

7 Roads and Traffic

7.1 Introduction

It is anticipated that the only traffic impact as a result of this proposed power supply development will be during construction, as there is very minimal development traffic envisaged post-construction. This chapter describes the existing environment, estimates the construction traffic generated by the proposed new development, and assesses the impact of the proposed construction traffic on the local road network. Cumulative impacts associated with other developments are also addressed.

The proposed development is the construction of a 220kV electrical power supply and substation for the proposed Apple Data Centre (currently under planning appeal). The main characteristics of the proposed development are described in **Section 7.4 *Characteristics of Proposed Development***.

7.2 Study Methodology

A brief description of the methodology of this assessment is presented below:

- **Section 7.3** of this chapter describes the '*Existing Receiving Environment*'. It describes the location of the proposed development in its context with Galway City and Athenry and gives a detailed description of the local road network, in respect of the proposed development. It also sets out the existing traffic patterns on the local road network.
- **Section 7.4** sets out the '*Characteristics of the Proposed Development*'. Within this section, the nature of the proposed development is set out, in terms of the proposed use and scale of development. It also details the projected trip generation and distribution of the construction phase traffic on the local road network.
- **Section 7.5** identifies '*Other Developments in the Vicinity*' of the proposed development. Within this section, on-going, proposed and potential developments are examined, including potential combinations of concurrent development which could lead to cumulative impacts. Traffic volumes associated with other development is also calculated.
- **Section 7.6** calculates the '*Combined Traffic Generation*' of the worst-case cumulative development associated with the proposed development and other developments in the vicinity.
- **Section 7.7** analyses the '*Potential Impacts of Proposed Development*' on the capacity of the surrounding road network.
- **Section 7.8** describes the '*Cumulative Impacts*' associated with other on-going, proposed and potential developments in the vicinity of the proposed development.
- **Section 7.9** describes the '*Mitigation Measures*' proposed to reduce the impact of the proposed development on the receiving environment.

- **Section 7.10** identifies the ‘*Residual Impacts*’ anticipated on the local, regional and national road networks resulting from the proposed development.
- **Section 7.11 ‘References’** lists the supporting documents referenced in this Chapter.

7.3 The Existing Receiving Environment

7.3.1 Site Location

The proposed development will be located on a green-field site approximately 12km east of Galway City, and approximately 4km southwest of Athenry.

The site of the proposed development is described in **Section 3.3** of this EIS. The proposed substation will be located within the site of the proposed Apple data centre (currently under planning appeal). The grid connection and the construction of proposed new overhead lines and tower structures will be undertaken on third party land to the north-east of the proposed substation. The overhead lines will cross the M6 at two locations immediately west of the M17/M18 motorway and Rathmorrissy Interchange (currently under construction).

The subject site is surrounded to the north-east and east by third party lands, the R438 to the south, the Apple Data Centre site to the south-west and third party lands and a local road to the west and north-west. The M6 motorway traverses the site, segregating the north and south portions of the site.

Figure 7.1 below shows the site location in a regional context, while a map showing the location of the proposed development in the context of the local road network is presented in **Figure 7.2** below.

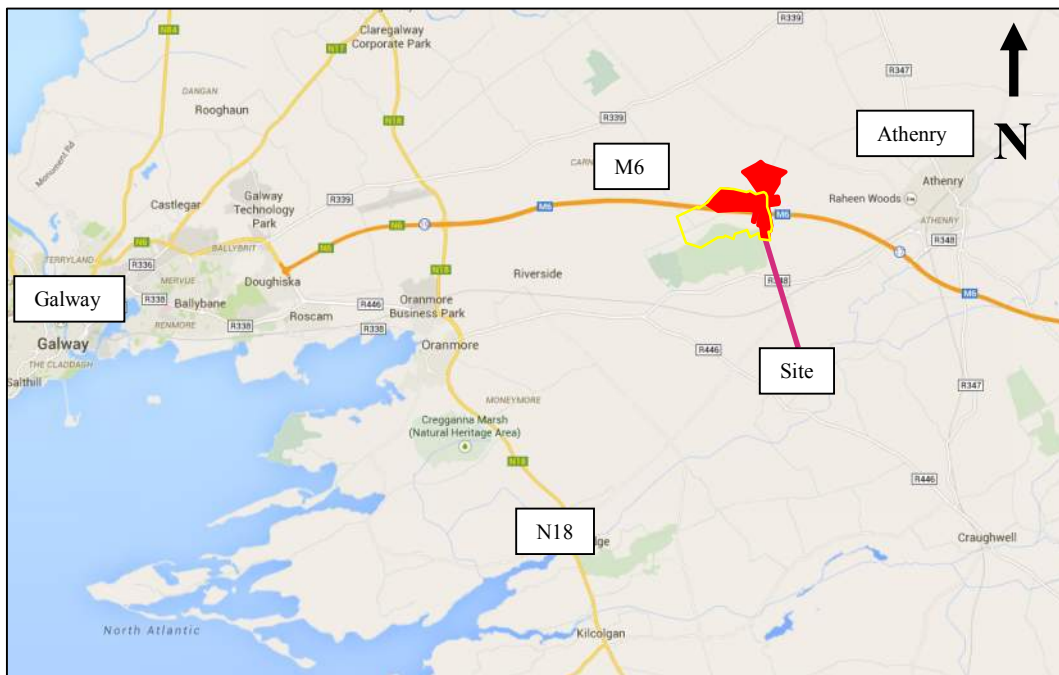


Figure 7.1 Site Location – Regional Context | Not to Scale [Source: © Bing Maps]

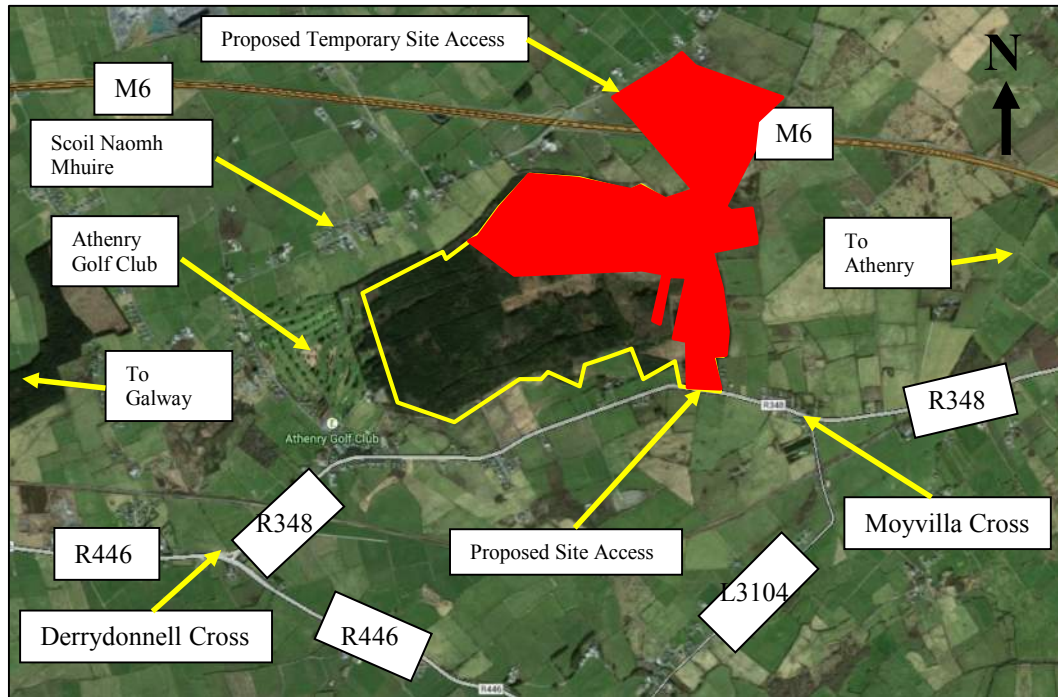


Figure 7.2 Site Location – Local Context | Not to Scale [Source: © Google Maps]

7.3.2 Local Road Network

A brief description of the local road network in the vicinity of the proposed development site is provided below. The layout of the local road network is presented in **Figure 7.2** above.

