impacts assessed previously in this section.

5 N4 Mullingar – Longford (Roosky) Scheme - A highway improvement scheme is being progressed by Westmeath County Council, Longford County Council and TII, on the N4 between Mullingar and Longford (Roosky). The project is at the Public Consultation 2 stage (programmed for February / March 2021) and considers various on-line and off- line alignments on the N4 corridor. It is noted that both the delivery route for turbine components and general construction traffic, and a 3 km section of the Grid Connection Route coincide with the section of the N4 being considered in this improvement scheme. With a proposed construction year of 2025 for the Proposed Development it is considered unlikely that the construction phase for the Proposed Development will overlap with the construction of the N4 improvement scheme. This will, however, require to be monitored as both proposals progress.

Table 14-24 Summary of projects considered in cumulative assessment and potential for cumulative traffic effects with proposed Coole Wind Farm

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects
1 Ballyjamesduff Wind Farm	Under appeal	Low	Low	Imperceptible
2 Ballyjamesduff Wind Farm	Operating	Not relevant	Not relevant	Included in background traffic flows
3 Peat Extraction	Assessed as operational	Not relevant	Not relevant	Included in background traffic flows
4 Forestry / Tree Felling	Operating	High	Low	Slight
5 N4 Mullingar – Longford (Roosky) Scheme	Proposed	Low	Medium	Imperceptible

14.1.10.6 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 include the following;

- Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Section 14.1.2.2;
- The majority of gravel and stone material being obtained from a borrow bit located approximately 1.6km on public road from the proposed wind farm site; and
- Construction of a link road between the R395 and the R396 to the west of Coole Village. The use of this link road avoids Coole village, minimising the impacts of traffic passing through the village.

Mitigation Measures During the Construction Stage

The successful completion of this Proposed Development will require significant coordination and planning, and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the Proposed Development in order to minimise the effects of the additional traffic generated by the Proposed Development. The range of measures will include the following which are also set out in the CEMP Section 4.12, Traffic Management Plan;

A detailed **Traffic Management Plan (TMP)**, incorporating all the mitigation measures is submitted as part of the CEMP included in Appendix 4-8 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on site. The TMP will include 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 Westmeath County Council in advance of deliveries of turbine components to site.

Information to locals – Locals in the area will be informed of any upcoming traffic related matters e.g. temporary lane/road closures (if required) or delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Contract Project 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 – A pre condition survey of roads associated with the proposed development will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. 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 relevant local authority including the roads sections of local authorities that the delivery routes traverse and An Garda Siochana, during the delivery phase of the turbines, when an escort for all convoys will be required. Liaison with the relevant local authority including the roads sections of local authorities that the cable route traverses. Once the surveys have been carried out and “prior to commencement” status of the relevant roads established,

(and in compliance with the provisions of the CEMP included as Appendix 4-8), the Roads section will be informed of the name and contact number of the Project Supervisor of the construction stage as well as the Site Environmental Manager.

Implementation of temporary alterations to road network at critical junctions – At locations highlighted in section 14.1.8.

Identification of delivery routes – These routes will be agreed and adhered to by all contractors.

Travel plan for construction workers – While the assessment above has assumed the worst case 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 a routes to / from the site and identification of an area for parking.

Temporary traffic signs – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including all new junctions providing access to the site and temporary access road on the R395, R396 and the L5755. All measures will be in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). A member of construction staff (flagman) will be present at key junctions during peak delivery times and at each construction site location along the Grid Connection Route.

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.

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.

Re-instatement works - All road surfaces and boundaries will be re-instated as described in section 14.1.8. A roads conditions survey (and any other analyses required by the Roads Section of the Council) would be undertaken immediately prior to construction commencement of the project to assess the condition of the road network at that time and to agree any required works with the local authority. Such a survey would be repeated immediately after completion of the construction phase of the project in order to ensure that any reinstatement works were carried out to a satisfactory standard as required by the local authority.

Road Opening Licence – Roads works associated with the grid connection cabling will be undertaken in line with the requirements of a road opening licence as agreed with Westmeath County Council.

Diversions and road closures – reasonable access to residences, farms and businesses will be maintained at all times during any road closures associated with the Grid Connection Route works. The details of this will be agreed with the roads authority in advance of works taking place. The network of local roads in the area will be used for traffic diversions for local traffic in order to expedite the works and limit the duration of the impact owing to the Grid Connection Route works.

