Sure Partners Limited

ARKLOW BANK WIND PARK PHASE 2 **ONSHORE GRID INFRASTRUCTURE**

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME II

Chapter 13 Traffic and Transport

ARUP

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Contents

13 Traffic and Transportation

13.1 Introduction

This chapter describes the likely significant effects in terms of traffic and transportation impacts of the proposed development during its construction, operational and decommissioning phases. This chapter presents the receiving transport environment including reporting on existing traffic volumes based on traffic count surveys carried out on the surrounding road network. The projected increase in traffic associated with the proposed development and its likely effects on the receiving transportation network are assessed. Finally, appropriate mitigation measures to reduce or avoid potential negative impacts on the surrounding transportation network are presented. The impacts of traffic on air quality, noise and climate are addressed in **Chapter 7** *Air Quality***, Chapter 8** *Climate* and **Chapter 11** *Noise and Vibration*.

As illustrated in **Figure 13.1** below, the proposed development consists of the following elements:

- Landfall for two offshore export cable circuits from the High Water Mark (HWM) to two Transition Joint Bays (TJB) at Johnstown North, located approximately 4.5km northeast of Arklow Harbour,
- Connection by two underground 220kV high voltage alternating current cable circuits, and fibre optic cables over a distance of c. 6km, from the landfall to the new onshore 220kV substation,
- A new onshore 220kV substation, to be located at Shelton Abbey, north of the Avoca River, approximately 2.1km northwest of Arklow Town consisting of two connected compounds:
    1. The transmission compound with the infrastructure to physically connect to the NETN, and
    2. The connection compound with the infrastructure to allow the connection of the windfarm in accordance with EirGrid grid code requirements.
- Flood defence improvement works to the existing Avoca River Business Park flood defences located c. 500m west of the substation site;
- A 220kV overhead line connection from the new 220kV substation at Shelton Abbey to the existing 220kV transmission network located c. 200m from the substation site.

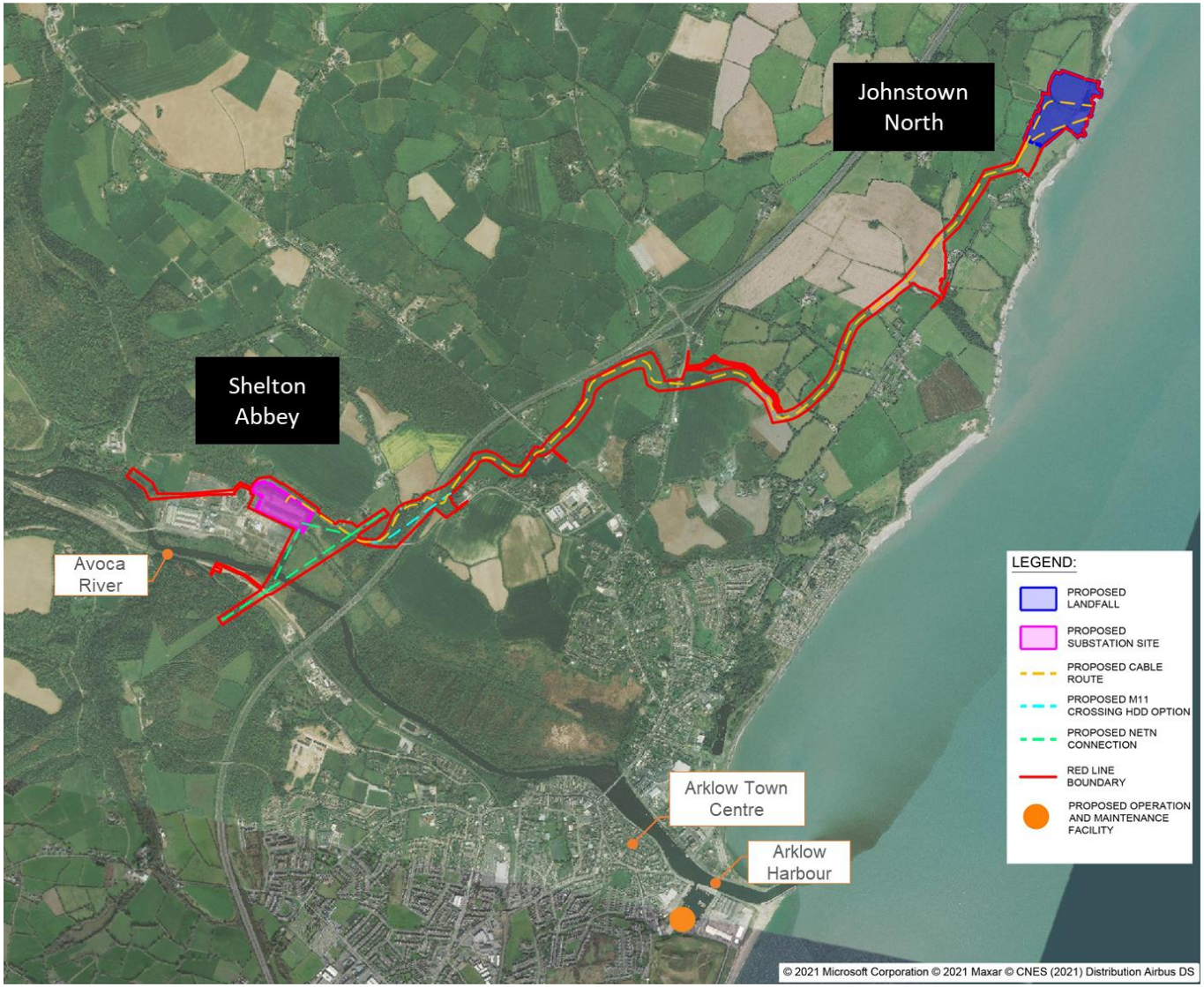


Figure 13.1: Elements of the proposed development [Base map source: Bing Maps]

In terms of phasing, the assessment is based on the following assumptions:

- Construction phase start: 2023
- Operation year for traffic assessment: 2025

Further information on the proposed development is described in **Chapter 5** *Description of Development* and **Chapter 6** *Construction Strategy* of this EIAR.

13.2 Assessment Methodology

A detailed description of the proposed development in relation to traffic and transportation is provided in Section 13.5. The presented assessment shows that the likely effect of the proposed development on the transport network will be greatest during the construction phase. The operational phase and decommissioning phase are expected to have little or no impact on the surrounding road network.

The assessment methodology used in this impact assessment is set out below.

13.2.1 Study Area

The study area shown in **Figure 13.2** below is the primary zone of influence with respect to the management of traffic during the construction phase of the proposed development and is the area most likely to experience temporary changes in traffic flow during the construction phase.

The study area considered as part of this transportation assessment includes the following roads:

1. M11 Motorway
2. R772 Dublin Road
3. L95115
4. L6179 Kilbride Road
5. L2180 Beech Road
6. R750 Sea/Coast Road
7. R747 Vale Road
8. Forest Road
9. Love Lane

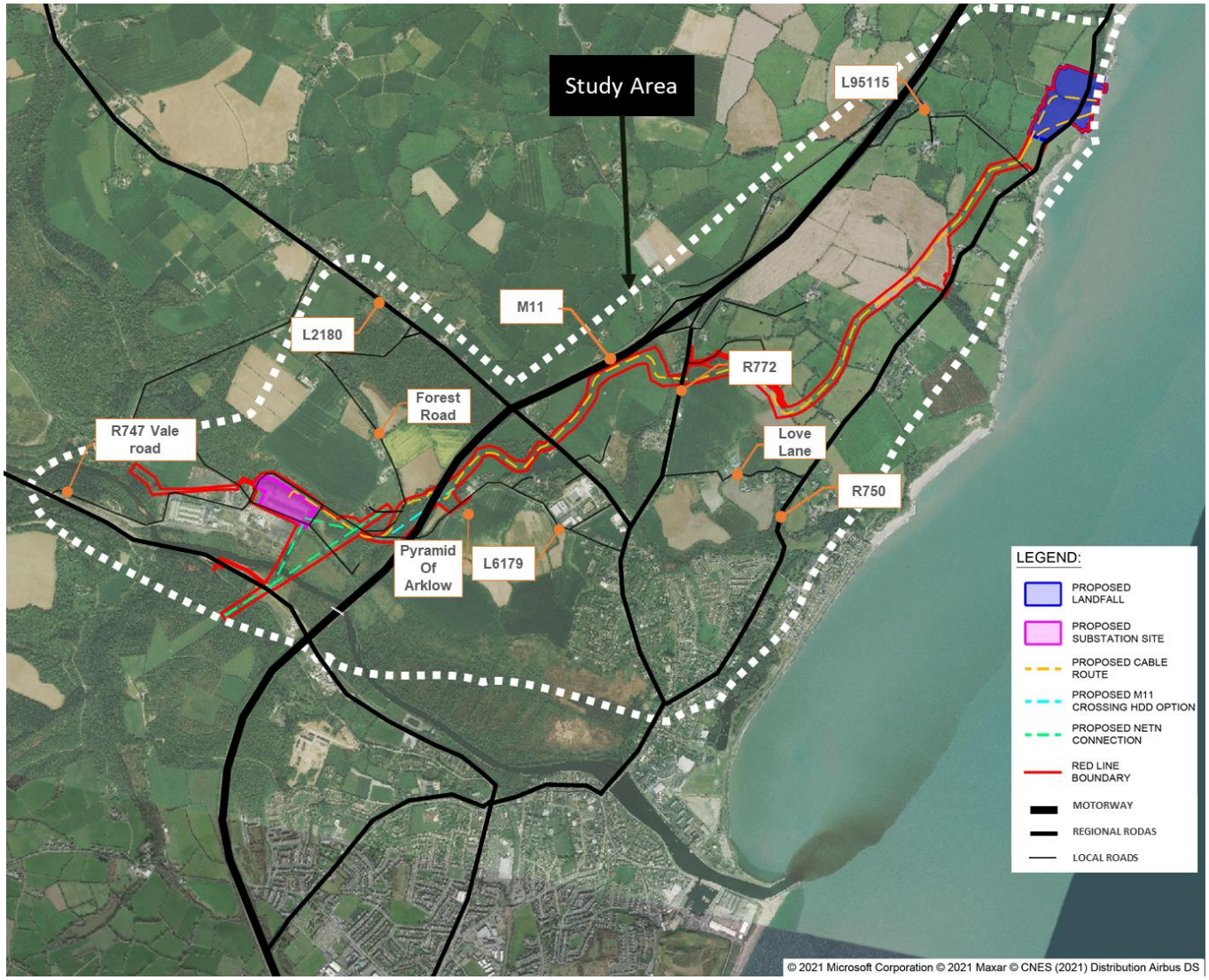


Figure 13.2: Roads within the study area [Base map source: Bing Maps]

13.2.2 Traffic Count Data

Traffic count data surveys were undertaken to establish baseline conditions on the receiving road network. The surveys were carried out over a 14-hour time period, between 06:00 and 20:00 at the 8 locations shown in **Figure 13.3** below on Tuesday 20 October 2020. The Covid-19 pandemic has led to lower than normal traffic volumes being recorded, and our approach to ensure representative traffic volumes is discussed in Section 13.3.3.

The data was recorded at 15-minute intervals for each turning movement at each arm of a junction. The construction phase of the development will be illustrated to have the most significant impact compared to the operational and decommissioning phases and was therefore the focus of the assessment. Due to the temporary nature of the construction works and the scale of projected traffic flows during this period, the assessment has concentrated on changes in link flows at junctions.