7.3.2.1 R348 Athenry Road

The R348 is a regional road which passes the site to the south. It will be the principal access route to the site as well as the location for access/egress to and from the site. The R348 is a two-way, two-lane single carriageway of approximately 6m width, with no hard shoulders. The R348 has a reasonably straight horizontal and vertical profile. To the east of the site, the R348 has a junction with the L3104 at Moyvilla Cross. Further east, the R348 then passes under the M6 motorway and continues to Athenry, while to the west, the R348 continues to its junction with the R446 Oranmore – Craughwell road at Derrydonnell Cross.

7.3.2.2 L3104 Clarinbridge Road

The L3104 is a local road which links the R348 to the R446 to the southeast of the site. From the junction with the R446, the local road L4102 then provides a further link south to the N18 at Clarinbridge. The L3104 is a two-way, two-lane single carriageway of approximately 6m in width, with no hard shoulders. The horizontal alignment is mostly straight. The road is also the subject of a 10-tonne weight restriction by Galway County Council.

Due to the relatively straight horizontal alignment of the L3104 and L4102 linking the N18 at Clarinbridge to the R348 at Moyvilla Cross, it is likely that a portion of vehicles travelling from the south are using the local road network (i.e. the L3104 and L4102) instead of the N18, R446 and R348 to travel to Athenry and beyond as it is a substantially shorter route (circa 11.5km via local roads, circa 17km via N18).

7.3.2.3 R446 Oranmore Road

The R446 is a regional road which links the N18 at Oranmore to Craughwell, and on towards Loughrea. The R348/R446 junction at Derrydonnell Cross is approximately 4km east of the N18 at Oranmore, from which the R348 leads to Athenry past the proposed development site. The R446 is a two-way, two-lane single carriageway, and is of a higher standard than the R348, with widths of approximately 12-13m (including hard shoulders), and other features such as right hand turn lanes, etc. present along the route. This is due to the fact that the R446 was previously a national primary road, prior to the opening of the M6 motorway in 2009. At the junction with the R348, the R448 is provided with a right hand turn lane to the R348, and a left-diverge lane.

7.3.2.4 M6 Motorway

The M6 Galway-Kinnegad Motorway passes to the north of the proposed site, with the nearest interchange located approximately 5 km east of the site at Athenry.

7.3.2.5 M17/M18 Motorway

The M17/M18 Gort-Tuam motorway is currently under construction. The scheme, which forms part of the Atlantic Road Corridor, consists of 57 km of motorway/dual carriageway. The alignment of the M17/M18 route, and its interchange with the M6 motorway at Rathmorrissy, will be immediately adjacent to the eastern boundary of the proposed development. This road scheme is further discussed in **Section 7.5.1**.

7.3.3 Public Transport

There are a number of public transport services which route along the local road network in the vicinity of the proposed site. The Bus Éireann Dublin-Galway 20/X20 Intercity service stops at Derrydonnell Cross on the R446, approximately 3km from the development site access. This service connects to the west to Oranmore, Galway Mayo Institute of Technology and Galway Bus Station, and to the east to Craughwell, Loughrea, Aughrim and Ballinasloe.

The BusLink 418 service from Athenry to Galway passes the proposed site access on the R348 and stops at Derrydonnell Cross approximately 3km west of the subject site.

Healy Bus Services operate a daily service from Loughrea to Galway, which stops at Moyvilla Cross at the junction of the L3104 and R348, approximately 700m east of the proposed site access.

Irish Rail also operate daily Galway-Limerick and Galway-Dublin services which stop at Oranmore and Athenry.

7.3.4 Existing Traffic Conditions

AM and PM traffic flow surveys were undertaken in the surrounding area on Tuesday 23 September 2014 at the following junctions/links:

- Site 1 – R446/R348 junction at Derrydonnell Cross
- Site 2 – R348/L3104 junction at Moyvilla Cross
- Site 3 – R348 Prospect Road Roundabout, outside Athenry
- Site 4 – R348 roundabout, south of Athenry
- Site 5 – M6/R348 interchange, northern roundabout
- Site 6 – M6/R348 interchange, southern roundabout
- Site 7 – M6 Motorway – Two-Way Link flow
- Site 8 – L7109/Castlelambert Road junction

Three-hour AM and PM surveys were undertaken by Sky-High Technology Ltd, from 07:00-10:00 and 16:00-19:00. **Figure 7.3** below shows the locations of the traffic surveys referred to above.

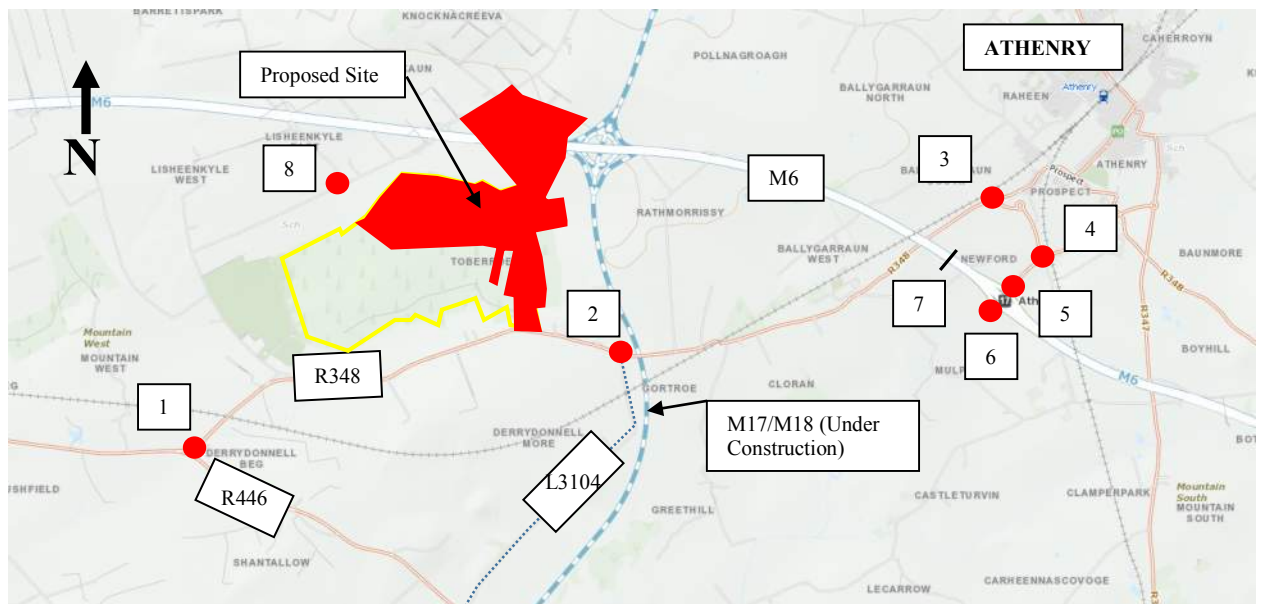


Figure 7.3 Traffic Survey Locations | Not to Scale [Ordnance Survey Ireland Licence No. EN 0002816 © Ordnance Survey Ireland / Government of Ireland]

7.3.5 Traffic Survey Results

The traffic surveys indicated above in **Figure 7.3** were interrogated in order to identify the morning and evening peak periods in the surrounding road network.