Trench Reinstatement - Trenches on public roads, once backfilled, will be temporarily reinstated to the satisfaction of the roads authority. Following temporary reinstatement of trench sections on public roads along which the Grid Connection Route travels will receive a surface overlay subject to agreement with the roads authority. The roads conditions survey, which will be undertaken immediately prior to construction commencement of the project, will ensure that any section of road along the grid connection route is not left in a degraded condition. The repetition of the survey immediately after completion of the construction phase of the Proposed Development will ensure that any reinstatement works were carried out to a satisfactory standard.

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 30 years of operation, a decommissioning plan, including material recycling / disposal and traffic management plan will be prepared for agreement with the local authority.

14.1.10.7 Residual Impacts

Construction Stage

During the 12 to 18 month construction stage of the Proposed Development, it is forecast that the additional traffic that will appear on the delivery routes indicated in Figure 14-2a will have a slight to moderate 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.

Road works required to lay the cable will generally be installed in a trench in the verge or in the road, which will result in local short term delays to traffic. There will also be an estimated 32 days when road closures will be required on local roads at spot locations, and a further 7 when the R396 will require to be closed. While traffic delays will be incurred resulting in a slight to moderate, temporary impact on local traffic, and potentially on local businesses, it is noted that only a short section of the cable route, and the trips that pass through it, will be affected each day.

Operational Stage

As the traffic impact of the optimised 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 Development is decommissioned a decommissioning plan will be prepared and implemented in order to minimise the residual impacts during this stage.

A Decommissioning Plan has been prepared (Appendix 4-11) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Development has been fully assessed in the EIAR.

14.2 Telecommunications and Aviation

14.2.1 Introduction

This section of the EIAR assesses the likely significant effects of the Proposed Development on telecommunications and aviation. Section 14.2.3 describes the way in which wind turbines can potentially interfere with telecommunications signals or aviation activities. Section 14.2.4 presents details on how such effects will be avoided, with the likely significant effects assessed (and mitigation measures proposed) in Section 14.2.5.

14.2.1.1 Statement of Authority

This section of the EIAR has been prepared by Ellen Costello and reviewed by Eoin O'Sullivan and Michael Watson, of MKO. Ellen is an Environmental Scientist who joined the company in 2019 and has been involved in a number of wind energy EIAR applications. Ellen holds a BSc. in Earth Science and a MSc. in Climate Change: Integrated Environmental and Social Science Aspects where she focused on renewable energy development in Ireland and its implications on environment and society. Eoin is an experienced geo-environmental scientist and has over ten years' experience in the assessment of a wide range of energy and infrastructure related projects and working in the fields of environmental and human health risk assessment, waste management, waste policy and permitting. Eoin holds an MSc in Environmental Engineering and is a Chartered Member of the Chartered Institute of Water and Environmental Management (CWEM) and Chartered Environmentalist (CEnv) with the Society of Environment. Michael has over 19 years' experience in the environmental sector and had worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy prior to joining MKO in 2014. Michael completed an MA in Environmental Management at NUI, Maynooth in 1999. Michael is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv) and also has extensive experience in the preparation of air and climate assessments and reports for EIAs, particularly relating to wind energy.

14.2.2 Methodology and Guidance

This section of the EIAR has been prepared in line with the guidance set out by:

- *Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2002).
- *'Advice Notes for Preparing Environmental Impact Statements – Draft September 2015'* (EPA, 2015).
- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements'* (EPA, 2003).
- '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports DRAFT'* (EPA, 2017).

This section of the assessment focuses particularly on the scoping and consultation exercise conducted with telecommunications operators and aviation authorities. Scoping was carried out in line with the above EPA guidelines, and the '*Best Practice Guidelines for the Irish Wind Energy Industry'* (Irish Wind Energy Association, 2012), which provides a recommended list of telecommunications operators for consultation. A full description of the scoping and consultation exercise is provided in Section 2.6 of Chapter 2 of this EIAR. Consultation with the telecommunications operators and aviation bodies informed the constraints mapping process, which in turn informed the layout of the Proposed Development, as described in Chapter 3, Section 3.6.1 of this EIAR.