The survey locations were as follows:

- Location 1: R750 Coast Road / Sea Road / L95115
- Location 2: R772 Dublin Road / Love Lane
- Location 3: M11 off-ramp / R772 Dublin Road / M11 on-ramp
- Location 4: M11 on-ramp / R772 Dublin Road / M11 off-ramp
- Location 5: R772 Dublin Road / L95115
- Location 6: Local Access Road / L2180 Beech Road
- Location 7: Forest Road / L6179 Kilbride Road
- Location 8: R772 Dublin Road / Ticknock Lane / Monument Lane

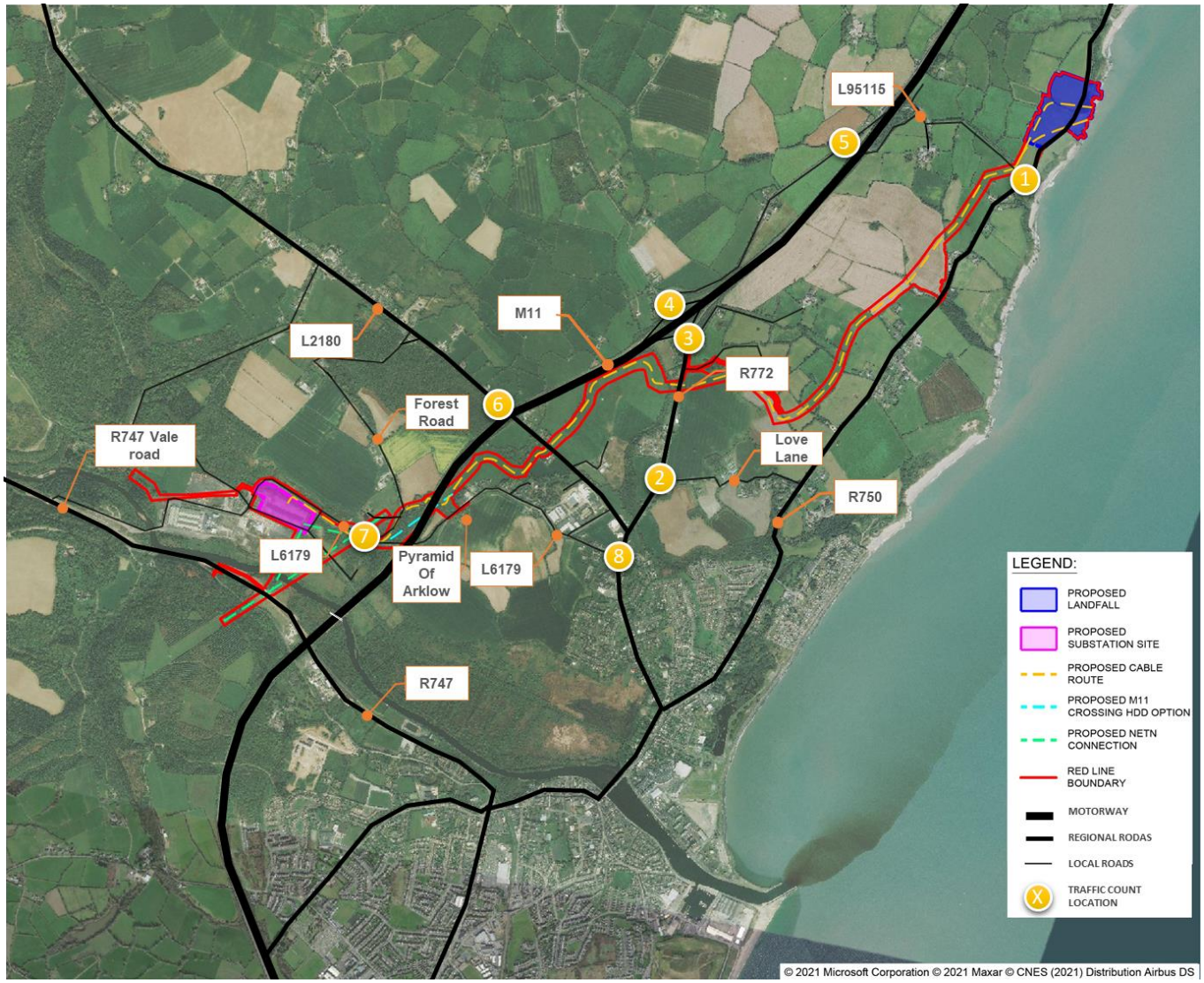


Figure 13.3: Traffic survey locations [Base map source: Bing Maps]

13.2.3 Future Year Traffic Growth Rates

Future traffic growth on the external road network has been estimated, based on Transport Infrastructure Ireland's (TII) growth rates for the Wicklow Region (Ref: Transport Infrastructure Ireland's Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, May 2019). Based on Table 6.2 of the guidelines, the recorded traffic flows have been increased by the central growth rates to establish traffic flows for the 2023 construction year.

13.2.4 Time Periods Assessed

The time periods assessed as part of this transportation assessment robustly included the busiest periods namely the morning peak period, the evening peak period and also daily flows (i.e. 24-hour period).

In terms of future assessment years, it is proposed to assess the proposed development for Year 2023 as this is the expected busiest period during the construction phase.

13.2.5 Impact Assessment Criteria

The significance of effects has been assessed based on the criteria presented in **Table 13.1** and is based on the Environmental Protection Agency's 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) August 2017' and with reference to the professional judgement of the author who has more than 20 years' experience as a transport planner.

Table 13.1: Assessment criteria

Significance of Effects	Topic Specific Criteria
Imperceptible	No perceived impact on prevailing travel conditions
Not Significant	A small change in traffic flows without causing a real change in travel conditions
Slight Effects	A change in traffic flow resulting in a minor change in travel conditions
Moderate Effects	A change in traffic flows resulting in a modest change in travel conditions
Significant Effects	A marked change in travel conditions resulting in long delays to traffic
Very Significant Effects	A significant change in travel conditions resulting in very long delays to traffic
Profound Effects	A major change in travel conditions resulting in the breakdown in traffic flow and significant delays to traffic

13.3 Existing Environment

13.3.1 Site Location

The development comprises four distinct elements – the landfall, cable route, substation and the connection to the national electricity transmission network (NETN), all of which are connected. The overall development is located north of Arklow town in County Wicklow, as illustrated in **Figure 13.2**.

The construction of the onshore cable route will have the broadest impact as it will stretch across approximately 6.0 km. While the cable will be laid across agricultural land for the most part, the route will cross the following 6 roads:

1. R750 Sea / Coast Road
2. L95115
3. R772 Dublin Road
4. L2180 Beech Road
5. M11 Motorway
6. L6179 Kilbride Road

The cable will also run within the following roads for short stretches:

1. Forest Road (if the M11 is crossed via the existing underpass instead of HDD)
2. L6179 Kilbride Road

13.3.2 Local Transport Network

13.3.2.1 Road Network

The character of the roads within the study area is generally rural in nature with some urban sections of the road network impacted within Arklow. A summary of the existing roadways is provided in **Table 13.2** below. The operational performance is based on the traffic count data that was collected for the assessment (refer to **Section 13.2.2**).

Table 13.2: Characteristic of impacted road infrastructure

1	**M11 Motorway**
Function	Main Motorway connecting the southeast of the country with Dublin. Junction 20 on the M11 Motorway provides the primary access point to all locations north of Arklow including the proposed development.
Operational Performance	The motorway carries high traffic flows but operates without delay

Width	The road has two lanes in each direction with an overall carriageway width of roughly 20m
Shoulder type	Hard shoulder
Footpath	No
Cycle Lane	No
Bus Lane	No
2	**R772 Dublin Road**
Function	Regional route connecting the north of Arklow town with the M11
Operational Performance	Generally high traffic volumes with some queuing evident on approach to Arklow.
Width	Approximately 7-10 m total width
Shoulder type	Grass verges
Footpath	Partly
Cycle Lane	Partly
Bus Lane	No
3	**L95115**
Function	Local access road serving individual homes and agricultural fields.
Operational Performance	Very low traffic flows with no delays.
Width	Approximately 3-4 m total width
Shoulder type	Grass verges
Footpath	No
Cycle Lane	No
Bus Lane	No

4	**L6179 Kilbride Road**
Function	Local access road to the Kilbride Industrial Estate east of the M11 and the Avoca River Business Park west of the M11.
Operational Performance	Low traffic flows with no delays noted. There is a relatively high number of HGV's due to the presence of the industrial zones.
Width	Approximately 6-8 m total width
Shoulder type	Grass verges
Footpath	No
Cycle Lane	Only a short section near the Kilbride Industrial Estate.
Bus Lane	No
5	**L2180 Beech Road**
Function	Local access road to individual homes and some businesses. The road connects with the R772 Dublin Road to the east and continues to the west through the study area in the direction of the village of Ballinaheese.
Operational Performance	Moderate traffic flows with little delay to traffic experienced on this route
Width	Approximately 5-6 m total width
Shoulder type	Grass verges
Footpath	Yes
Cycle Lane	No
Bus Lane	No
6	**R750 Sea / Coast Road**
Function	Local access route serving individual homes and agricultural lands. The route is of scenic value and during summer months experiences higher traffic flows.

Operational Performance	Low traffic volume flows with no delays experienced on approach to Arklow
Width	Approximately 5-8 m total width
Shoulder type	Grass verges
Footpath	Along some sections approaching Arklow town
Cycle Lane	No
Bus Lane	No
7	**R747 Vale Road**
Function	Regional access road connecting Arklow with Aughrim
Operational Performance	Moderate traffic flows are experienced on this route
Width	Approximately 6m total width
Shoulder type	Grass verges
Footpath	No
Cycle Lane	No
Bus Lane	No
8	**Forest Road**
Function	Local private access road with a connection to the L6179 Kilbride Road to the south and the L2180 Beech Road to the north.
Operational Performance	Very low traffic volume level.
Width	Approximately 3m total width
Shoulder type	Grass verges
Footpath	No
Cycle Lane	No

Bus Lane	No
9	**Love Lane**
Function	Local access road which provides a route between the R750 and R772
Operational Performance	Very low traffic volume level
Width	Approximately 3m total width
Shoulder type	Grass verges
Footpath	No
Cycle Lane	No
Bus Lane	No

13.3.2.2 Public Transport Network

In terms of public transport services and infrastructure:

- Multiple bus services are operating in Arklow town, including the 002, 005, 133 and 384 services. These connect the town with the surrounding towns and cities including Dublin and Dublin Airport. These buses are operating on the regional road R772 Dublin Road and the regional road R747 Vale Road, both of which run through the study area.
- Arklow Train Station is served by five trains daily and three trains during the weekend period. The station is located outside of the study area. Existing Traffic Patterns

13.3.3 Existing Traffic Patterns

In order to assess the potential impact of the proposed development on the local road network an examination of the existing traffic flows was necessary. Traffic count data surveys were carried out during October 2020 as discussed in Section 13.2.2.

Government restrictions imposed due to the COVID-19 pandemic have led to lower than normal traffic volumes being recorded throughout Ireland during 2020. To take account of this within the assessment, historic traffic count data for 2019 was sourced from the TII Traffic Counter data website (www.nratrafficdata.ie) and factors were calculated to adjust the 2020 observed traffic count data to reflect the expected level of traffic flows without the impact of the COVID-19 pandemic.

The location of the historic traffic count data is the M11 between Junction 21 Arklow South and Junction 22 Tinnock, Arklow South, Co. Wicklow. **Table 13.3** below shows the factors that were applied:

Table 13.3: COVID-19 related growth factors

(2020/2019)	AM Peak	PM Peak	14-Hour
Factor	1.19	1.19	1.17

These factors were also applied to the typical 24-hour data (AADT) sourced from the TII Traffic Counter data website.

The historic data set also indicates an increase in traffic volume during summertime due to increased traffic associated with holiday makers in the area. To reflect this, an additional factor of 1.10 was applied to the observed traffic count data to be representative of a typical day during summertime in the base year. The inclusion of the above adjustments will ensure the assessment is robust.

The resulting morning peak, evening peak and weekday daily traffic flows for the base year of 2020 are presented in **Table 13.4** below.

Table 13.4: Base year two-way traffic flows (Summer) (vehicles)

Location	Link	AM Peak Summer 08:00 - 09:00 (Vehs)	PM Peak Summer 16:00 - 17:00 (Vehs)	14-Hour Summer (Vehs)	Typical 24-hour (AADT) (Vehs)
1	R750 Sea / Coast Road	14 (0% HGV)	41 (0% HGV)	348 (2% HGV)	396 (2% HGV)
	L95115	4 (0% HGV)	9 (0% HGV)	63 (0% HGV)	73 (0% HGV)
2	R772 Dublin Road	910 (3% HGV)	916 (3% HGV)	10053 (3% HGV)	11461 (3% HGV)
	Love Lane	83 (0% HGV)	90 (1% HGV)	900 (1% HGV)	1024 (1% HGV)
3	R772 Dublin Road	933 (3% HGV)	930 (3% HGV)	9904 (3% HGV)	11290 (3% HGV)
4	R772 Dublin Road	613 (3% HGV)	449 (4% HGV)	5645 (4% HGV)	6437 (4% HGV)
5	R772 Dublin Road	72 (10% HGV)	91 (1% HGV)	895 (4% HGV)	1021 (4% HGV)
	L95115	6 (0% HGV)	12 (0% HGV)	81 (0% HGV)	92 (0% HGV)
6	Local Access Road	1 (0% HGV)	2 (0% HGV)	24 (0% HGV)	29 (0% HGV)
	L2180 Beech Road	319 (2% HGV)	365 (1% HGV)	3869 (2% HGV)	4408 (2% HGV)

Location	Link	AM Peak Summer 08:00 - 09:00 (Vehs)	PM Peak Summer 16:00 - 17:00 (Vehs)	14-Hour Summer (Vehs)	Typical 24-hour (AADT) (Vehs)
7	Forest Road	12 (0% HGV)	13 (0% HGV)	160 (3% HGV)	182 (3% HGV)
	L6179 Kilbride Road	91 (7% HGV)	125 (10% HGV)	766 (10% HGV)	878 (10% HGV)
8	R772 Dublin Road (Templerainy Park)	986 (2% HGV)	1019 (1% HGV)	12229 (2% HGV)	13928 (2% HGV)
	Ticknock Lane	19 (0% HGV)	13 (0% HGV)	174 (0% HGV)	198 (0% HGV)
	Monument Lane	34 (0% HGV)	15 (0% HGV)	601 (0% HGV)	683 (0% HGV)

From the information above, it is clear that the busiest routes in the area are:

1. R772 Dublin Road; and
2. L2180 Beech Road

13.4 Characteristics of the Proposed Development

13.4.1 Introduction

The following sections present the traffic and transportation elements of the proposed development including the proposed construction access routes, the likely duration of the works associated with the various phases of construction and the scale of traffic associated with each phase of the construction works. In addition, the scale of traffic associated with the operational phase will also be presented.