Locations 1, 2 and 3 represent the nearest main junctions to the subject site. Analysis of these three junctions showed that Location 1 (the R446/R348 junction at Derrydonnell Cross) was the busiest of the three. This junction showed an AM peak period of 07:45-08:45 and a PM peak of 17:00-18:00. These AM and PM peak periods were therefore used for analysis purposes for all three sites and at the proposed site access. **Table 7.1** below presents the 2-way link flows in September 2014. As the peak construction period is envisaged to occur in 2017, the base traffic volumes have been factored to 2017, and these are also presented below. This surveyed traffic was factored to 2017 using Transport Infrastructure Ireland (TII, formerly NRA) *'Project Appraisal Guidelines, Unit 5.5: Link-Based Traffic Growth Forecasting'*.

Table 7.1 Two-Way Traffic Flows on local road network

	Peak Period			
	AM 07:45-08:45		PM 17:00-18:00	
	2014	2017	2014	2017
R446 north of R348	772	800	805	834
R446 south of R348	600	622	648	671
L3104	107	111	91	94
R348	266	275	304	315
M6 north west of Athenry Interchange	1103	1142	1112	1151
M6 south east of Athenry Interchange	942	975	829	858

7.4 Characteristics of the Proposed Development

7.4.1 Nature of the Proposed Development

The proposed development is the construction of a 220kV electrical power supply and substation for the proposed Apple data centre (currently under planning appeal). The layout of the proposed substation and the proposed route and layout for the electrical connection to the existing overhead 220kV power lines is shown on **Figure 7.4**.

It is proposed that two separate connections will be brought to the proposed substation, one from the Cashla Tynagh Line and one from the Cashla Prospect Line. These connections will involve the construction of seven new tower structures. In addition, three existing tower structures will be removed as part of the works. In general, the power supply to the site will be via underground cables. However in the location of the M6 motorway and the new Rathmorrissey interchange, sections of overhead lines will be required.

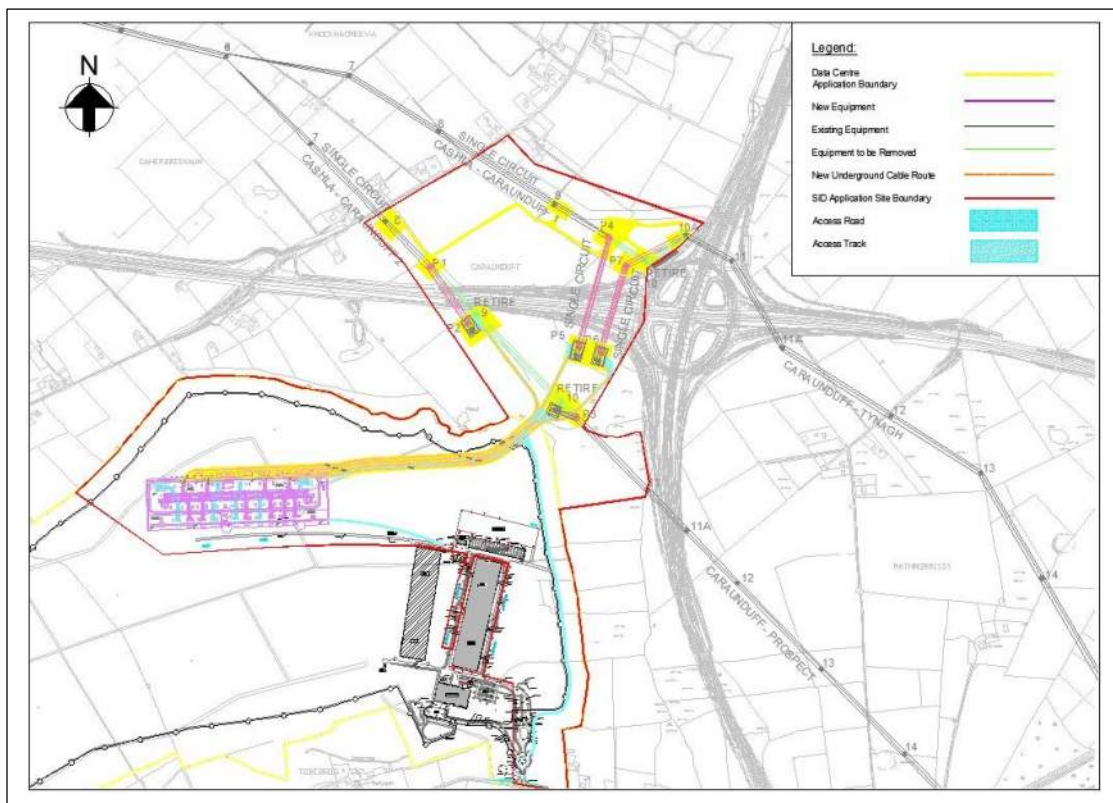


Figure 7.4 Proposed Development | Not to Scale

Construction of the proposed development will generate increased traffic on the local network. Maintenance of the proposed development will generate some very light, infrequent traffic but the volumes will be negligible. A dedicated right hand turn lane is proposed as part of the planning application for the Apple data centre. This will be constructed on the R348 to access the proposed site of the data centre and will be designed to comply with TD 41-42/11 of the National Roads Authority (NRA) *Design Manual for Roads and Bridges (DMRB)*, including achievement of required sightlines and visibility splays from the proposed site access junction. This access junction will be used to access the southern element of this proposed development i.e. access to the proposed substation and access to towers P2, P3 P5 and P6. Temporary construction access to the northern portion of the site of the proposed development is described in Section 7.4.2.5 *Temporary Access to Towers*.

7.4.2 Projected Traffic Generation

The proposed development, when completed will not generate traffic on a day to day basis, with the exception of infrequent, routine maintenance visits. Therefore the proposed development is considered to have no impact on traffic, once completed. However, during construction the proposed development will generate traffic on the surrounding road network. The construction of the proposed development will involve two main activities:

- Tower Construction and Overhead Lines
- Substation Construction and Underground Cabling

7.4.2.1 Substation Construction Workforce

There will be two main construction workforce teams on site during the construction, namely a civil engineering team and a mechanical and electrical engineering team. For the civil enabling works, it is anticipated that there will be between 75-100 construction workers on site. For the mechanical and electrical installation phase of the project, it is anticipated that approximately 120 construction workers will be on site. The construction duration is estimated at approximately 14 months. It is not anticipated that the peak construction period for both the civil and the electrical works will coincide, therefore a combined peak construction force of 195-220 is not likely. The following table breaks down the expected monthly allocation of construction workforce:

Table 7.2 Projected Traffic Generation – Daily Substation Construction Workforce

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14
Activity														
Civil														
Substation civil preparatory works	80	80	5											
Transformer foundation			10	10	10	10								
Equipment bases	20	20	40	40	40	20								
Buildings Construction			15	10	10									
Cable trenching			10	20	20	20								
Roads			6	6	6									
Fencing			10	10	10									
Drainage			4	4	4	4								
Install stone chippings														
Install 220 kV Cable ducts						20								
M&E														
Earthing Installation	15	15	15											
Building M&E fit out						10	10							
Install AIS Equipment				30	40	40	40	40	20					
Install Protection Panels						6	6	10						
Assemble Transformers						6	6	6	6	6	6			
Install misc cabinets						8	8	14	14	14	8			
Control cable installation							20	30	30	30	30	20		
MV Cabling								4	4	4	4	4		
Install LV equipment							8	8	16	8	8			
Erect new towers							4	8	8	8	8			
Install 220 kV Cables									10	20	20	10		
Commissioning														
Commissioning												5	20	10
Total Civil	100	100	100	100	100	74	0	0	0	0	0	0	0	0
Total M&E	15	15	15	30	40	70	102	120	108	90	84	34	0	0
Total	115	115	115	130	140	144	102	120	108	90	84	39	20	10