The assessment of likely significant effects on material assets uses the standard methodology and classification of impacts as presented in Section 1.7.2 of Chapter 1 of this EIAR. The full project description, including proposed turbine locations and elevations, is provided in Chapter 4 of this EIAR.

14.2.3 Background

14.2.3.1 Broadcast Communications

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The alternating current, electrical generating and transformer equipment associated with wind turbines, like all electrical equipment, also generates its own electromagnetic fields, and this can interfere with broadcast communications. The most significant effect at a domestic level relates to a possible flicker effect caused

by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the wind farm is directly in line with the transmitter radio path.

14.2.3.2 Domestic Receivers

Depending on local topography, a domestic receiver may receive broadcast signals from more than one location. The strength of the signals varies with distance from the transmitter, and the receiver's antenna is generally always directed towards the most local, and usually strongest, broadcasting station.

There are two types of potential electromagnetic interference to domestic receivers (Shadowed and Scattered), depending on the location of the receiver in relation to a wind farm. 'Shadowed' houses are located directly behind a wind farm, relative to the location from where the signal is being received. In this case, the main signal passes through the wind farm and the rotating blades can create a degree of signal scattering. In the case of viewers located beside the wind farm (relative to the broadcast signal direction), the effects are likely to be due to periodic reflections from the blade, giving rise to a delayed signal.

In both cases, i.e. shadowed houses located behind the wind farm and those located to the side of it, the effects of electromagnetic interference may depend to some degree on the wind direction, since the plane of rotation of the rotor will affect both the line-of-sight blockage to viewers located behind the wind farm and the degree of reflection to receivers located to the side.

Potential effects on broadcast communications are generally easily dealt with by detailed micro-siting of turbines in order to avoid alignment with signal paths or by the use of repeater relay links out of line with the wind farm.

14.2.3.3 Other Signal Types

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. Interference with radar systems occurs when wind turbines are located close to an airport or directly in line with the instrument landing approach.

The closest aerodrome is at Abbeyshrule, Co. Longford, a small private airport that is located approximately 22.2 kilometres southwest of the nearest proposed turbine location, and therefore outside the range at which any interference issues would be expected.

14.2.4 Preventing Electromagnetic Interference

14.2.4.1 National Guidelines

The *'Wind Energy Development Guidelines for Planning Authorities'* (Department of the Environment, Heritage and Local Government, 2006) state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required. Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms. This consultation has been carried out by MKO as part of the assessment of the Proposed Development as summarised below; full details are provided in Chapter 2 of this EIAR.

14.2.4.2 Scoping and Consultation

As part of the EIAR scoping and consultation exercise, MKO contacted the relevant national and regional broadcasters, fixed and mobile telephone operators, aviation authorities and other relevant parties. Consultation was also carried out with ComReg in order to identify any other additional

licensed operators in the vicinity of the Proposed Development site to be contacted, who may not have been on the list of main operators.

Initial contact was made with the main telecommunications operators in August 2020, followed by circulation of the EIAR Scoping Document in August 2020, as described in Section 2.6 of Chapter 2 on Scoping and Consultation. Following finalisation of the proposed wind farm layout, the proposed turbine coordinates were circulated to all telecommunications and aviation consultees on 15th December 2020.

The responses received from the telecommunications and aviation consultees are summarised below in Table 14-25.

Table 14-25 Telecommunications and Aviation Scoping Responses

Consultee	Response	Potential Interference Flagged?
Broadcasting Authority of Ireland	No response as of 21st January 2021	No response received to date
BT Communications Ireland	Received 11th August 2020	No
ComReg (Commission for Communications Regulation)	Received 30th July 2020	No
Department of Communications, Climate Action & Environment	No response as of 21st January 2021	No response received to date
Department of Defence	Acknowledged receipt on the 7th September 2020	No response received to date
Eir (now includes Eircom Ltd. and Meteor Mobile)	Received 8th September 2020	No
ENET Telecommunications	Received 11th August 2020 and 15th December 2020	Yes – see below
ESB Telecoms	Received 7th January 2021	No
Irish Aviation Authority	Received 14th September 2020	No
Imagine Group	Received 12th August 2020	No
Ripplecom	Received 21st December 2020	Yes - see below
RTE Transmission Network (2rn)	Received 15th December 2020	No
Tetra Ireland Communications (emergency services)	Received 12th August 2020	No
Three Ireland (now includes O2 Ireland)	Received 11th & 13th August 2020 and 9th September 2020	Yes – see below
Towercom	No response as of 21st January 2021	No response received to date
Viatel	Received 18th December 2020	No
Virgin Media	Received 17th December 2020	No
Vodafone Ireland	Received 7th September 2020 and 15th December 2020	No

Consultee	Response	Potential Interference Flagged?
Westmeath County Council – Information & Communications Technology Section	No response as of 21st January 2021	No response received to date

The scoping responses from the telecommunications and aviation consultees are described below. Copies of scoping responses are provided in Appendix 2-2.