13.4.2 Construction Phase

13.4.2.1 Introduction

The volume of construction traffic activity is based on:

- the scale of the expected export and import of earthworks,
- other material and equipment deliveries to site,
- staff movements and service trips (i.e. compound set up, maintenance, external third party visitors, etc.).

The majority of the increased traffic flows will be generated at the following seven temporary construction compounds proposed to serve the proposed development, each with an access point off the public road network (See **Figure 13.4**):

1. Landfall HDD temporary construction compound (at Johnstown North)
2. Temporary cable construction compound (at Johnstown North)
3. HDD temporary construction compound (east of R772)
4. HDD temporary construction compound (west of R772)
5. HDD temporary construction compound (east of M11)
6. HDD temporary construction compound (west of M11)
7. Substation temporary construction compound (Shelton Abbey)

In addition, four working areas are proposed to serve specific activities related to the proposed development for a relative short duration, each with an access point off the public road network, being:

1. Flood defence working area (Shelton Abbey townland)
2. New Tower 5A working area at Kilbride
3. Decommission Tower 6 working area at Kilbride
4. New Tower 6B and Decommission Tower 7 working area at Ballyraine Lower

A haul route will be constructed alongside the cable between the landfall and the substation. The haul route will be accessed via access points to the temporary construction compounds and working areas, as detailed above. Three other access points from the public road network are proposed to access the haul route for the construction of the cable:

1. Haul route access point along R750 Sea / Coast Road
2. Haul route access point along L2180 Beech Road
3. Haul route access point along R772 Dublin Road

The crossing of the R750 Sea / Coast Road (landfall) and the R772 Dublin Road will be by HDD. The crossing of the M11 will be either via HDD or via an existing underpass. In respect of the M11 crossing, it is considered that, in terms of this transport assessment, the HDD crossing would generate the highest number of vehicle trips due to the amount of excavated material to be removed. The HDD crossing therefore has been used in this assessment to ensure its robustness. Should the option to use the existing underpass materialise then the volume of generated traffic will be less, resulting in a reduced impact.

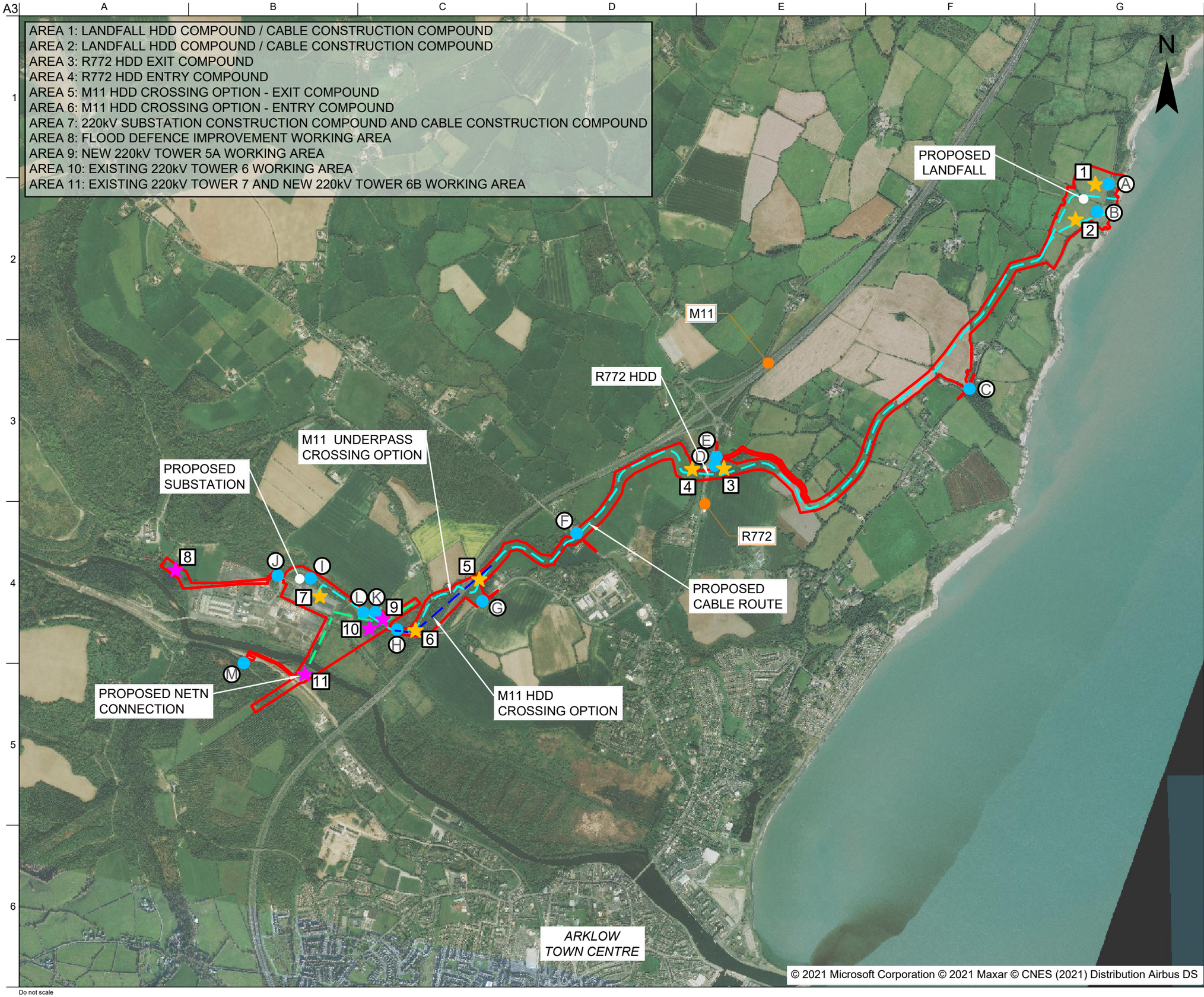
All other road crossings, namely the L95115, L2180 Beech Road and L6179 Kilbride Road will be crossed by open cut construction methods.

In addition, the construction traffic generated by the proposed development will have localised impacts on the existing environment at access points to the construction compounds, working areas and cable construction haul route along the following roads:

1. R750 Sea / Coast Road
2. R772 Dublin Road
3. L2180 Beech Road
4. L6179 Kilbride Road
5. Forest Road
6. R747 Vale Road

A3

AREA 1: LANDFALL HDD COMPOUND / CABLE CONSTRUCTION COMPOUND
AREA 2: LANDFALL HDD COMPOUND / CABLE CONSTRUCTION COMPOUND
AREA 3: R772 HDD EXIT COMPOUND
AREA 4: R772 HDD ENTRY COMPOUND
AREA 5: M11 HDD CROSSING OPTION - EXIT COMPOUND
AREA 6: M11 HDD CROSSING OPTION - ENTRY COMPOUND
AREA 7: 220kV SUBSTATION CONSTRUCTION COMPOUND AND CABLE CONSTRUCTION COMPOUND
AREA 8: FLOOD DEFENCE IMPROVEMENT WORKING AREA
AREA 9: NEW 220kV TOWER 5A WORKING AREA
AREA 10: EXISTING 220kV TOWER 6 WORKING AREA
AREA 11: EXISTING 220kV TOWER 7 AND NEW 220kV TOWER 6B WORKING AREA



LEGEND:

- RED LINE BOUNDARY
- PROPOSED CABLE ROUTE
- PROPOSED M11 CROSSING HDD OPTION
- PROPOSED NETN CONNECTION
- 1 — PROPOSED TEMPORARY CONSTRUCTION COMPOUND
- 8 — PROPOSED TEMPORARY WORKING AREA
- A — PROPOSED CONSTRUCTION ACCESS

Rev	Date	By	Chkd	Appd
D1	18.02.21	SB	EO'G	MW

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Project Title
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Phase 2
Onshore Grid Infrastructure

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Temporary Construction Compounds and Working Areas

Scale at A3: 1:20,000
Role: Civil
Suitability: For Information
Arup Job No: 271715-00
Rev: D1
Name

Figure 13.4

Do not scale

For the purpose of this assessment the construction activity was grouped into 3 impact areas, as follows:

Impact Area 1: Construction activities at the landfall will include the construction of both compounds, associated access roads and the HDD works, and will utilise:

- Landfall HDD temporary construction compound (at Johnstown North) (access point A or B off R750 Sea / Coast Road
- Landfall Cable Route temporary construction compound (at Johnstown North) (access point A or B off R750 Sea / Coast Road)

Impact Area 2: Construction activities related to and along the cable route will utilise:

- Landfall Cable Route temporary construction compound (at Johnstown North) (access point A or B off R750 Sea / Coast Road)
- HDD temporary construction compound and haul route access points (east of R772) (access point D and E off R772 Dublin Road)
- HDD temporary construction compound and haul route access point (west of R772) (access point F off L2180 Beech Road)
- HDD temporary construction compound and haul route access point (east of M11) (access point G off L6179 Kilbride Road)
- HDD temporary construction compound (west of M11) (access point H off Forest Road)
- Substation temporary construction compound (access point I via L6179 Kilbride Road)
- Haul route access point along R750 Sea / Coast Road (access point C)

Impact Area 3: Construction activities related to the substation (and NETN connection) will utilise:

- Substation temporary construction compound (access point I via L6179 Kilbride Road)
- Flood defence working area at Shelton Abbey (access point J via L6179 Kilbride Road)
- New Tower 5A working area at Kilbride (access point K off L6179 Kilbride Road)
- Decommission Tower 6 working area at Kilbride (access point L via L6179 Kilbride Road)
- New Tower 6B and Decommission Tower 7 working area at Ballyraine Lower (access point M off R747 Vale Road)

13.4.2.2 Landfall Area

The offshore export cable circuits will connect to the underground onshore cable circuits at the landfall site.

At the landfall, there will be both a HDD temporary construction compound and a temporary cable construction compound. This section considers the potential construction phase impacts of the proposed development at the landfall area (i.e. construction of the compounds, access roads and the HDD landfall works).

The main characteristics, with regard to the traffic and transport assessment, at the landfall are as follows:

- The landfall contains both a temporary cable construction compound and a temporary HDD compound. The temporary cable construction compound will serve the cable route during construction. There are two options for the location of these compounds, one in each of the two adjacent fields, which are located on the western side of the R750 road. The HDD compound may be in the northern field and the cable compound in the southern field, or vice versa and both arrangements are being assessed.
- Two 220kV export cable circuits will be installed via HDD from the nearshore to two onshore Transition Joint Bays. These Transition Joint Bays will allow connection between onshore and offshore cables.
- The duration of construction works at the landfall area will be c. 10 months between September 2023 and June 2024. For the purpose of the assessment it was robustly assumed that the export and import of earthworks will take place over a period of 2 months.
- In respect of parking, it is assumed that up to 60 staff members will use the landfall area, during the construction phase (at least 50 required for the cable route construction and 10 required for the landfall HDD construction). Assuming a vehicle occupancy of 1.2 the minimum number of temporary parking spaces required at the landfall area is 50.