The above table demonstrates that Month M6 is predicted to experience the combined peak construction activities on site. The following graph in Figure 7.5 illustrates this along with a profile of total construction workforce over the 14 month construction period:

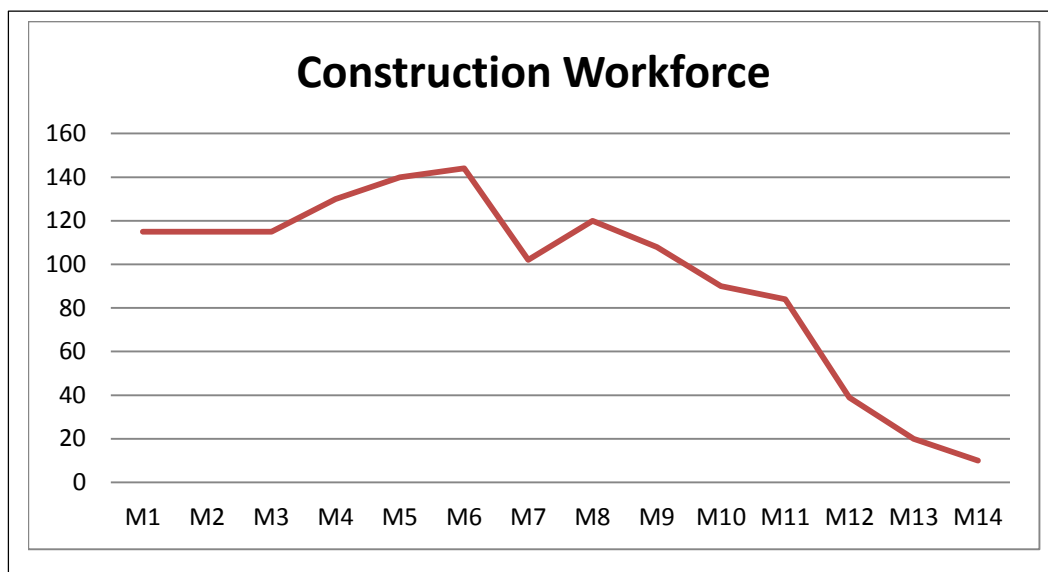


Figure 7.5 Profile of Substation Construction Workforce On-Site during Construction

The construction workers are assumed, for analysis purposes, to arrive to site in the morning and leave site in the evening. Traffic Count surveys in the vicinity of the proposed Apple Data Centre site were carried out in September 2014, and indicated that the local AM peak traffic period is 07:45 - 08:45 and that the local PM peak traffic period is 17:00 – 18:00. As part of the proposed Construction Traffic Management Plan, the main contractor will agree a construction methodology with the relevant authorities. However, in order to provide a robust assessment, it is assumed that all construction workers would arrive and depart during both the AM and the PM peak traffic periods. It is also conservatively assumed that each construction worker arrives and departs as a single occupant in a vehicle.

7.4.2.2 Substation Construction Deliveries

The following table details the projected daily deliveries of materials associated with the construction of the proposed substation, per month throughout the 14 month construction period:

Table 7.3 Projected Traffic Generation – Substation Construction Deliveries

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14
Activity														
Civil														
Substation civil preparatory works														
Stone chipping/capping layer	48	48	48	48	48	48								
Loose subsoil	32	32	32	32	32	32								
Transformer foundation			6	6	6	6								
Equipment bases		5	5	5	5	5								
Buildings Construction			5	5										
Cable trenching			4	4	4	4								
Roads			4	4	4	4								
Fencing			2	2	2	2								
Drainage			4	4	4	4								
Install 220kV Cable ducts					8	8								
M&E														
Earthing Installation	5	5	5											
Building M&E fit out					3	3								
Install AIS Equipment				5	5	3	2							
Install Protection Panels					3	3	2	2						
Assemble Transformers				5	5	2	2	1	1					
Install misc cabinets					3	3	2	1	1					
Control cable installation					3	3	2	2	2					
MV Cabling						3	3	3						
Install LV equipment						3	3	3		2	2	2	2	
Erect mast, gantries					3	2	2	1						
Install 220 kV Cables								3	3	3				
Commissioning														
Commissioning													5	5
Total Civil	80	85	110	110	113	113	0	0	0	0	0	0	0	0
Total M&E	5	5	5	10	25	25	18	16	7	5	2	2	2	0
Total	85	90	115	120	138	138	18	16	7	5	2	2	7	5

The table above predicts that months M5 and M6 will be the most intensive months for material deliveries, with a maximum of 138 HGV deliveries per day expected at peak times. It is expected that such deliveries would be distributed evenly over the course of the working day. For a 10 hour working day, this would equate to between 13 and 14 deliveries per hour.

It should be noted that when compared to the rest of the 14 month construction period, Months M5 and M6 represent the culmination of an early peak of construction-related HGV movements, which tapers off dramatically from month M7 to month M14. This is illustrated in the following graph, which shows a gradual increase in deliveries between months M1 and M5 and a large decrease in HGV deliveries between months M6 and M14.

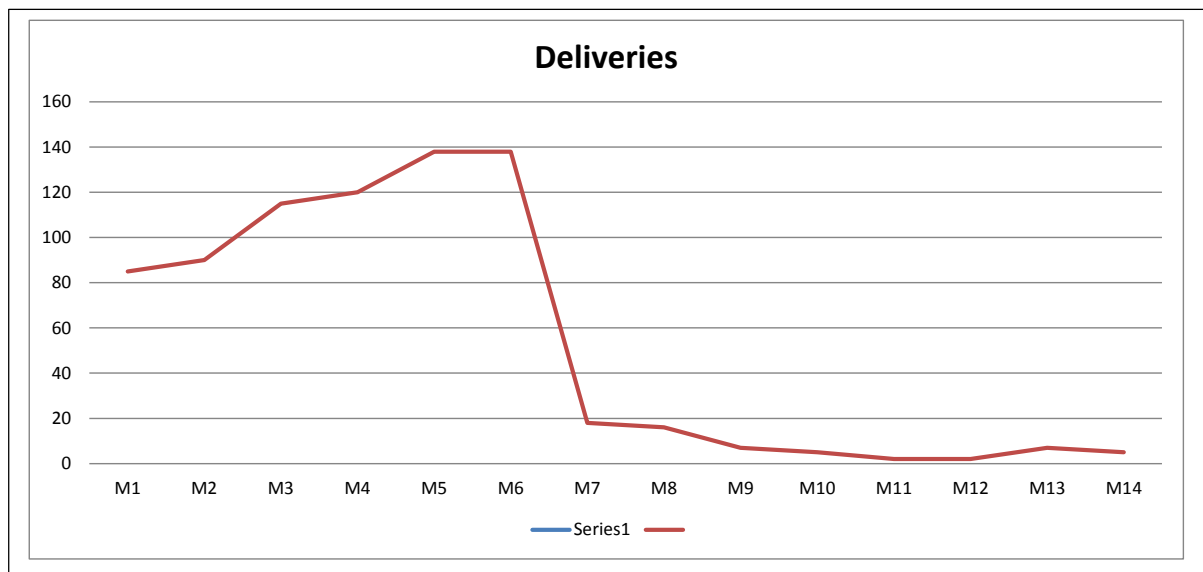


Figure 7.6 Profile of Deliveries during Substation Construction

7.4.2.3 Tower Construction Staff and Deliveries

The erection of seven new towers are proposed as part of the development. Of these seven, three new towers are proposed to the north of the existing M6 while the remaining 4 are proposed south of the M6.

The construction of each tower will necessitate the use of several different types of vehicles. The vehicles directly involved in the works include crane(s), excavators, dump trucks, 4x4s, tractor and trailers and concrete delivery vehicles. In addition, vehicles to transport construction workers to and from site will also be present.