14.2.4.2.1 Broadcasters

The scoping response from RTÉ Transmission Network (operating as 2rn) stated that they have no links within three kilometres of the proposed wind farm site, and no issues with the Proposed Development.

It is standard practice of 2rn to produce a Protocol Document for wind farm developments, which will be signed by the developer. The Protocol Document ensures that in the event of any interference occurring to RTÉ television or radio reception due to operation of a wind farm, the required measures as set out in the document, will be carried out by the developer to rectify this. The Protocol Document ensures that the appropriate mitigation is carried out in the event of any unanticipated broadcast interference arising to RTÉ television or radio reception as a result of the Proposed Development.

A standard Protocol Document has been prepared by 2rn for the Proposed Development, which has been signed by Coole Wind Farm Ltd. A copy of the Protocol Document is presented in Appendix 14-2 of this EIAR.

The scoping response from Virgin Media stated that there is no potential for interference on their network.

14.2.4.2.2 Telephone and Broadband Operators

Of the scoping responses received from telephone, broadband and other telecommunications operators, those who highlighted an initial potential interference risk are addressed below. The remaining consultees who responded to scoping, operate links either outside the Proposed Development site, and therefore are not subject to any interference risk, or do not operate any links in the area.

ENET

At the time of the initial scoping with the telecoms operators during August 2020, ENET flagged one planned link in the northwest corner of the Proposed Development site that could potentially be affected by the Proposed Development. This link was subsequently commissioned and ENET requested a clearance distance of 60 metres from the link. The link is located approximately 230 metres from the closest turbine location and therefore in exceedance of the requested buffer by ENET. The coordinates of the Proposed Development turbine layout was circulated to ENET in December 2020 and they confirmed that the proposed turbine locations would have no impact on their respective network.

Three Ireland

The scoping exercise that was undertaken for the 2017 Coole Wind Farm application identified a telecom link that passed through the wind farms site (hereafter Multyfarnham – Slieve Glah link). The telecom link is operated by Three Ireland. The scoping response from Three Ireland in December 2020 identified a further telecoms link (hereafter Multyfarnham – Kilnaleck link) passing through the Proposed Development site. Turbines T4 and T5 were identified as potentially affecting the link.

During follow-up consultation, Three requested a 30 metre clearance from rotor tip to the centre of the link path resulting in approximately 107.5 metres clearance from proposed turbine locations. Three further clarified that the link was commissioned in the 4th Quarter of 2016.

Ai Bridges Ltd., were subsequently appointed to evaluate the possible effects that the Proposed Development could have on the Three Ireland network. Ai Bridges Ltd. conducted a field survey of the telecoms masts in question and a desk-based 3D link analysis on both the Mutyfarnham – Slieve Glah link identified in 2017 and the Multyfarnham – Kilnaleck link identified in 2020. Further details on this assessment are provided below and presented in the Ai Bridges Telecommunications Impact Study in Appendix 14-3 of this EIAR.

Multyfarnham – Slieve Glah link

Following a field survey of the telecoms mast location, a 3D telecoms link analysis was conducted and is shown in Plate 14-10. The results from the analysis carried out by Ai Bridges Ltd indicates that the Proposed Development would not impact a radio transmission link between Multyfarnham and Slieve Glah. This was issued to Three Ireland on the 9th of September 2020. There was no further acknowledgement of the link by Three Ireland. The coordinates of the Proposed Development turbine layout were circulated to Three Ireland in December 2020.