Construction activities at the landfall will include the construction of both compounds and the HDD works, and will utilise (letters below refer to **Figure 13.4**):

1. Landfall HDD temporary construction compound (at Johnstown North) (access point A or B off R750 Sea / Coast Road via Junction 20 off the M11 and R772 Dublin Road)
2. Landfall cable temporary construction compound (at Johnstown North) (access point A or B off R750 Sea / Coast Road via Junction 20 off the M11 and R772 Dublin Road)

   The access route to the landfall area is discussed in Section 13.5.2.2 and shown in **Figure 13.5.**

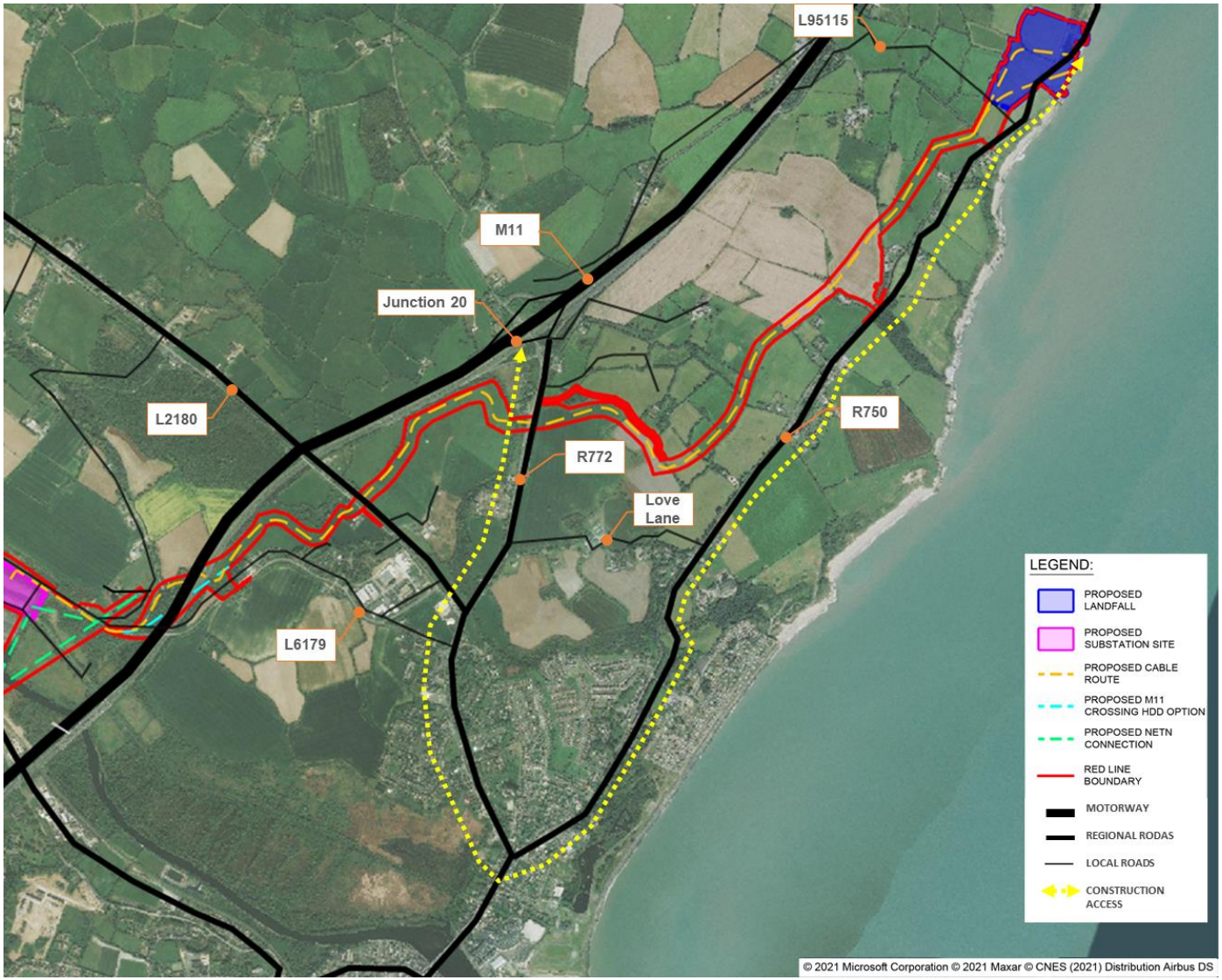

Figure 13.5: Access route to the compounds at the landfall area [Base map source: Bing Maps]

Traffic Generation

Traffic generated by the construction activities related to the cable route (i.e. expected export and import of earthworks, other material and equipment deliveries to site, staff movements and service trips (i.e. compound set up, maintenance, external third party visitors, etc.)), is not dealt with in this section. Refer to section 13.4.2.3 for traffic generated by the construction activities related to the cable route.

In this section traffic generated by construction activities related to the landfall area are presented. This only comprises the traffic associated with the construction of the compounds at the landfall (HDD temporary construction compound and temporary cable construction compound) and the traffic generated by the HDD works at the landfall area, summarised as follows, and detailed below:

- Earthworks and materials - excavated waste exported, fill materials imported and construction materials delivered, using the public road network, via the landfall area;
- Construction equipment being delivered to the landfall area;
- Staff commuting to and from the landfall area; and
- Service trips associated with the landfall area (i.e. compound set up, maintenance, external third party visitors, etc.).

The projected increase in traffic associated with the landfall is presented in **Figure 13.5** based on the following assumptions:

- A combined total of approximately 15,000 m^3 of excavated and fill material, and other construction materials, will be generated during the construction of the two compounds and the HDD works during the site enabling works, and it is assumed this will take place over 60 days. The projected volume of excavated/ fill material reflects the HDD compound location (of the two options) which is most likely to generate the highest volumes of materials ensuring a robust assessment (refer to **Chapter 6** *Construction Strategy*). HGV trips will be spread evenly over the day for logistics and traffic management reasons and the number of HGV's has been based on assumed vehicle capacities. For the purposes of this assessment 10% of HGV traffic is expected during the peak periods based on a typical 10-hour workday.
- The landfall area construction is expected to generate equipment deliveries in the range of 5-10 per day. These deliveries include drilling equipment, civil infrastructure (kerbs, fencing, ducting, etc.), fuel and various other construction materials. During the drilling works approximately 900 m^3 of water deliveries will be generated which are included in the projected traffic generation flows.
- Approximately 10 construction staff will be employed for the landfall construction. It has been assumed that some staff will travel together to the HDD compound (apprentices, subcontractors who work together as small teams etc.) and therefore an occupancy rate of 1.2 people per vehicle has been assumed.

Daily trips have been calculated by multiplying these vehicle numbers by 2.5 to account for arriving to the area in the morning, leaving in the evening, and a small number of trips during the day for lunch, collecting small tools and materials, etc. For the purpose of this assessment a third (33%) of staff are assumed to arrive during the morning peak period and leave during the evening peak period.

- The number of estimated service trips (i.e. compound set up, maintenance, external third party visitors, etc.) associated with the construction of the landfall is expected to be in the region of 20 light vehicles per day.

Table 13.5 below presents the projected volume of traffic generation (HGVs and light vehicle total) associated with the landfall (being construction of both compounds and the landfall HDD works). Refer to Section 13.5.2.1 for more information.

Table 13.5: Traffic generation by the compounds at the landfall area (related to the construction of the compounds (HDD and temporary cable construction compounds) and HDD works at the landfall)

	Earthworks (Vehs)	Material and equipment deliveries (Vehs)	Staff (Vehs)	Service (Vehs)	TOTAL (Vehs)
Daily	55	10	21	20	106
Peak Hour	6	1	7	2	16

13.4.2.3 Cable Route

The cable route will connect the offshore energy produced to the National Electricity Transmission Network (NETN). 2 no. 220 kV High Voltage Alternating Current (HVAC) cable circuits with associated fibre optic communication and earthing cables will be laid underground from the landfall at Johnstown North, to the proposed onshore 220 kV substation at Shelton Abbey. The main characteristics of the cable route, with regard to the assessment are as follows:

- The cable route is approximately 6.0km in length.
- The cables will primarily be laid underground in agricultural land to minimise the impact on public roads.
- Underground cable to be installed in narrow trenches along public roadways in a number of isolated places where cables cannot be laid in private lands due to sensitive habitat or environmental reasons, namely Forest Road and L6179 Kilbride Road which will require temporary traffic management during construction as per Section 13.7.1.1.

- Underground cables to be installed across a total of 6 roads, 3 of these crossings will be via open cut (with temporary traffic management required during construction as per Section 13.7.1.1) and 2 roads, the M11 and the R772 Dublin Road will be via HDD (M11 assumed HDD for the purposes of a robust assessment), to ensure there is no significant impact on traffic flows at these busier locations. The HDD crossing of the R750 Sea / Coast Road forms part of the landfall HDD works.
- The duration of construction works along the cable route will be c. 24 months commencing in early 2023, with completion in late 2024. To ensure a robust assessment it was assumed that the export and import of earthworks/fill along the cable route to/from the temporary cable construction compound at the landfall and to/from the substation temporary construction compound will take place over a period of 6 months. It was also robustly assumed that the export and import of earthworks along the cable route to/from the four HDD temporary construction compounds at the R772 and M11 will take place over a period of 1 month.
- In respect of parking, a maximum of 10 staff members are expected at each of the HDD compounds at the R772 and the M11 crossings. Four bays are provided at each of the R772 HDD compounds and four bays are provided at the M11 HDD compound east of the M11. Space is restricted at the M11 HDD compound west of the M11, so no parking is provided there. Assuming a vehicle occupancy of 1.2 the minimum number of temporary parking spaces required for each HDD compound is 8. An additional 20 parking bays are therefore provided at the substation compound to accommodate HDD staff. These staff members will be transported to / from the respective HDD compounds and the substation compound. Parking for the compounds used during the construction at the landfall area and the substation compound are discussed in Section 13.4.2.2 and Section 13.4.2.4 respectively.
- For all other cable route construction activities staff will be transported via communal on-site vehicles to/from the landfall cable route temporary construction compound (at Johnstown North) and to/from the substation temporary construction compound and the haul route access point along the R750 Sea / Coast Road; as well as the cable construction along Forest Road and L6179 Kilbride Road. Dedicated construction areas will be provided to allow for on-site vehicle parking and temporary equipment storage such as the cable drums.

Construction activities related to and along the cable route will utilise (letters below refer to **Figure 13.4**):

1. Cable route temporary construction compound (at Johnstown North) (access point A or B off R750 Sea / Coast Road via Junction 20 off the M11 and R772 Dublin Road)
2. HDD temporary construction compound and haul route access points (east of R772) (access point D and E off R772 Dublin Road via Junction 20 off the M11)

3. HDD temporary construction compound and haul route access point (west of R772) (access point F off L2180 Beech Road via Junction 20 off the M11)
4. HDD temporary construction compound and haul route access point (east of M11) (access point G off L6179 Kilbride Road via Junction 20 off the M11, R772 Dublin Road and L2180 Beech Road)
5. HDD temporary construction compound (west of M11) (access point H off Forest Road via Junction 20 off the M11, R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road)
6. Substation temporary construction compound (access point I via L6179 Kilbride Road via Junction 20 off the M11, R772 Dublin Road and L2180 Beech Road)

- Haul route access point along R750 Sea / Coast Road (access point C via Junction 20 off the M11 and R772 Dublin Road)

Traffic Generation

Traffic generated by the construction activities related to the cable route (i.e. expected export and import of earthworks, other material and equipment deliveries to site, staff movements and service trips (i.e. compound set up, maintenance, external third party visitors, etc.)), is dealt with in this section. This includes the construction of the 4 HDD compounds, the traffic generated by the HDD works at the 4 HDD compounds and the traffic generated by construction activities between the landfall area, the substation area and the access points to the haul route, which is summarised as follows:

- Earthworks and materials - excavated waste exported, fill materials imported and construction materials delivered (including the cable drums), using the public road network, along the cable route
- Construction equipment being delivered along the cable route
- Staff commuting along the cable route
- Service trips associated with the cable route (i.e. compound set up, maintenance, external third-party visitors, etc.)

The projected increase in traffic associated with the cable route is presented in **Table 13.6** based on the following assumptions:

- A combined total of approximately 44,000 m^3 of excavated and fill material, and other construction materials, will be generated during the site enabling works along the cable route, assumed to take place over 180 days. An additional total of approximately 12,000 m^3 of excavated and fill material will be generated during the site enabling works at the four HDD compounds, assumed to take place over 30 days. HGV trips will be spread evenly over the day for logistics and traffic management reasons and the number of HGV's has been based on assumed vehicle capacities. For the purposes of this assessment 10% of HGV traffic is expected during the peak periods based on a 10 hour workday.

- The cable route construction is expected to generate equipment deliveries in the range of 20-30 per day. These deliveries include drilling equipment, civil infrastructure (kerbs, fencing, ducting, etc.), fuel and various other construction materials. During the drilling works approximately 1,500 m^3 of water deliveries will be generated which are included in this assumption.
- Approximately 50 construction staff will be employed for the cable route civil works and 20 for the works at the two HDD crossings (that is 70 staff in total across the entire cable route civil works), albeit at any one time, this total could utilise any one of the temporary cable construction compounds. The same travel characteristics in terms of vehicle occupancy, daily trips per staff and peak hour attendance has been applied to the each of the temporary construction compounds, as applied to the landfall temporary cable construction compound.
- The number of estimated service trips (i.e. compound set up, maintenance, external third party visitors, etc.) associated with the construction of the cable route is expected to be in the region of 50 light vehicles per day in total.