It is anticipated that any excavated materials at each tower location will remain on-site, negating the need to haul material off-site. The volume of traffic generated for each tower will be relatively low and will be distributed over the construction duration of several weeks. **Table 7.4** below identifies the total volume of traffic expected to be generated by each tower.

Table 7.4 Project Traffic Generation – Tower Construction

Tower Type	Movements Generated		Peak Daily Movements
	LV	HV	
All	122	142	28

Construction of the towers is anticipated to be undertaken from month M7 to month M12, with commissioning taking place between months M12 and M14. As such, traffic generated by the construction of the towers will not coincide with the overall peak traffic levels of the proposed development i.e. month M6.

7.4.2.4 Abnormal Load Deliveries

The construction of the proposed substation will require the transport of abnormal load deliveries to the proposed substation site. These abnormal load deliveries are for the proposed 220/20 kV power transformers. It is expected that there will be ten of these deliveries to the substation site during the construction period. The transformers will be transported by vehicles specifically designed to cater for abnormal load deliveries.

The movement of abnormal loads are the subject of an application requesting permission to An Garda Síochána. This “Permit for Specialised Vehicles” form, when signed by An Garda Síochána’s Permits Officer, grants permission to move abnormal loads as defined under Road Traffic (Permits for Specialised Vehicles) Regulations, SI 147 of 2009, on designated inter-urban routes. Inter urban routes are identified in the Schedule of Designated Roads governed in the Road Traffic (Specialised Vehicle Permits) (Amendment) Regulations 2010. The Act states that any deviations from the Schedule of Designated Roads requires independent authorisation from the Local Authority concerned and or Minister for Transport. This subsequent process is set out under the Road Traffic (Specialised Permits for Particular Vehicles) Regulations, SI 283 of 2007.

- The anticipated route for delivery to the proposed development site is likely to be as follows. The transformers will typically be delivered through Dublin Port.
- From Dublin Port, the delivery vehicles will travel along Promenade Road and join the M50 to exit the City area via the Dublin Port Tunnel.
- On exiting the tunnel, deliveries will travel along the M50 until junction 7 (junction with the N4) where vehicles will leave the M50 and travel along the N4/M4 leaving the Greater Dublin area.
- Delivery vehicles will continue along the M4 to Junction 11 at Kinnegad and join the M6 Galway Road.
- The route will continue along the M6 to junction 19 where delivery vehicles will exit and travel along the N18 in a southerly direction to its junction with the regional road the R446 at Oranmore.
- Delivery vehicles will access the R446 and travel in an easterly direction, then veering left to the R348 at Derrydonnell arriving at the site entrance.

The maximum height of the delivery vehicle (including the transformer) will be 4.65 metres which will ensure that there are no clearance restrictions associated with its transit that may prevent usage of the anticipated route from the Dublin Port Tunnel or overhead signage/gantries along the route. The maximum load per axle will be 10 tonnes to ensure that the weight is appropriately spread across the entire trailer and within acceptable load thresholds.

Post the statutory approval process for the proposed development, the route for delivery of abnormal loads will be confirmed under the legal framework of the statutory instrument, SI 283 of 2007. As part of this process a detailed report will be undertaken by the appointed Contractor in consultation with all relevant local authorities and An Garda Síochána which will stipulate the following:

- Intended route to site including identification of all road networks to be used and clearly stating the intention to make abnormal load deliveries during the night (mitigating against day time traffic impacts).
- A general assessment of the route corridor to identify the general condition and structural survey of all the roads, bridges and culverts along the transportation route, prior to any construction taking place. The survey will be undertaken in consultation with Transportation Infrastructure Ireland (TII) and all relevant local authorities.
- Upon agreement of the above, details of the identified pull-in lay-bys for overtaking of slow moving vehicles will be agreed.
- Should there be a requirement to make any changes to existing infrastructure; permission will be sought from the relevant bodies.
- A Construction Traffic Management Plan (CTMP) will be implemented during the construction stage of the proposed development. The CTMP will ensure that potential impacts resulting from construction traffic, including the delivery of abnormal load deliveries, are kept to a minimum at all times.

7.4.2.5 Temporary Access to Towers

In order to carry out temporary works required at the OHL towers, located to the north and south of the existing M6 motorway, temporary access to these towers will be required. Access points have been identified and are indicated in **Figure 7.2** above.

To the north of the existing M6, access to the towers will be gained via an existing farm access located on the local road connecting Athenry Golf Club to the L3103 via the overbridge with the M6 at Caraunduff. Some minor works, including the installation of a new gate are proposed.

To the south of the existing M6, access to each of the towers is proposed via the data centre site access junction located on the R348.

Temporary access tracks to each of the towers are proposed. These temporary access tracks may vary in type having regard to land conditions, use and specific environmental conditions. Details on the types of access tracks proposed are contained in **Section 4** of this Environmental Impact Statement.

Construction traffic associated with the proposed overhead lines, shall be relatively minor and of short duration. This work can be broken down into five general stages:

- Stage 1 – Preparatory Site Work (1 – 7 days);
- Stage 2 – Tower Foundations; standard installation (3 – 6 days),
- Stage 3 – Tower Assembly and Erection and Preliminary Reinstatement (3 – 4 days);
- Stage 4 – Conductor / Insulator Installation (7 days); and
- Stage 5 – Final Reinstatement of Land (1 – 5 days).

7.4.2.6 Peak Development Traffic Generation

It can be seen from the previous sections that the peak traffic generated by the proposed power supply development will occur during month M6 of the 14 month construction period. In month M6, traffic generation will occur on the southern portion of the site only as construction work on the towers is scheduled to begin in month M7. The total peak traffic for the proposed development, in month M6 is detailed below in **Table 7.5**, for both the AM and PM peak hours:

Table 7.5 Peak Traffic Generation for Proposed Development

Type	Peak Period			
	AM 07:45-08:45		PM 17:00-18:00	
	IN	OUT	IN	OUT
Construction Workers	144	0	0	144
Construction Deliveries	14	14	14	14
Total	158	14	14	158

7.5 Other Developments in the Vicinity

For the purpose of this assessment, it is assumed that the following activities and developments will be present on the local road network and have been assessed as part of a cumulative impact assessment in conjunction with the proposed development:

- M17/M18 under construction. This project is currently under construction.
- Data Centre 1 under construction.
- Data Centre 1 open and operational.
- Further Data Halls under construction.
- Amenity Walk users

Due to the nature of the proposed power supply development and the necessity for the proposed development to be completed prior to the proposed Data Centre Hall 1 becoming fully operational, three scenarios to assess the cumulative impact of all developments were examined. The programme of works required to realise all four options listed above restricts the possibility of these options all occurring simultaneously. For example the peak construction traffic and the peak operational traffic for the Data Centre Phase 1 cannot occur simultaneously. Similarly, peak construction traffic for future data halls will not occur until the proposed power supply development is completed. **Table 7.6** below details the developments considered in each of the three scenarios:

Table 7.6 Analysed Cumulative Development Scenarios

Assessment Scenario	Proposed Power Supply Development Construction	Data Centre Phase 1 Construction	Data Centre Phase 1 Operational	M17/M18 Construction	Further Data Centre Construction	Amenity Walk Users
2017 – Do Nothing	x	x	x	✓	x	x
2017 – Proposed Development Under Construction	✓	✓	x	✓	x	x
Post Power Supply Construction Scenario	x	x	✓	✓	✓	✓

The “2017 – Do Nothing” scenario only considers the impact of predicted background traffic volumes in conjunction with construction traffic generated by the construction of the M17/M18 road scheme (which is currently under construction). This is considered to be the base scenario and is used as a comparison to the proposed power supply development and the proposed Apple data centre phase 1 construction scenario in order to assess the relative cumulative impact on the road network.