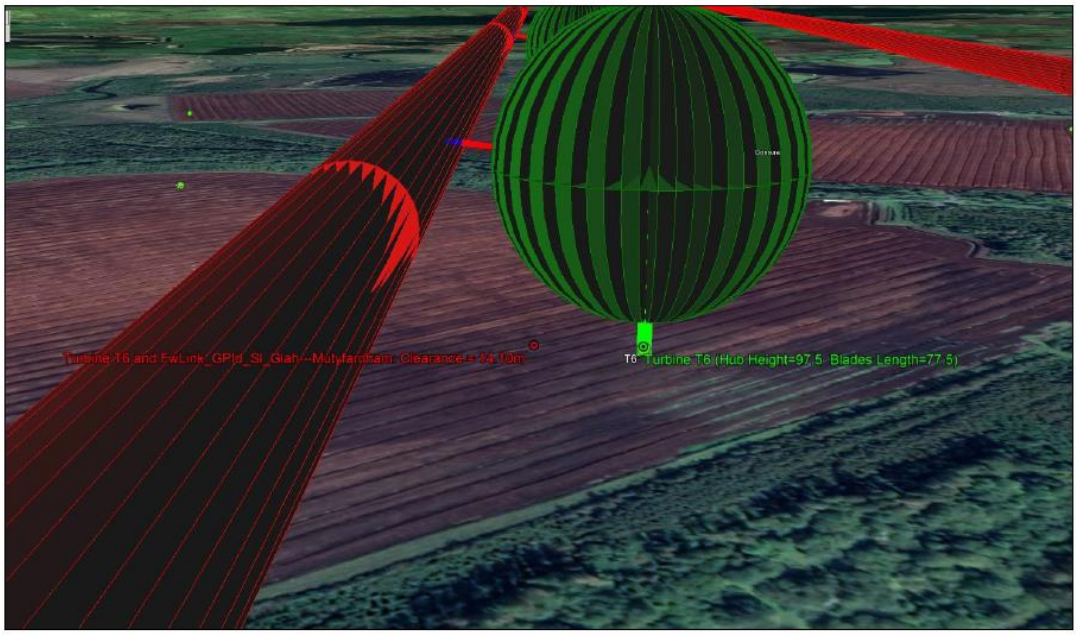

Plate 14-10 Multyfarnham to Slieve Glah link - 3-D Analysis

Multyfarnham – Kilnaleck link

Following a field survey of the telecoms mast location, a 3D telecoms link analysis for the link was conducted and is shown in Plate 14-11. The results from the analysis carried out by Ai Bridges Ltd indicates that the Proposed Development would likely impact a radio transmission link between Multyfarnham and Kilnaleck. This was issued to Three Ireland on the 9th of September 2020 along with a request for further consultation to explore potential mitigation. Three Ireland responded on the 9th September 2020 to state that the Multyfarnham and Kilnaleck link is now decommissioned and Three Ireland have no other links traversing the Proposed Development site.