Table 13.6 below presents the projected volume of traffic (HGVs and light vehicle total) generation along the cable route. Refer to Section 13.5.2.1 for more information.

Table 13.6: Traffic generation along the cable route (related to the construction of the cable route)

	Earthworks (Vehs)	**Material and equipment deliveries (Vehs)**	**Staff (Vehs)**	**Service (Vehs)**	**TOTAL (Vehs)**
Daily	191	30	146	50	417
Peak Hour	19	3	47	5	74

13.4.2.4 Substation Area

The substation area will comprise two permanent compounds - a transmission compound (with the infrastructure to physically connect to the NETN), and a connection compound (with the infrastructure to allow the connection of the proposed windfarm in accordance with EirGrid grid code requirements). The substation area will also include a temporary construction compound used for the construction of the substation as well as the cable route. Additional works namely flood defence improvement works, new tower construction work and tower decommissioning work, will also take place in this area. This section considers the potential construction phase impacts of the proposed development at the substation area (i.e. construction of the compounds and additional works).

The main characteristics, with regard to the traffic and transport assessment, at the substation area are as follows:

- The duration of construction works at the substation area will be c. 24 months commencing in 2023. For the purpose of the assessment it was robustly assumed that the export and import of earthworks at the substation area will take place over a period of 3 months.
- The proposed construction compound for the substation is within the overall permanent substation site. The construction of the connection to the NETN will also be served by the substation compound and this temporary construction compound will also be used to serve the construction of the cable route.
- The connection to the NETN comprises an overhead line (OHL) from the proposed 220kV substation to the existing 220kV NETN. This connection will include a northern loop-in to the transmission network of approximately 270m and a southern loop-in to the transmission network of approximately 350m in length. The works will include the construction of two new towers replacing the existing towers which will be decommissioned.
- In respect of parking, 40 staff members are the maximum number of staff expected at the substation compound during the construction phase. Assuming a vehicle occupancy of 1.2 the minimum number of temporary parking spaces required at the substation compound is 33, with this number reducing to only 12 permanent parking spaces being provided for the operation of the substation. An additional 20 parking spaces are required to accommodate HDD staff members (as discussed in **Section 13.4.2.3**). Parking has been provided at the substation compound to accommodate these requirements.

Construction activities related to the substation area will include the construction of the permanent transmission compound, permanent connection compound, temporary construction compound, flood defence improvement works, a new tower 5A and a new tower 6B and the decommissioning of tower 6 and tower 7, and will utilise (letters below refer to **Figure 13.4**):

1. Substation temporary construction compound (access point I via L6179 Kilbride Road via Junction 20 off the M11, R772 Dublin Road and L2180 Beech Road)
2. Flood defence working area at Shelton Abbey (access point J via L6179 Kilbride Road via Junction 20 off the M11, R772 Dublin Road and L2180 Beech Road)
3. New Tower 5A working area at Kilbride (access point K via L6179 Kilbride Road via Junction 20 off the M11, R772 Dublin Road and L2180 Beech Road)
4. Decommission Tower 6 working area at Kilbride (access point L of L6179 Kilbride Road via Junction 20 off the M11, R772 Dublin Road and L2180 Beech Road)
5. New Tower 6B and Decommission Tower 7 working area at Ballyraine Lower (temporary access track with access point M off R747 Vale Road via Upper Main Street)

The access route to the substation area is discussed in Section 13.5.2.2 and shown in **Figure 13.6** and **Figure 13.7**.

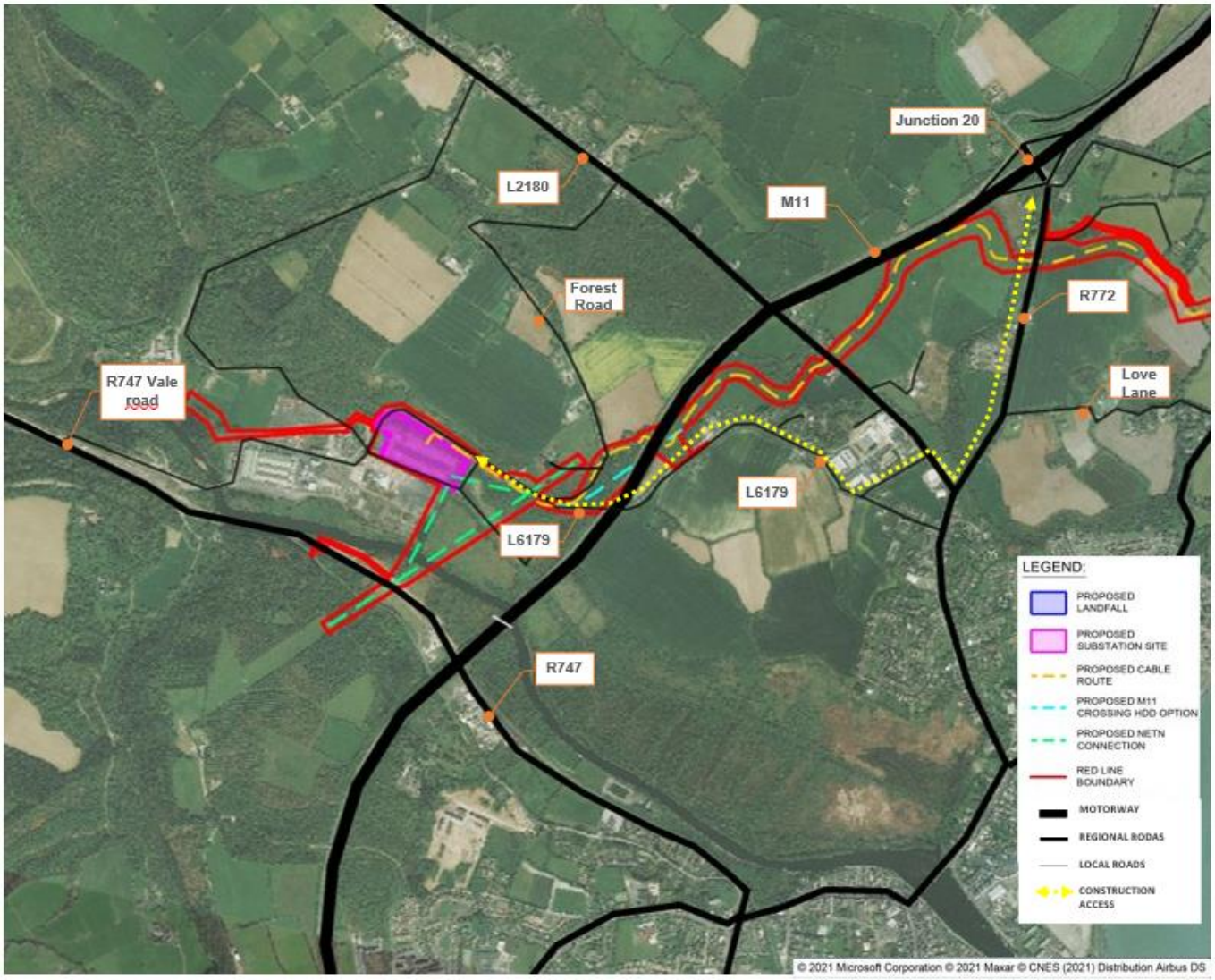

Figure 13.6: Access route to the compounds at the substation area [Base map source: Bing Maps]

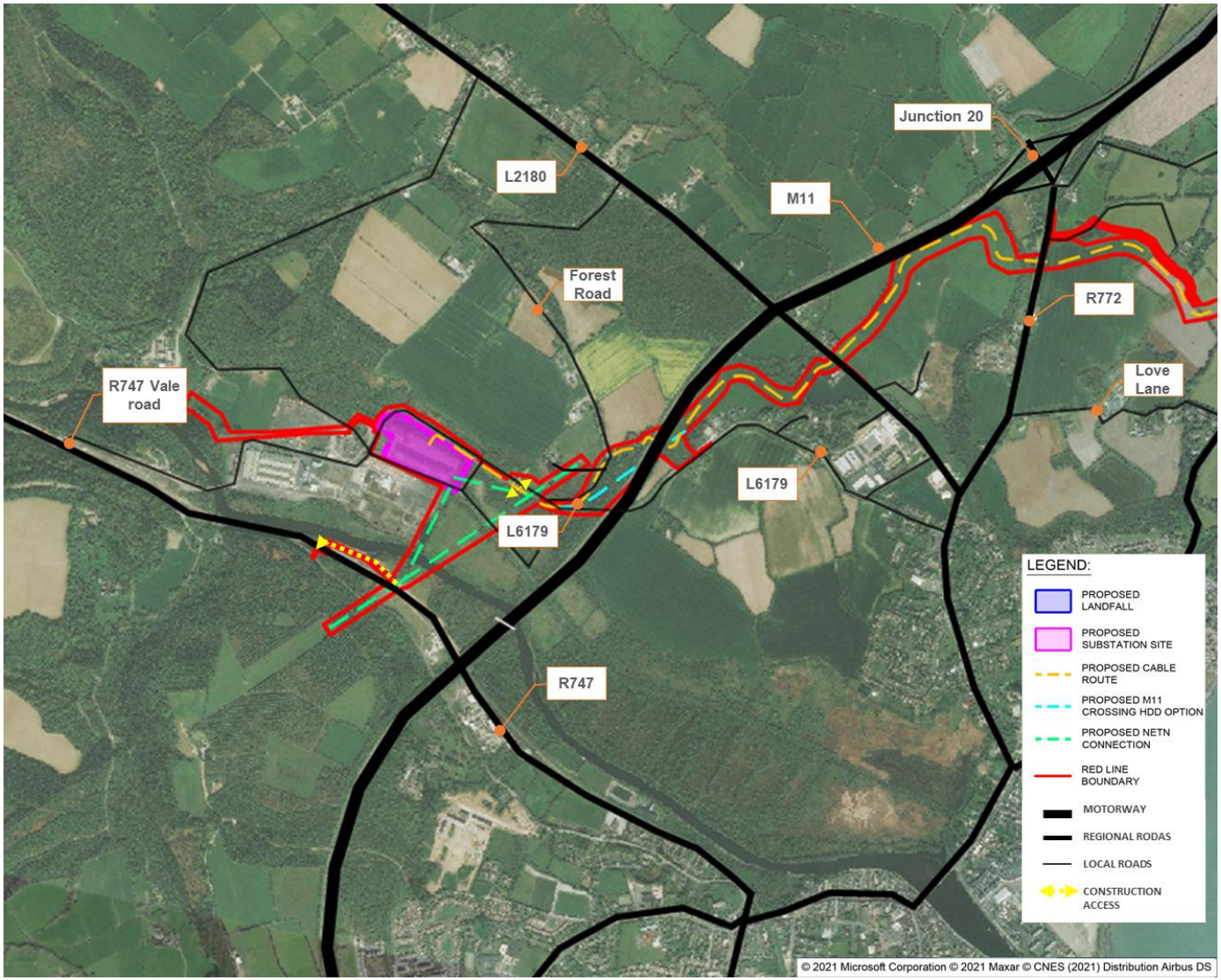

Figure 13.7: Access routes to NETN connection working areas [Base map source: Bing Maps]

Traffic Generation

Traffic generated by the construction activities related to the cable route (i.e. expected export and import of earthworks, other material and equipment deliveries to site, staff movements and service trips (i.e. compound set up, maintenance, external third party visitors, etc.)), is not dealt with in this section. Refer to section 13.4.2.3 for traffic generated by the construction activities related to the cable route.

In this section traffic generated by construction activities related to the substation area are dealt with. This only comprises the traffic associated with the construction of the compounds at the substation (two permanent compounds and a temporary construction compound) and the traffic generated by the additional works at the substation area, summarised as follows, and detailed below:

- Earthworks and materials - excavated waste exported, fill materials imported and construction materials delivered, using the public road network, via the substation area
- Construction equipment being delivered to the substation area
- Staff commuting to and from the substation area
- Service trips associated with the substation area (i.e. compound set up, maintenance, external third party visitors, etc.)

The projected increase in traffic associated with the substation area is presented in **Table 13.7** based on the following assumptions:

- A combined total of 88,000 m3 of excavated and fill material, and other construction materials, will be required for the site enabling works at the substation area, assumed to take place over 90 days. HGV trips will be spread evenly over the day for logistics and traffic management reasons and the number of HGV's has been based on assumed vehicle capacities. For the purposes of this assessment 10% of HGV traffic is expected during the peak periods based on a 10 hour workday.
- The substation area construction is expected to generate equipment deliveries in the range of 30-40 per day.
- Approximately 40 construction staff will be employed for the construction of the substation compounds and the additional works including the NETN connection. The same travel characteristics in terms of vehicle occupancy, daily trips per staff and peak hour attendance has been applied to the substation as for the other temporary construction compounds associated with the proposed development.
- The number of estimated service trips i.e. compound set up, maintenance, external third party visitors, etc.) associated with the construction of the substation compounds and the additional works including the connection to NETN is expected to be in the region of 20 light vehicles per day.