The “2017 – Proposed Development Under Construction” scenario includes peak traffic expected to be generated by the proposed power supply development construction, peak traffic expected to be generated by the proposed Apple data centre Phase 1 construction and construction traffic generated by the ongoing M17/M18 road scheme.

The “Post Power Supply Construction Scenario” includes traffic anticipated to be generated by the Apple data centre Phase 1 workforce, construction traffic generated by the on-going M17/M18 road scheme, peak construction traffic anticipated to be generated by the construction of potential future data halls and amenity walk users accessing the proposed car-park. The proposed power supply development will not generate traffic on a daily basis once it is completed and operational and therefore no traffic associated with the proposed power supply development is considered in this scenario.

7.5.1 M17/M18

The most significant major infrastructural project in the vicinity of the proposed development site is the M17/M18 Gort-Tuam motorway (currently under construction). The scheme, which forms part of the Atlantic Road Corridor, consists of 57 km of motorway/dual carriageway. The scheme commences at the northern extremity of the M18 Gort-Crusheen scheme and extends in a northerly direction with junctions at Kiltiernan (connecting to the N67), at Rathmorrisy (connecting to the M6 Galway-Kinnegad route), at Annagh Hill (connecting to the N63), and at Tuam (connecting to the existing N17). The scheme is broken down

into a number of phases, of which the Oranmore-Gort phase is the most relevant to the proposed site.

The alignment of the M17/M18 route will be immediately adjacent to the boundary of the proposed development. Cabling between pylons P4 and P5 and also between pylons P6 and P7, pass over the proposed slip roads at the Rathmorrissy Interchange. The Rathmorrissy interchange will be a junction of the new M17/M18 and the M6, and will be located to the east of the proposed site. The M17/M18 will pass over the R348 Athenry Road to the east of the subject site. Traffic using the M17/M18 that wishes to access the proposed site will continue to do so via the M6 interchange at Athenry and access the site via the R348. This scheme is currently under construction with a projected completion date in Q4 2017/Q1 2018.

As part of the construction phase for the M17/M18, a portion of construction material may be transported using the local road network in the vicinity of the proposed development site. It is envisaged that this will be primarily via the R446. However the R348 has also been identified as a potential alternative haul route for materials to and from the M17/M18 route. It is estimated in the Environmental Impact Statement for the motorway scheme that the HGV traffic on the local road network in the vicinity of the proposed sub-station site will be approximately 90 deliveries per day.

Although the Environmental Impact Statement for the M17/M18 scheme does not commit to use of the R348 for construction haulage, there will be an overbridge constructed over the R348 to the south-east of the proposed development site. Therefore, for the purpose of this assessment, it has been assumed that the R348 will be in use as a route for construction traffic associated with the motorway scheme, and that 90 HGV deliveries per day will be present on the R348 passing the site. Similar to construction traffic generated by the proposed development, it is assumed that this traffic will be distributed over the working day. As such 10 HGV movements per direction on the R348 passing the site access junction, during the AM and PM peak hours has been assumed.

7.5.2 Apple Data Centre Phase 1 Construction

The proposed power supply development is partially located on the site of a proposed Apple Data Centre (which is currently under planning appeal). Should the proposed power supply development be granted planning permission, it will be constructed in tandem with the proposed Apple Data Centre Phase 1. The Environmental Impact Statement for the proposed Apple Data Centre Phase 1 anticipates a maximum of 300 construction workers on site at peak construction periods. It also anticipates that 100 HGV construction deliveries will be generated per day. The EIS makes the assumption that all construction workers will arrive on site during the AM peak hour and depart the site during the PM peak hour. In order to carry out a robust assessment, it is assumed that each worker arrives and departs in their own vehicle. Of the HGV traffic anticipated to be generated by the Apple Data Centre Phase 1, it is assumed that these shall be evenly distributed over the working day, this equates to 10 HGV arrivals and departures per peak

hour. **Table 7.7** below presents the traffic anticipated to be generated by the proposed Apple Data Centre Phase 1:

Table 7.7 Projected Traffic Generation -Apple Data Centre Phase 1 Construction Phase

AM PEAK 07:45-08:45	Inbound	Outbound	Total
Construction Workers	300	0	300
Construction Materials	10	10	20
PM PEAK 17:00-18:00	Inbound	Outbound	Total
Construction Workers	0	300	300
Construction Materials	10	10	20

7.5.3 Apple Data Centre Phase 1 Complete and Operational

Unlike the proposed development, which will not generate traffic post-construction, the proposed Apple Data Centre Phase 1 will generate traffic when open and operational due to the presence of staff working at the Data Centre. It is expected that a workforce of 150 people shall be present when the facility is fully operational. The number of workers on site will remain at 150 should the seven further data halls be constructed.

The 150 workers at the proposed Apple data centre will cater for a 24 hour operation at the facility and it is projected that a certain proportion of workers will arrive and depart the facility outside the local peak traffic periods. **Table 7.8** below presents the projected arrivals and departures profile for Data Centre 1 workers during the local peak traffic periods:

Table 7.8 Projected Traffic Generation – Apple Data Centre Operational Phase

AM PEAK 07:45-08:45	Inbound (60%)	Outbound (20%)	Total
Total Staff = 150	90	30	120
PM PEAK 17:00-18:00	Inbound (20%)	Outbound (60%)	Total
Total Staff = 150	30	90	120

7.5.4 Further Data Hall Construction

The proposed data centre, which is currently under planning appeal is proposed to be the first phase of a multi-phase development. It is anticipated that up to 8 data halls in total may be developed over the duration of the masterplan for the Apple data centre site. In order to undertake a robust assessment of any potential cumulative traffic impacts, the scenario in which the construction of the power supply development and Phase 1 of the Data Centre are complete has been examined, which assumes that construction works associated with further data halls will be on-going during the operation of the Apple Data Centre Phase 1. As the Apple data centre Phase 1 cannot become fully operational until such time as this proposed power supply development is completed, the construction of any potential future data halls will not begin prior to the proposed power supply project being operational.

Assumptions regarding the volume of construction-related traffic were taken from the Environmental Impact Statement prepared with the planning application for the proposed Apple data centre. As with the traffic generation calculated for the construction of the proposed Apple data centre Phase 1, very robust assumptions have been made to assess capacity which include all construction workers arriving to site during the AM peak hour and all construction workers departing the site during the PM peak hour. In order to account for construction materials, 10 HGV arrivals and departures during the AM and PM peak hours have been assumed.

Table 7.9 below details the construction traffic which may be generated by further data-centre construction.

Table 7.9 Projected Traffic Generation – Future Data Hall Construction Phase

AM PEAK 07:45-08:45	Inbound	Outbound	Total
Construction Workers	300	0	300
Construction Materials	10	10	20
PM PEAK 17:00-18:00	Inbound	Outbound	Total
Construction Workers	0	300	300
Construction Materials	10	10	20

7.5.5 Amenity Walk Users

An amenity walk which currently exists within the proposed Apple data centre Phase 1 site is to be maintained. A total of 29 parking spaces are proposed to be provided in a dedicated area inside the site, north of the junction with the R348 as part of the proposed Apple Data Centre Phase 1 development. In this assessment, it has been assumed that 10 of the parking spaces are occupied with arrivals during the AM Peak, and 10 vehicles depart during the PM Peak. The origins and

destinations of this traffic has been assumed to be the same as that used for staff at the site. During the construction stages of the proposed power supply development and the Apple data centre Phase 1, this amenity walk car-park will not be available to amenity walk users. It should be noted that the amenity walk is in use at present, and is therefore included in background traffic, and the assessment accounts for a transfer of this existing traffic to the proposed site access junction.

7.6 Combined Traffic Generation

The three scenarios considered were as follows:

- 2017 – Do Nothing
- 2017 – With Proposed power supply project and Data Centre Phase 1 under construction
- “Post Construction Scenario” – Construction of the proposed power supply and data centre Phase 1 completed, data centre Phase 1 operational, further data halls under construction and amenity walk users accessing the car-park.