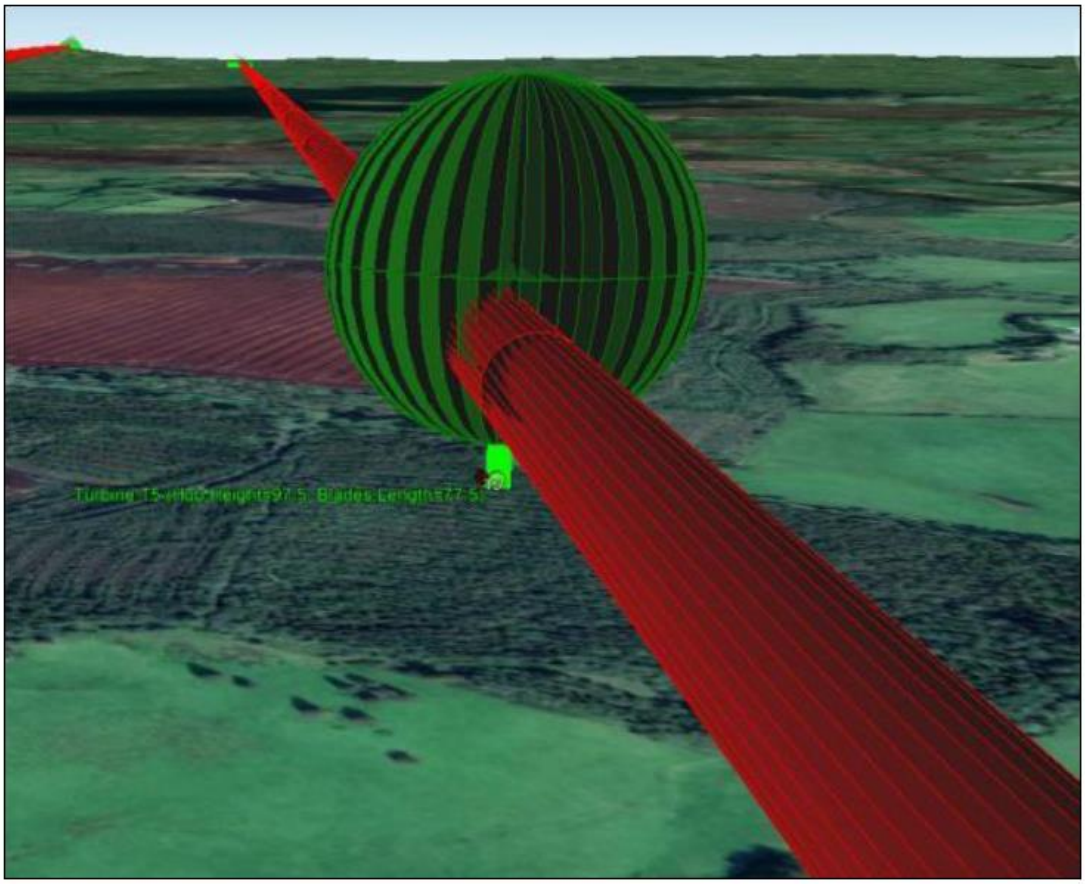

Plate 14-11 Multyfarnham to Kilnaleck link - 3-D Analysis

Ripplecom

The scoping response from Ripplecom in December 2020 identified a telecoms link passing through the Proposed Development site. Turbines T7 and T15 were identified as potentially affecting the link. During follow-up consultation, Ripplecom requested a 10 metre clearance from rotor tip to the centre of the link path resulting in approximately 87.5 metres clearance from proposed turbine locations. As the Proposed Development could not achieve this requested clearance, Ai Bridges Ltd were appointed to evaluate the possible effects that the Proposed Development could have on the Ripplecom network. Ai Bridges Ltd. conducted a field survey of the telecoms masts in question and a desk-based 3D link analysis on the link. The analysis results indicated that the Ripplecom link would be impacted by turbine T15 and the analysis findings were presented to Ripplecom along with mitigation measure solutions. Ripplecom accepted the mitigation measure proposal and have no further concerns regarding the Proposed Development. Further details on this assessment are presented in the Ai Bridges Telecommunications Impact Study in Appendix 14-3 of this EIAR. Further details on the agreed mitigation measures for the Ripplecom link are detailed below in Section 14.2.5.3.1.

14.2.4.2.3 *Aviation*

The Irish Aviation Authority (IAA) scoping response stated that in general terms, the Authority has no specific requirements in relation to this request for information in relation to the Proposed Development. In their scoping response the IAA stated "*Based on the information provided, during the formal planning process, the Safety Regulation Division – Aerodromes will likely make the following general observation:*

In the event of planning consent being granted, the applicant should be conditioned to contact the Irish Aviation Authority to:

1. *agree an aeronautical obstacle warning light scheme for the wind farm development,*
2. *provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location*
3. *notify the Authority the intention to commence crane operations with at least 30 days prior notification of their erection."*

The Department of Defence acknowledged receipt of the scoping request and have not provided any further responses. The response received by the Department of Defence for the 2017 Coole Wind Farm application is noted and included below for reference:

In February 2017, a scoping response was received from the Department of Defence (DoD) for the 2017 Coole Wind Farm which set out lighting requirements for turbines, as follows:

1. *Single turbines or turbines delineating corners of a wind farm should be illuminated by high intensity obstacle lights.*
2. *Obstruction lighting elsewhere in a wind farm will be of a pattern that will allow the hazard be identified and avoided by aircraft in flight.*
3. *Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment. Obstruction lighting fitted to obstacles must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum specifically at or near 850nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.*

14.2.4.2.4 *Other Consultees*

No scoping response was received from the Broadcasting Authority of Ireland (BAI), the Department of Communications, Climate Action and Environment, and the Information & Communications Technology (ICT) Section of Westmeath County Council.