Table 13.7 below presents the projected volume of traffic (HGVs and private car total) generation associated with the substation area. Refer to Section 13.5.2.1 for more information.

Table 13.7: Traffic generation by the substation area (related to the construction of the substation compounds and the additional works including the connection to NETN)

	Earthworks (Vehs)	Material and equipment deliveries (Vehs)	Staff (Vehs)	Service (Vehs)	TOTAL (Vehs)
Daily	219	40	83	20	362
Peak Hour	22	4	27	2	55

13.4.3 Operational Phase

The operational phase of the proposed development is likely to have minimal effect on traffic and transportation in the vicinity. The likely traffic movements and activities which could affect traffic and transportation are set out below.

13.4.3.1 Landfall Area

Maintenance and inspection of the transition joint bay chambers and earth link boxes will be required. Access to the site will be on an ad hoc, infrequent basis and annual inspections will take place.

13.4.3.2 Cable Route

Routine maintenance of the cables will comprise an inspection inside the link box and communication chambers, which will be located at every joint bay along the route. It is envisaged that visits to the joint bays will take place on an annual basis.

It may transpire that cables may need to be repaired or replaced during the operational phase. In the unlikely event of power cable replacement, this would require an excavator to expose the joint bays at either end of the fault, plus plant/equipment to pull and feed cables between joint bays.

13.4.3.3 Substation Area

The substation will have two parts – the connection compound and the transmission compound. Both will be largely unmanned and operated remotely but each has the capability of accommodating 8 staff if required. Routine operational checks, 6 to 8 times per month are envisaged per compound, with each visit resulting in one or two vehicles at a time, generally during normal working hours.

Annual maintenance activities will be undertaken, over a period of c. one week and this may require up to 6 vehicles per day per compound during shifts over a 24-hour period.

13.4.3.4 Connection to NETN

The NETN is the responsibility of the Transmission Asset Owner (TAO) and any associated operational maintenance and inspection works will be undertaken in accordance with its standard inspection and operational procedures. Due to the nature of the asset, it is envisaged that the frequency and scale of inspections will be very low and similar to the low level already ongoing for the existing overhead line.

13.4.3.5 Summary

In summary, the proposed development will generate infrequent traffic flows during its operation with occasionally, during short periods of repair or maintenance, increased traffic flows of less than 30 trips per day being expected. This level of increase and the frequency of occurrence will result in no perceived impact on the receiving transport environment.

13.4.4 Decommissioning Phase

The decommissioning phase of the proposed development is likely to be similar to the construction stage but of reduced scale and corresponding impact on the receiving traffic and transportation networks within the study area. The likely activities associated with the decommissioning phase, which could affect traffic and transportation are set out below.

13.4.4.1 Landfall Area

The cables will be decommissioned when the project ceases operation, at the same time as the decommissioning of the substation.

On decommissioning, the cables and associated ducts will most likely remain in-situ as there would be more environmental impact in removing these than can be justified by the recycle value of cable material and as is standard industry practice. However, all above ground infrastructure will be removed and these areas fully reinstated.

The works will require a small workforce and will be of short duration.

13.4.4.2 Cable Route

The cables will be decommissioned when the project ceases operation, at the same time as the decommissioning of the substation.

On decommissioning, the cables and associated ducts will most likely remain in-situ as there would be more environmental impact in removing these than can be justified by the recycle value of cable material and as is standard industry practice.

However, all above ground infrastructure will be removed and these areas fully reinstated.

The works will require a small workforce and will be of short duration.

13.4.4.3 Substation Area

The normal asset life of a substation is c. 50 years but may be extended beyond this. When the proposed development reaches the end of its useful life, it may be either refurbished and replaced, or it will be decommissioned.

If decommissioned, all buildings and above ground structures on the substation site will be removed. All above ground structures along the cable route will be removed. It is likely that the ducts and cables will be left in place, as to remove them would be likely to cause a more substantial environmental impact than leaving them in-situ.

The decommissioning plant required will be similar to that required for the construction phase of the substation. The workforce required will be smaller and the duration of the works will be shorter.

13.5 Likely Significant Effects

The following sections present the projected change in traffic flows on the surrounding road network based on the projected additional traffic associated with the construction, operation and decommissioning of the proposed development.

Bus services and infrastructure along the R772 Dublin Road and the R774 Vale Road in the study area will not be impacted by the proposed development, as no lane closures or traffic diversion will be required along these roads.

Rail services and infrastructure will not be impacted by the proposed development as the station is located in Arklow town, outside of the study area. A mobile crane may be used to lift equipment and materials over the Arklow to Gorey railway line (in consultation with Irish Rail) to the existing access track as part of works on the NETN connection. To minimise disruption to rail services, any such lifting over the Arklow to Gorey railway will occur at night.

13.5.1 'Do-Nothing' Effects

If the proposed development does not proceed, the traffic volume is expected to remain at its current levels, with a gradual increase into the future in line with TII Project Appraisal Guidelines Growth Rates (Ref: Transport Infrastructure Ireland's Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections, May 2019).

13.5.2 Assessment of Effects during Construction

13.5.2.1 Traffic Generation

The assessment assumes that the construction of all aspects of the proposed development will take place in parallel, at the same time. This is a robust scenario in terms of traffic. It is also assumed that peak construction takes place during summer time where the traffic on the roadways in the study area will be at their busiest.

Therefore, the maximum projected increase in traffic associated with this likely construction sequence will result in the following increase in traffic flows.

Table 13.8: Traffic Generation

	Daily (Light Vehs)	Daily (HGVs)	Peak Hour (Light Vehs)	Peak Hour (HGVs)
Landfall Area	41	65	9	7
Cable Route (including R772 and M11 HHD construction)	196	221	52	22
Substation Area	103	259	29	26
TOTAL	**340**	**545**	**90**	**54**

13.5.2.2 Traffic Distribution

For the purposes of this assessment, it is assumed that all externally generated traffic will arrive to and from Junction 20 on the M11 and this is the designated access point from the Motorway to the construction site(s). This will ensure a robust assessment with respect to the potential increase in traffic on the R772 Dublin Road.

Table 13.9 presents the projected distribution of traffic along the local road network taking into account the potential sequencing of construction activities, in particular, the construction of the cable route (Refer to **Figure 13.3**).

Table 13.9: Traffic distribution

Link	Landfall area	Cable Route	Substation area
R772 Dublin Road (Location 3)	100%	100%	100%
R772 Dublin Road (Location 2)	100%	100%	100%
R772 Dublin Road (Location 8)	100%	100%	100%
R750 Sea / Coast Road (Location 1)	100%	100%	0%

Link	Landfall area	Cable Route	Substation area
R772 Dublin Road (Location 4)	50%	50%	50%
L2180 Beech Road	0%	100%	100%
L6179 Kilbride Road (Location 7)	0%	100%	100%
Forest Road	0%	30%	0%
R747 Vale Road	0%	0%	5%
L95115	0%	0%	0%
Love Lane	0%	0%	0%

For the landfall area it is assumed that 100% of the traffic travels along the R772 Dublin Road and R750 Sea / Coast Road (refer to **Figure 13.5**).

For the cable route construction, it is assumed that during construction 100% of the traffic could travel along the R772 Dublin Road and R750 Sea / Coast Road. Alternatively, 100% of the traffic could travel along the R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road. The two possibilities are robustly assumed to occur at the same time in the assessment and the highest possible traffic link volumes (up to 100%) are evaluated.

Forest Road will be used to support the construction of the cable route along the road, and to access the HDD temporary construction compound west of the M11 from the L6179 Kilbride Road. For the purpose of this assessment it is assumed that 30% of the overall cable route construction traffic is expected to be generated by the works along Forest Road.

For the substation area, it is assumed that 100% of the traffic travels along the R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road (refer to **Figure 13.6**).

The R747 Vale Road will be used to access the working area for the new tower 6B and the decommissioning of tower 7 via a temporary access track. For the purpose of this assessment 5% of the overall substation area traffic is expected to be generated by the works along R747 Vale Road (refer to **Figure 13.7**).

It is robustly assumed that all construction traffic will occur at the same time.

The distribution takes into account the following construction traffic management measures (refer to Section 13.7.1.1):

- No construction traffic will be permitted to use the L95115 during the course of the construction works, however some short term activity will be expected during the construction of the cable crossing this roadway.
- No construction traffic will be permitted to use Love Lane during the course of the construction works.

13.5.2.3 Traffic Assignment

Table 13.10 presents the projected increase in traffic associated with the construction of the proposed development taking into account the envisaged sequencing of construction stages.

Table 13.10: Proposed development traffic volumes on the road network

Link	Daily (Vehs)	Daily (HGVs)	Peak Hour (Vehs)	Peak Hour (HGVs)
R772 Dublin Road (Location 3)	340	545	90	54
R772 Dublin Road (Location 2)	340	545	90	54
R772 Dublin Road (Location 8)	340	545	90	54
R750 Sea / Coast Road (Location 1)	237	286	61	29
R772 Dublin Road (Location 4)	170	272	45	27
L2180 Beech Road	299	479	81	48
L6179 Kilbride Road (Location 7)	299	479	81	48
Forest Road	59	66	16	7
R747 Vale Road	5	13	1	1
L95115	0	0	0	0
Love Lane	0	0	0	0

From the above table it can be seen that the R772 Dublin Road is expected to experience the greatest increase in traffic with traffic flows on both the R750 Sea / Coast Road, the L6179 Kilbride Road and the L2180 Beech Road also expected to experience an increase in traffic flows.

13.5.2.4 Projected Traffic Increases

Table 13.11, Table 13.12 and **Table 13.13** present the projected future traffic flows during the construction stage both with and without the proposed development as well as the percentage change in traffic flows.

Most of the construction site staff will be on site for standard working hours between 07.00-19.00 and will arrive before and depart after these times. However, for the purposes of this assessment, we have assumed that the peak traffic generation associated with the construction activities will coincide with the peak periods on the receiving road network, to ensure a robust assessment.

Table 13.11: Projected traffic flows 2023 – Daily

Location	Link	Without Development (Vehs)		With Development (Vehs)		Percentage Change in traffic (LV+HGV)
		LV	HGV	LV	HGV	
1	R750 Sea / Coast Road	357	7	594	293	144%
	L95115	66	0	66	0	0%
2	R772 Dublin Road	10188	365	10528	910	8%
	Love Lane	933	11	933	11	0%
3	R772 Dublin Road	10054	343	10394	888	9%
4	R772 Dublin Road	5693	235	5863	507	7%
5	R772 Dublin Road	898	41	898	41	0%
	L95115	85	0	85	0	0%
6	Local Access Road	25	0	25	0	0%
	L2180 Beech Road	3972	87	4271	566	19%
7	Forest Road	163	4	222	70	75%
	L6179 Kilbride Road	725	84	1024	563	96%
8	R772 Dublin Road (Templerainy Park)	12587	238	12927	783	7%
	Ticknock Lane	182	0	182	0	0%
	Monument Lane	629	0	629	0	0%

Table 13.12: Projected traffic flows 2023 - AM Peak Period

Location	Link	Without Development (Vehs)		With Development (Vehs)		Percentage Change in traffic (LV+HGV)
		LV	HGV	LV	HGV	
1	R750 Sea / Coast Road	15	0	76	29	597%
	L95115	4	0	4	0	0%
2	R772 Dublin Road	924	32	1014	86	15%

Location	Link	Without Development (Vehs)		With Development (Vehs)		Percentage Change in traffic (LV+HGV)
		LV	HGV	LV	HGV	
	Love Lane	87	0	87	0	0%
3	R772 Dublin Road	946	33	1036	87	15%
4	R772 Dublin Road	619	23	664	50	11%
5	R772 Dublin Road	69	7	69	7	0%
	L95115	6	0	6	0	0%
6	Local Access Road	1	0	1	0	0%
	L2180 Beech Road	331	5	412	53	38%
7	Forest Road	12	0	28	7	185%
	L6179 Kilbride Road	91	6	172	54	133%
8	R772 Dublin Road (Templerainy Park)	1010	24	1100	78	14%
	Ticknock Lane	20	0	20	0	0%
	Monument Lane	35	0	35	0	0%

Table 13.13: Projected traffic flows 2023 - PM Peak Period

Location	Link	Without Development (Vehs)		With Development (Vehs)		Percentage Change in traffic (LV+HGV)
		LV	HGV	LV	HGV	
1	R750 Sea / Coast Road	42	0	103	29	213%
	L95115	9	0	9	0	0%
2	R772 Dublin Road	934	29	1024	83	15%
	Love Lane	94	1	94	1	0%
3	R772 Dublin Road	950	26	1040	80	15%
4	R772 Dublin Road	453	18	498	45	15%

Location	Link	Without Development (Vehs)		With Development (Vehs)		Percentage Change in traffic (LV+HGV)
		LV	HGV	LV	HGV	
5	R772 Dublin Road	95	1	95	1	0%
	L95115	12	0	12	0	0%
6	Local Access Road	2	0	2	0	0%
	L2180 Beech Road	382	2	463	50	34%
7	Forest Road	13	0	29	7	171%
	L6179 Kilbride Road	119	13	200	61	98%
8	R772 Dublin Road (Templerainy Park)	1060	8	1150	62	14%
	Ticknock Lane	13	0	13	0	0%
	Monument Lane	17	0	17	0	0%

The projected increase in traffic along the R772 Dublin Road within Arklow is relatively low due to the high traffic flows already on this route, with the projected increases in traffic flow being between 7% and 15%. This translates to up to 144 additional vehicles in the peak hour of which around 54 will be HGVs.