The combination of developments considered in each scenario is presented in **Table 7.6**. The combined traffic volumes anticipated to be generated in each scenario for the AM and PM peak hours are presented below in **Table 7.10** and **Table 7.11**.

Table 7.10 Combined Traffic Generation AM Peak Hour

Assessment Scenario	Proposed Power Supply Development Construction		Data Centre Phase 1 Construction		Data Centre Phase 1 Operational		M17/M18 Construction Vehicles		Further Data Centre Construction		Amenity Walk Users		TOTAL (vehicles)
	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	E/B	W/B	Arr.	Dep.	Arr.	Dep.	
2017 – Do Nothing	-	-	-	-	-	-	10	10	-	-	-	-	20
2017 – Proposed Power Supply and data centre Phase 1 Under Construction	158	14	310	10	-	-	10	10	-	-	-	-	512
“Post Construction” Scenario	-	-	-	-	90	30	10	10	310	10	10	0	470

Table 7.11 Combined Traffic Generation PM Peak Hour

Assessment Scenario	Proposed Power Supply Development Construction		Data Centre Phase 1 Construction		Data Centre Phase 1 Operational		M17/M18 Construction Vehicles		Further Data Centre Construction		Amenity Walk Users		TOTAL (vehicles)
	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	E/B	W/B	Arr.	Dep.	Arr.	Dep.	
2017 – Do Nothing	-	-	-	-	-	-	10	10	-	-	-	-	20
2017 – Proposed Power Supply and data centre Phase 1 Under Construction	14	158	10	310	-	-	10	10	-	-	-	-	512
Post Construction Scenario	-	-	-	-	30	90	10	10	10	310	-	10	470

It can be seen from the tables above, the worst case scenario in relation to traffic generation occurs when the proposed development and the Apple data centre Phase 1 are simultaneously under construction. This scenario is further analysed in **Section 7.7**.

7.6.1 Annual Average Daily Traffic

In addition to the peak hour traffic assessments, a further calculation of Annual Average Daily Traffic (AADT) on the surrounding road network links was undertaken for the purposes of noise and air quality impact assessment in **Chapters 8 and 9** respectively. These AADT volumes, are presented in **Chapter 8**.

AADT was calculated using the methodology contained in Transport Infrastructure Ireland's (TII, formerly NRA) '*Project Appraisal Guidelines, Unit 16.2 Expansion Factors for Short Period Traffic Counts*'. This process involved applying factors to expand the 6 hour traffic survey to a 24 hour survey based on the geographical location of the proposed development. This daily traffic was further adjusted to account for the day of the week the surveys were carried out and the month in which the surveys were completed. Finally, a growth factor was applied to the 2014 AADT for future year assessments in accordance with the procedure outlined in **Section 7.3.5**.

It should be noted, when calculating AADT for future year cumulative impact assessments, amenity walk users are already included in background traffic growth, as this is an existing amenity site. The transfer of these users from the existing Amenity Walk access to the proposed development site does not constitute an increase in AADT.

7.6.2 Construction Material/Haulage

It has been assumed for this assessment that the local roads, including the L3104, will not be used for the haulage of materials. Instead the regional and national roads such as the R348, R446, N18 and M6 will be used. This is consistent with the current 10-tonne weight restriction in place on the L3104. This restriction will also be contractually imposed on the contractors at the construction stage. For the purposes of this assessment, it has been assumed that 70% of construction materials will arrive and depart on the R446 while the remaining 30% of HGV traffic generated shall arrive from and depart towards Athenry. This is based on the most likely haul routes to and from the site given probable sources of materials. Should the power supply development be granted planning permission, prior to construction beginning, a Construction Traffic Management Plan will be prepared by the appointed Contractor and agreed with Galway County Council.

7.6.3 Workforce Traffic Generation/Distribution

Workforce traffic trips to and from site (for construction workers and future operation workers for the proposed Apple data centre Phase 1) have been distributed based on the following assumptions:

- 50% of the arriving staff traffic in the AM will be from the west, i.e. Galway City
 - Of this 50%, it is assumed that 10% will use the M6 and route back to the site from the Athenry interchange; the remaining 40% will use the local road network and the N18, R446, etc.
- 20% of the arriving staff traffic in the AM will be from the south, i.e. Kilcolgan, Craughwell, Gort, etc.
 - Of this 20%, it is assumed that 5% will use the R446 and the R348 to access the site; the remaining 15% will use the R446 and L3104 to access the site.
- 30% of the arriving staff traffic in the AM will be from the east, i.e. Athenry, Ballinasloe, Athlone, Loughrea, etc.
 - Of this 30%, it is assumed that 10% will route through Athenry town from the wider area and then join the R348 at the Prospect Roundabout (Site 2 in Figure 7.3 above), and the other 20% will use the M6 from the east (Ballinasloe and Loughrea, etc.) to travel to the Athenry Interchange, leave the M6 and then join the R348 at the Prospect Roundabout.

Therefore, at the proposed site access point on the R348, it is assumed that 45% of the traffic will come from the west (40% from Galway and 5% from the south) and 55% will come from the east (15% from the L3104, 30% from the east, and 10% from Galway using the M6 to Athenry).

In the PM peak, the traffic exiting the development site is assumed to return following the same profile as the AM arrivals. **Table 7.12** below shows the proposed arrival and departure profiles for traffic generated by the proposed power supply development (workforce and construction materials).

Table 7.12 Traffic Distribution to/from proposed power supply development

Origin	Peak Period			
	AM 07:45-08:45		PM 17:00-18:00	
	IN	OUT	IN	OUT
R446 Derrydonnell Cross	75	10	10	75
L3104 Moyvilla Cross	22	0	0	22
R348 Athenry	62	4	4	62
Total	159	14	14	159

The distribution of cumulative traffic anticipated to be generated in the worst case scenario i.e. M17/M18 under construction, Apple data centre Phase 1 under construction and the proposed power supply under construction is presented below in **Table 7.13**

Table 7.13 Traffic Distribution of cumulative development

Origin	Peak Period			
	AM 07:45-08:45		PM 17:00-18:00	
	IN	OUT	IN	OUT
R446 Derrydonnell Cross	227	27	27	227
L3104 Moyvilla Cross	67	0	0	67
R348 Athenry	195	17	17	195
Total	489	44	44	489

It should be noted that traffic generated by the construction of the M17/M18 will pass by the proposed site access and is therefore included at both the R446 Derrydonnell Cross and the R348 to Athenry link. The traffic distribution above has been assessed using junction modelling software, the results of which are presented in **Section 7.7**.

7.7 Potential Impacts of the Proposed Development

7.7.1 General

Traffic volumes at the key junctions in the vicinity of the proposed power supply project have been increased using the following growth factors to account for background traffic annual growth in the years between 2014 (when traffic surveys were undertaken) and 2017 (when the peak construction period is anticipated), in accordance with growth rates for the Galway City and County area as set out in the Transport Infrastructure Ireland (TII, formerly NRA) *'Project Appraisal Guidelines, Unit 5.5: Link-Based Traffic Growth Forecasting'*:

- 2014-2017 – Light Vehicle (LV) Traffic by 3.6% and Heavy Vehicle (HV) Traffic by 2.1%

This section of the report presents the assessment of the local road network and junction assessments of the critical junctions in the vicinity of the proposed power supply development. The following potential impacts represent the worst case in the absence of mitigation.

7.7.2 Assessment Methodology

For the purpose of this chapter, the following assumptions have been made with regard to traffic flows outlined above in **Section 7.6**:

- In 2017, construction of the proposed power supply and on the M17/M18 upgrade scheme will be at its peak.
- In 2017 the proposed Apple data centre (Phase 1) is expected to be under construction and up to 300 construction workers are anticipated to be present on site.