14.2.5 Likely Significant Effects and Associated Mitigation Measures

14.2.5.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed, the already permitted 13-turbine layout will proceed under the terms of the (Pl. Ref. No. 17/6292/ABP-300686-18) planning permission. The permitted development was designed to have no significant effects on telecommunications or aviation operations in the area.

14.2.5.2 Construction Phase

The potential for electromagnetic interference from wind turbines occurs only during the operational phase of the Proposed Development. There are no electromagnetic interference impacts associated with the construction phase of the Proposed Development, and therefore no mitigation required.

14.2.5.3 Operational Phase

14.2.5.3.1 *Telecommunications*

Pre-Mitigation Impact

Consultation regarding the potential for electromagnetic interference from the Proposed Development was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators, the majority of which confirmed that no turbines are proposed within

the areas requested to be left clear of turbines. Ripplecom, a Broadband operator in the area, identified a link that could potentially be impacted by turbine T15.

Mitigation Measures

Ai Bridges approached Ripplecom with the following mitigation measures for the telecoms link that would potentially be impacted by turbine T15:

- A new lattice structure be erected at the Ripplecom end of the link and the link dish at the customer end of the Ripplecom link would be relocated to the corner of the customer building. This would provide a clearance between T15 and the Ripplecom link.
- Alternatively, should fibre broadband be installed in the area and be utilised by Ripplecom prior to the commissioning of the Proposed Development, the above mitigation measures would not be required and there would be no interference as the link through the development would no longer be required .

These mitigation measures have been accepted by Ripplecom and are further detailed in Appendix 14-3 attached.

In the event of interference occurring to telecommunications, the Department of the Environment, Heritage and Local Government *'Wind Farm Planning Guidelines'* (2006) acknowledge that '*electromagnetic interference can be overcome'* by the use of divertor relay links out of line with the wind farm.

Residual Impact

The Proposed Development will have no impact on the telecommunications signals of any other operator, due to distance from or absence of any links in the area.

Significance of Effects

There will be no significant effect on telecommunications from the Proposed Development.

14.2.5.3.2 *Aviation*

Pre-Mitigation Impact

The Proposed Development will have no impact on aviation operations or telecommunications. No issues were raised during the scoping and consultation exercise with respect to potential impacts on aviation.

The scoping response of the Irish Aviation Authority has requested that standard lighting requirements be used at the Proposed Development.

While there has been no scoping response to date from the Department of Defence, this application is cognisant of the request made by the Department of Defence, for the 2017 Coole Wind Farm application.

Mitigation Measures

Coole Wind Farm Ltd. will agree an acceptable aviation obstacle warning lighting scheme with the Department of Defence and the Irish Aviation Authority (IAA) ahead of turbine construction, and will supply the coordinates and elevations for built turbines to the IAA, as is standard for wind farm developments.

Residual Impact

The Proposed Development will have no impact on aviation operations or telecommunications.

Significance of Effects

There will be no significant effect on aviation operations or telecommunications due to the Proposed Development.

14.2.5.4 Cumulative Effect

Section 2.7 of this EIAR describes the methodology used in compiling the list of projects considered in the assessment of cumulative effects, and provides a description of each project, including current status.

There is 1 no. existing single wind turbine at Ballyjamesduff, Co. Cavan, located at a distance of 16 kilometres from the closest Proposed Development turbine. There is a further single wind turbine proposed to be located at Ballyjamesduff, Co. Cavan, approximately 16 kilometres closest Proposed Development turbine and 1 no. proposed wind farm consisting of 11 turbines in Bracklyn, Co. Westmeath which is located at a distance of 25 kilometres from the closest Proposed Development turbine at its closest point. There will therefore be no cumulative effect on telecommunications or aviation from the proposed wind farm in combination with any other project.

14.2.5.5 Conclusion

A comprehensive scoping and consultation exercise was carried out with the main telecommunications operators and aviation bodies, plus other regional operators identified by ComReg as operating within ten kilometres of the Proposed Development site. Two operators, Three Ireland and ENET, flagged a potential interference issue, however, it was found that the proposed turbine locations are positioned outside the potential interference zone. One operator, Ripplecom, identified a potential interference from one turbine location. Mitigation measures have been agreed with Ripplecom.

The obstacle warning light scheme required for tall structures by the Irish Air Corps and the Irish Aviation Authority will be agreed ahead of turbine construction, as is standard for permitted wind farms.

The Proposed Development will have no significant effects on telecommunications or aviation.