The L6179 Kilbride Road will have an increase in traffic between 96% and 133%. This translates to up to 129 additional vehicle trips in the peak hour of which around 48 will be HGVs. TII's standard for Rural Road Link Design (DN-GEO-03031) recommends a type 3 single carriageway (6.0m wide) provides capacity for an Annual Average Daily Traffic (AADT) of up to 5,000 vehicles. The projected demand using the L6179 Kilbride Road is approximately 1,587 vehicles per day, so it is clear that this road has considerable carrying capacity even with this increase.

The short section (approximately 170m) of the L2180 Beech Road between the R772 Dublin Road and the L6179 Kilbride Road will have an increase in traffic of between 19% and 38%. This translates to up to 129 additional vehicle trips in the peak hour (of which around 48 will be HGVs). TII's standard for Rural Road Link Design (DN-GEO-03031) recommends a type 3 single carriageway (6.0m wide) provides capacity for an Annual Average Daily Traffic (AADT) of up to 5,000 vehicles. The projected demand using the L2180 Beech Road is approximately 4,837 vehicles per day, which is close to the capacity of a rural road operating at Level of Service D.

The R750 Sea / Coast Road is expected to experience increases in traffic of between 144% and 597%. This translates to up to 90 additional vehicle trips in the peak hour of which 29 will be HGVs. TII's standard for Rural Road Link Design (DN-GEO-03031) recommends a type 3 single carriageway (6.0m wide) provides capacity for an Annual Average Daily Traffic (AADT) of up to 5,000 vehicles. The projected demand using the R750 Sea / Coast Road is approximately 887 vehicles per day, so it is clear that this road has considerable carrying capacity even with this increase.

Forest Road is expected to experience increases in traffic of between 75% and 185%. This translates to up to 23 additional vehicle trips in the peak hour of which 7 will be HGVs. The projected demand using Forest Road is approximately 292 vehicles per day, and no significant capacity constraints are expected.

In summary it can be concluded that the significance of effects will be as follows (refer to Section 13.2.5):

- R772 Dublin Road – not significant – a small temporary change in traffic flows without causing a real change in travel conditions.
- L6179 Kilbride Road - slight effects – a temporary change in traffic flow resulting in a minor change in travel conditions.
- L2180 Beech Road – slight effects – a temporary change in traffic flow resulting in a minor change in travel conditions.
- R750 Sea / Coast Road – slight effects – a temporary change in traffic flow resulting in a minor change in travel conditions.
- Forest Road - slight effects – a temporary change in traffic flow resulting in a minor change in travel conditions.

13.5.3 Assessment of Effects during Operation

13.5.4 Assessment of Effects during Operation

Traffic generated during the operational phase of the proposed development will be solely confined to inspection and maintenance vehicles accessing the landfall area, joint bays along the cable route and the substation including the connection to the NETN. The levels of traffic generated will be minimal (between 12 and 16 trips a month), and therefore no significant effects are envisaged.

13.5.5 Assessment of Effects during Decommissioning

The impact on future traffic conditions associated with the decommissioning works will be less than that associated with the construction works themselves due to the nature of decommissioning works, as described above. Any future impacts are expected to be a temporary change in traffic flow resulting in a minor change in travel conditions and the effects would be slightly negative (refer to Section 13.2.5).

13.6 Cumulative Effects

As set out in Chapter 21, a tiered approach to the cumulative assessment is adopted in which the proposed development is considered cumulatively with other projects.

13.6.1 Tier 1

- Project 1: ABWP Phase 2 Offshore Infrastructure,
- Project 2: ABWP Phase 2 Operations and Maintenance Facility (OMF);
- Project 3: EirGrid Grid Upgrade Works; and
- Project 4: Irish Water Upgrade Works

In relation to potential traffic and transportation effects, **Table 13.14** below highlights potential traffic and transportation effects associated with the Tier 1 projects with the proposed development.

Table 13.14: Tier 1 projects potential cumulative effects

Tier 1 Project	Potential Cumulative Effects (refer to Section 13.2.5)
Project 1: ABWP Phase 2 Offshore Infrastructure Status: Pending submission	The construction port for the storage, fabrication and delivery of offshore infrastructure has not yet been confirmed. Therefore, no detail relating to anticipated traffic movements or the port is available for this project. However, for the purpose of this report it is assumed that Arklow Port will be used as port for storage. It is likely that the majority of traffic generated from this project will access the port through Junction 21 on the M11 and will not be permitted to travel through the town centre but directed along the R772. Given the distance between this ABWP Phase 2 Offshore Infrastructure project and the proposed development, it is not likely for this project to fall within the zone of influence of the proposed development. No significant cumulative traffic impact effect is expected.
Project 2: ABWP Phase 2 Operations and Maintenance Facility (OMF) Status: Pending submission	No detail relating to anticipated traffic movements is available for this ABWP Phase 2 Operations and Maintenance Facility (OMF) project to be located at Arklow Port. It is likely that the majority of traffic generated from this project will access the port through Junction 21 on the M11 and will not be permitted to travel through the town centre but directed along the R772. Given the distance between this ABWP Phase 2 Operations and Maintenance Facility (OMF) project and the proposed development, it is not likely for this project to fall within the zone of influence of the proposed development. No significant cumulative traffic impact effect is expected.

Project 3: EirGrid Grid Upgrade Works Status: Pending submission	No detail relating to anticipated traffic movements is available for the works associated with the EirGrid Grid Upgrade Works project. It is anticipated that there will only be minor works associated with overhead lines in the vicinity of the proposed development, with more significant substation works required at existing substations within the network (likely Ballybeg substation at a distance of 20km). The cumulative effects are therefore considered imperceptible.
Project 4: Irish Water Upgrade Works	No detail relating to anticipated traffic movements is available. The water main runs from Arklow Town in a north-westerly direction towards Shelton Abbey. The upgrade is approx. 2.3km from R772 to Shelton Abbey parallel to the Shelton Abbey Canal. It is likely that the majority of traffic generated from this project will access the construction area through Junction 21 on the M11 and will not be permitted to travel through the town centre but directed along the R772. No significant cumulative traffic impact effect is expected.

13.6.2 Tier 2

- Project 5: Arklow Wastewater Treatment Plant (WwTP);
- Project 6 and 7: NRG Neon Holdings Limited Solar Farm Johnstown North/Ballymoney;
- Project 8 and 9: Highfield Solar Limited Ballinclea and Templeraney;
- Project 10: Rappel Enterprises Ltd;
- Project 11: MaZo Architecture;
- Project 12 and 17: Crag Digital Avoca Ltd Data Centre/Amended Application;
- Project 13: Ardale Properties Ltd Housing Estate;
- Project 14: Harmony Timber Solutions Office and Factory.
- Project 15: Sigma Aldrich Ireland
- Project 16: Wexford Bus and Stoneleigh Development Limited Park and Ride Facility
- Project 18: Crag Digital Avoca Ltd 110kV Substation;
- Project 19: Arklow Flood Relief Scheme; and
- Project 20: Avoca River Business Park Flood Defence Works

In relation to potential traffic and transportation effects, **Table 13.15** highlights potential traffic and transportation effects based on traffic generation and distribution as illustrated in the information available. The effect described in **Table 13.15** assumes that the construction phase of each individual project will coincide with the proposed development's construction works except in the case of the Wexford Bus and Stoneleigh Development Limited Park and Ride Facility.

Table 13.15: Tier 2 projects potential cumulative effects

Tier 2 Project	Potential Cumulative Effects (refer to Section 13.2.5)
Project 5: Arklow WwTP	The construction of Arklow WwTP is expected to increase traffic flows on the Ferrybank Road in Arklow town (R772 Dublin Road river crossing connecting Arklow to Junction 20 on the M11) by less than 5% during the peak hour periods, and by less than 3% on an all-day basis. The temporary increase in traffic volumes from this project will have limited impact on the performance of roads located within the zone of influence of the proposed development and will be not significant.
Project 6 and 7: BNRG Neon Holdings Limited Solar Farm Johnstown North/ Ballymoney	The construction of both solar farms is expected to result in 48 LV trips/day (96 LV trips during peak construction) and 31 HGV trips/day. These trips will be divided almost evenly between the existing cul-de-sac on Junction 20 on the M11 (Location 3, refer to **Figure 13.3**) and R772 Dublin Road connecting junction 20 and the L95115 Road (north of Location 4 on **Figure 13.3**). Considering the traffic volumes on these links, the temporary increase in traffic from these projects will be not significant.
Project 8 and 9: Highfield Solar Limited Ballinclea and Templerainy	No detail relating to anticipated traffic movements is available for this Highfield Solar Limited project. However, based on the description of the works and the level of traffic generation anticipated for the BNRG solar farm above (with a similar size of development), the level of traffic generated during construction works will be negligible. The traffic attributed to this project is most likely to use the R772 Dublin Road. Considering the traffic volumes on this link, the temporary increase in traffic from this project will be not significant.
Project 11: MaZo Architecture	No detail relating to anticipated traffic movements is available for this MaZo Architecture project. However, given the distance between this project and the proposed development, it is not likely for this project to fall within the zone of influence of the proposed development. Construction vehicles are most likely to access the project site through Junction 21 on the M11. The temporary increase in traffic will be imperceptible.
Project 13: Ardale Properties Ltd Housing Estate	No detail relating to anticipated traffic movements is available for this Ardale Properties Ltd Housing Estate project. However, given the distance between this project and the proposed development, it is not likely for this project to fall within the zone of influence of the proposed development. Construction vehicles are most likely to access the project site through the Junction 21 on the M11. The temporary increase in traffic will be imperceptible.

Tier 2 Project	Potential Cumulative Effects (refer to Section 13.2.5)
Project 15: Sigma Aldrich Ireland	No detail relating to anticipated traffic movements is available for this storage facility. However, based on the description of the works and the level of traffic generation anticipated the level of traffic generated during construction works will be negligible. The temporary increase in traffic will be imperceptible.
Project 16: Wexford Bus and Stoneleigh Development Limited Park and Ride Facility	No detail relating to anticipated traffic movements is available for this Park and Ride facility. However, based on the description of the works, the level of traffic generation anticipated for this project will be greatest during operation. The daily trip generation by the facility is expected to be in the region of 340 LVs which will lead to a 3% increase in traffic along the R772 Dublin Road. Considering the traffic volumes on this link, the temporary increase in traffic from this project will be not significant.
Project 19: Arklow Flood Relief Scheme	The construction of Arklow Flood Relief Scheme is expected to result in a maximum of 358 trips daily (LV+HGV). This is translated in an increase in traffic flows on the R772 Dublin Road of less than 2.2% on an all-day basis. The temporary increase in traffic volumes from this project will have limited impact on the performance of the R772 Dublin Road and will therefore be not significant.

Projects not included in the table above are projects planned at the Avoca River Business Park where the proposed development will be constructed. Multiple projects are approved or awaiting approval at the Avoca River Business Park including:

- Project 10: Rappel Enterprises Ltd
- Project 12 and 17: Crag Digital Avoca Ltd Data Centre Existing and New Application
- Project 14: Harmony Timber Solutions Office and Factory
- Project 18: Crag Digital Avoca Ltd 110kV Substation
- Project 20: Possible Flood Embankment Works at Avoca River Business Park

To evaluate the potential cumulative effects for most of these projects (Projects 10, 12, 17, 14 and 18) it is assumed that the peak traffic generation phase of these four projects, combined, will coincide with the proposed development construction works. If any reinforcement works are required to the Avoca River Business Park flood defence embankment, these works will be carried out in advance of the construction of the proposed development.

It is noted that the original Crag Digital Avoca Ltd Data Centre permission plans and the amended application for Crag Digital Avoca Ltd assume the same level of trip generation and distribution.

13.6.2.1 Rappel Enterprises Ltd

No detail relating to anticipated traffic movements is available for this proposed office development however, based on the description of the works and standards provided by Wicklow County Council for the operational phase, traffic during operation is expected to be higher than traffic during construction. Based on the project floor area, this project is assumed to result in roughly 65 LV trips/day during its operational phase.

13.6.2.2 Crag Digital Avoca Data Centre (Existing and New Application)

The construction phase of this project will result in a maximum of 320 LV trips/day and a maximum of 46 HGVs trips/day. This will only be for one month and then the total number of site operatives will reduce significantly during the remaining months of construction.

13.6.2.3 Harmony Timber Solutions Office and Factory

No detail relating to anticipated traffic movements is available for this proposed Harmony Timber Solutions Office and Factory development. However, based on the description of the works and standards provided by Wicklow County Council for the operational phase, traffic during operation is expected to be higher than traffic during construction. Based on the project floor area, this project is assumed to result in roughly 75 LV trips/day during its operational phase.

13.6.2.4 Crag Digital Avoca Ltd 110kV Substation

No detail relating to anticipated traffic movements is available for this proposed Crag Digital Avoca Ltd 110kV Substation project. However, based on the description of the works, the project is assumed to result in the same number of trips expected during the construction phase of the proposed development's substation. A total of 103 LV and 259 HGV trips/day are therefore anticipated for this project (refer to Table 13.8). There is no OHL construction work associated with this project. However, the same level of traffic generation is assumed for a robust evaluation.

13.6.2.5 Flood Defence Embankment Works in the Avoca River Business Park

There will be possible maintenance and repair works to the existing flood embankment around the Avoca River Business Park as part of a regular inspection, maintenance and repair programme, to manage residual risk of flooding from a potential breach of the embankment. Investigations are to be undertaken which will determine the nature and extent of the works required. Any required reinforcement works, will be undertaken in advance of the substation construction, with ongoing maintenance and repair thereafter, subject to regular inspection and monitoring.

As any required works are not expected to overlap with the construction of the substation, there are no significant cumulative effects to traffic and transportation expected during any required maintenance and repair works.

During operation of the proposed development, there will be an ongoing inspection, maintenance and repair programme for the flood defence embankment. Any works required to the embankment during this time, will have some associated traffic. However, as there are no significant operational traffic volumes associated with the proposed development, there are no significant cumulative effects on traffic and transportation expected during the operational phase.

13.6.3 Summary

The assessment of the construction of ABWP Phase 2 EirGrid Grid Upgrade Works (Tier 1) combined with the four Tier 2 developments will result in 666 LV and 564 HGV trips/day. Assuming all trips come from junction 20 on the M11 using the R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road, the increase in traffic is presented in **Table 13.16** below:

Table 13.16: Cumulative impact on the R772 Dublin Road, L2180 Beech Road and L6179 Kilbride Road (daily trips)

Road	Without Proposed Development (Vehs)	With Proposed Development (Vehs)	With Proposed Development and five Avoca Business Park Developments (Vehs)	Percentage change in traffic if five Avoca Business Park Developments coincide with the proposed development
R772 Dublin Road	10553 (4% HGV)	11438 (8% HGV)	12668 (11% HGV)	11%
L2180 Beech Road	4059 (2% HGV)	4837 (12% HGV)	6067 (19% HGV)	25%
L6179 Kilbride Road	809 (12% HGV)	1587 (35% HGV)	2817 (40% HGV)	77%

The projected increase in traffic along the R772 Dublin Road within Arklow is relatively low due to the high traffic flows already on this route, the projected increases in traffic flow per day are around 11%. This translates to up to 1230 additional vehicle trips per day of which around 564 will be HGVs.

The short section (approximately 170m) of the L2180 Beech Road between the R772 Dublin Road and the L6179 Kilbride Road will have an increase in traffic of around 25%. This translates to up to 1230 additional vehicle trips in the peak hour of which around 564 will be HGVs. TII's standard for Rural Road Link Design

(DN-GEO-03031) recommends a type 3 single carriageway (6.0m wide) provides capacity for an Annual Average Daily Traffic (AADT) of up to 5,000 vehicles. The projected demand using the L2180 Beech Road in this scenario is approximately 6,067 vehicles per day. Assuming the cumulative operations or construction of the five developments at Avoca River Business Park will take place at the same time, the Level of Service of this short section of road will temporarily breech level D and some temporary delays may occur.

The L6179 Kilbride Road will have an increase in traffic of around 77%. This translates to up to 1230 additional vehicle trips per day of which around 564 will be HGVs. TII's standard for Rural Road Link Design (DN-GEO-03031) recommends a type 3 single carriageway (6.0m wide) provides capacity for an Annual Average Daily Traffic (AADT) of up to 5,000 vehicles. The projected demand using the L6179 Kilbride Road is approximately 2,817 vehicles per day, so it is clear that this road has considerable carrying capacity even with this increase.

Should these projects be carried out simultaneously the impact should be mitigated through increased coordination between the different construction projects, Wicklow County Council and An Garda Síochána.

13.7 Mitigation Measures and Monitoring

13.7.1 Construction Phase

13.7.1.1 Construction Traffic Management Plan (CTMP)

The construction of the cable route requires the construction of a number of road crossings as well as construction along a number of roads. Traffic will be managed as follows, in agreement with Wicklow County Council:

Table 13.17: Road or lane closures

Road	During construction	During road crossings	During cable construction along the road
M11	N/A	Crossing through HDD or existing underpass, no road closures required.	N/A
R772 Dublin Road	N/A	Crossing through HDD, no road closures required.	N/A
L95115	No construction traffic permitted	Open cut crossing. Stop / go (single lane closure) or localised	N/A

Road	During construction	During road crossings	During cable construction along the road
		diversion (full closure)	
L6179 Kilbride Road	N/A	Open cut crossing. Stop / go (single lane closure), or localised diversion (full closure)	Stop / go (single lane closure)
L2180 Beech Road	N/A	Open cut crossing. Stop / go (single lane closure) or localised diversion (full closure)	N/A
R750 Sea / Coast Road	N/A	Crossing through HDD, no road closures required.	N/A
R747 Vale Road	Restricted visibility to be managed by the use of banksman / temporary traffic management for all vehicles entering / egressing from entrance no. 6.	N/A	N/A
Forest Road	N/A	N/A	Stop / go (single lane closure)
Love Lane	No construction traffic permitted	N/A	N/A

Road closures will be kept to a minimum to avoid disruption to traffic. Each of the road closures will be short in duration and temporary (unlikely to exceed a week with access allowed between working shifts). Where possible, traffic flow will be maintained by use of temporary traffic signals. It is acknowledged that whilst the increase in traffic due to construction will be minimal, there will be a certain level of inconvenience to local residents and businesses along these routes as a result of the works.

A Construction Traffic Management Plan (CTMP) has been prepared and is included in the Construction Environmental Management Plan (CEMP), see **Appendix 6.1**. The Contractor will update the CTMP prior to commencement of

construction, will keep the CTMP updated throughout, will agree the CTMP with Wicklow County Council and An Garda Síochána and will fully implement the CTMP.

The CTMP includes the details of the required traffic management measures (as summarised in **Table 13.7**). It demonstrates how pedestrians, cyclists and motorised vehicles can pass through the area safely where appropriate and that measures are in place which ensure traffic operates in as efficient a manner as possible.

The CTMP includes a detailed consultation plan to deal with third party queries from local resident and community groups along the cable route in particular but also in the vicinity of the proposed site compounds. The Contractor will appoint a single point of contact to facilitate the communication of the various traffic management plans.

The implementation of the CTMP and the co-ordination of works in consultation with Wicklow County Council and local residents, will minimise these impacts.

13.7.1.2 Construction Mitigation Measures

The following mitigation measures are proposed for the construction stage of the proposed development:

- Deliveries of materials will be planned and programmed to ensure that the materials are delivered only as they are required at the working areas along the cable route and will avoid peak hours for set-up and removal of equipment;
- Works requiring multiple vehicle deliveries, such as concrete pours, will be planned so as to ensure there will be no queuing on the public roadways around the working areas;
- For any works related to the cable route that require lane closures (refer to **Table 13.7**) the length of lane closure and the required working area will be kept as small as possible;
- All trucks entering and exiting the working areas which are carrying materials which could become windborne will be covered with tarpaulin;
- Trucks will not be allowed to park on public roads either outside the working areas or on any of the approach roads leading to the working areas;
- All trucks entering the working areas will be restricted to suitable speed limits and will be directed to the relevant area by the site manager, avoiding school areas at drop off and collection times. St Josephs National School is located on the R772 Dublin Road. Bus services and infrastructure along the R772 Dublin Road and the R774 Vale Road in the study area will not be impacted by the proposed development, as no lane closures or traffic diversion will be required along these roads (as per Section 13.5);
- Trucks required to wait at the working areas will switch off engines to avoid unnecessary fuel usage and noise;

- All trucks exiting the construction compounds will be required to pass through a dry or wet wheel wash. All water from the wheel wash will be collected, treated to remove silt or other contaminants, and removed from site. This will ensure no spread of invasive species from vehicle movements (see CEMP in **Appendix 6.1**);
- Roads immediately adjacent to the construction compounds will be visually inspected on a daily basis and power swept and washed as and when required; and
- Adequate parking will be provided at the substation site, landfall compounds (HDD and temporary construction compounds), the cable route HDD compounds and the substation compound to avoid queuing at the site entrances and prevent disruption to neighbouring businesses and residences. Site entrance gates will be set back from the main road to allow a vehicle to pull in off the road before the gate is opened.

13.7.1.3 Monitoring During Construction

The effectiveness of the Construction Traffic Management Plan will be continually monitored by the Contractor to ensure the effects on traffic flows on the surrounding road network are minimised. The monitoring regime will consider all modes of traffic including pedestrians, cyclists and car parking provision.

13.7.2 Operation Phase

As there are no significant operational effects associated with the proposed development no mitigation measures are required for the operational phase.

13.7.3 Decommissioning Phase

The mitigation measures, described above for the construction phase, updated to reflect best practice at the time, will be implemented for the decommissioning phase.

13.8 Residual Effects

By adopting the mitigation measures proposed above, the additional traffic associated with the development's construction is anticipated to have a slight temporary negative impact on the road network and its users for the duration of the construction works only.

There will be no significant operational stage traffic impacts associated with the proposed development.

On decommissioning, the adoption of and adherence to a decommissioning plan which will include adequate traffic management proposals will ensure that the residual impacts on traffic and transport at the decommissioning stage will not be significant.

13.8.1 Do-Nothing Scenario

If the proposed development does not proceed, the traffic in the vicinity of the proposed development is expected to remain at its current levels, with a gradual increase into the future in line with TII Project Appraisal Guidelines Growth Rates.

13.8.2 Construction Phase

Subject to the implementation of the CTMP and mitigation measures outlined above, there will be a temporary slight traffic effect on the residents and road users in the vicinity of the cable trench excavations and cable installation works for the duration of the works. A change in traffic flow resulting in a minor change in travel conditions will be experienced (refer to Section 13.2.5).

Once the cable route construction has been completed, the residual impact will be imperceptible on the road network and on traffic.

Subject to the implementation of the CTMP and mitigation measures outlined above, construction of the substation and the landfall will have a temporary slight traffic impact effect on residents and road users. Once the construction of the landfall and substation has been completed, the residual impact will be imperceptible on the road network or traffic.

13.8.3 Operational Phase

No significant residual effects on traffic and transportation are envisaged during the operational phase.

13.8.4 Decommissioning Phase

The decommissioning phase will require less extensive works than the construction phase but will nevertheless require similar mitigation measures. Residual effects, similar to the construction phase, are predicted to be temporary and slight negative.

13.8.5 Cumulative Effects

The residual cumulative effect of the permitted projects in the vicinity of the proposed development will be minimal. The construction phases will be temporary, and the operational phases will generate low levels of traffic. No significant residual cumulative effects on traffic and transportation are envisaged.

13.9 References

Environmental Protection Agency (2017) *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017)*

Environmental Protection Agency (2015) *Advice Notes for Preparing Environmental Impact Statements Draft September 2015*

Transport Infrastructure Ireland (2014) *Traffic and Transport Assessment Guidelines*

Transport Infrastructure Ireland (May 2019) *Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections*

Transport Infrastructure Ireland (June 2017) *DN-GEO-03031 Rural Road Link Design*

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