The proposed power supply development site access, the R348/R446 junction at Derrydonnell Cross, the R348/L3104 junction at Moyvilla Cross and the Prospect Road Roundabout Junction were evaluated using **Junctions 9** assessment software which is part of the suite of programmes developed by TRL (Transport Research Laboratory). The results presented show the 'ratio of flow to capacity' (RFC) value for the junctions, and the estimated 'Mean Maximum Queue' (MMQ) to be expected at the junctions.

The RFC ratio represents the amount of traffic a junction is currently carrying as a portion of its overall carrying capacity – an RFC value of 100% would indicate that a junction is carrying 100% of the traffic it can possibly carry. Typically RFC values above 85% would indicate that a junction is approaching its operating capacity; at RFC values above 90% the junction may still operate, but traffic flow is likely to become unstable and may develop queuing and delay.

The following shows the increase in two-way link flows on the surrounding road network in 2017 as a result of the proposed power supply development and the cumulative increase taking account of other proposed and on-going developments:

Table 7.14 Two-Way Traffic Flows on surrounding road network

	Peak Period					
	AM 07:45-08:45			PM 17:00-18:00		
	Without	With Power Supply Development	With Cumulative Development (Power Supply construction, + Data Centre Phase 1 Construction +M17/M18 Construction)	Without	With Power Supply Development	With Cumulative Development (Power Supply construction, + Data Centre Phase 1 Construction +M17/M18 Construction)
R446 north of R348	800	866 (+8%)	998 (+25%)	834	900 (+8%)	1032(+24%)
R446 south of R348	622	640 (+3%)	671 (+8%)	671	689 (+3%)	720(+7%)
L3104	111	133 (+20%)	178 (+60%)	94	116 (+23%)	161(+71%)
R348	275	341 (+24%)	473 (+72%)	315	381 (+21%)	513(+63%)
M6 North West of Athenry Interchange	1142	1159 (+1.5%)	1191 (+4.3%)	1151	1168 (+1.5%)	1200 (+4.3%)
M6 South East of Athenry Interchange	975	1007 (+3.2%)	1069 (+9.6%)	858	890 (+3.7%)	952 (+10.9%)

7.7.3 Junction Assessment - Proposed Power Supply and Data Centre Site Access

The proposed power supply development is anticipated to take approximately 14 months to construct. As indicated in **Section 7.4.2** the peak traffic generation arising from the construction of the proposed power supply development will occur in Month M6 of the construction programme. Month M6 is expected to fall in 2017. In order to assess the worst case cumulative impact of the proposed power supply development in conjunction with other developments, it is assumed that the construction of the proposed Apple data centre Phase 1 will also be at peak construction simultaneously with the proposed power supply development. Additionally, it is assumed that the construction of the M17/M18 will be concurrently on-going in 2017 and has been incorporated into the 'Do Nothing' scenario.

During construction in 2017, access to and from the site of the proposed power supply development (south of the M6) will be via the R348. It is proposed to construct a right hand turn lane on the R348 to serve the proposed Apple data centre (Phase 1). In the 'Do Nothing' scenario, this proposed site access junction will not exist. In the 'With Cumulative Development' scenario, access will be for construction workers and materials for the Apple data centre Phase 1 and

construction workers and construction materials for the proposed power supply development. M17/M18 construction traffic has been included on the R348 mainline flow, as the M17/M18 will be under construction at the same time.

Table 7.15 below shows the results of the scenarios outlined above, for the AM and PM Peaks, respectively. The results are presented for the highest RFC and queue values estimated by PICADY, as opposed to presenting results for all arms of the junction.

Table 7.15 Proposed Data Centre Development Site Access – Junction Assessment Results

SCENARIO	AM (07:45-08:45)		PM (17:00-18:00)	
	Maximum RFC (%)	Max Queue (veh)	Maximum RFC (%)	Max Queue (veh)
2017 Do Nothing	-	-	-	-
2017 With Cumulative Development	48	0.9	80	3.7

The above results indicate that the proposed junction at the site access has sufficient capacity to accommodate the anticipated peak traffic flows. The 2017 ‘With Cumulative Development’ scenario shows the highest RFC and queue values occur in the PM Peak. It can be seen that the junction will perform satisfactorily, with minimal queuing observed. As demonstrated in Section 7.5, the ‘2017 With Cumulative Development’ represents the worst case traffic generation scenario anticipated for all proposed and potential scenarios examined.

7.7.4 Junction Assessment – Derrydonnell Cross (R446/R348 junction)

The junction layout at Derrydonnell Cross is not a typical priority junction, as it has a dedicated left-slip lane provided from the R446 to the R348. The left-turning traffic can therefore use the left-slip lane, or simply continue to the junction and turn left there. However, for the purpose of this assessment, the junction has been assessed as a standard T-junction, in order to ensure a robust assessment and to account for any potential works or incidents, etc. that may render the left-slip lane inoperative.

Two scenarios were modelled for the Derrydonnell Cross junction, namely the ‘2017 Do Nothing’ and ‘2017 With Cumulative Development’. These scenarios were modelled for both the AM and PM peak hours.

Table 7.16 below shows the results of the PICADY assessment for the R446/R348 junction at Derrydonnell Cross.

Table 7.16 R446/R348 Derrydonnell Cross – Junction Assessment Results

SCENARIO	AM (07:45-08:45)		PM (17:00-18:00)	
	Maximum RFC (%)	Max Queue (veh)	Maximum RFC (%)	Max Queue (veh)
2017 Do Nothing	36	0.6	22	0.3
2017 With Cumulative Development	43	0.7	79	3.4

It can be seen in the results above that the R446/R348 junction at Derrydonnell Cross is capable of accommodating the additional traffic flows anticipated from the proposed development in conjunction with other proposed developments. As expected, the 2017 ‘With Cumulative Development’ scenario is the most intensive in terms of traffic flow, however a mean-maximum queue of only 3 vehicles is observed. This queue relates to the R348 entering onto the R446.

7.7.5 Junction Assessment – Moyvilla Cross (R348/L3104 junction)

Moyvilla Cross is a simple T-junction between the regional road R348 and the local road L3104. Similar to the previous junction, two scenarios were modelled for both the AM and PM peaks.

Table 7.17 below shows the results of the PICADY assessment for the R348/L3104 junction at Moyvilla Cross.

Table 7.17 R348/R446 Moyvilla Cross – Junction Assessment Results

SCENARIO	AM (07:45-08:45)		PM (17:00-18:00)	
	Maximum RFC (%)	Max Queue (veh)	Maximum RFC (%)	Max Queue (veh)
2017 Do Nothing	15	0.2	12	0.1
2017 With Cumulative Development	30	0.4	14	0.2

It can be seen in the results above that the R348/L3104 junction at Moyvilla Cross has sufficient capacity to accommodate all traffic flow increases associated with the proposed development in conjunction with other proposed developments.

7.7.6 Junction Assessment – Prospect Road Road Roundabout Junction

In line with the assessments undertaken for the Derrydonnell Cross and Moyvilla Cross junctions, the Prospect Road roundabout was assessed for the 2017 ‘Do Nothing’ and ‘With Cumulative Development’ scenarios. The junction was analysed using ARCADY, an assessment program similar to PICADY which is

used for analysis of roundabout junctions and which is part of the suite of programmes used by Junctions 9.

Table 7.18 below shows the results of the ARCADY assessment at the Prospect Road roundabout junction.

Table 7.18 Prospect Road Roundabout – Junction Assessment Results

SCENARIO	AM (07:45-08:45)		PM (17:00-18:00)	
	Maximum RFC (%)	Max Queue (veh)	Maximum RFC (%)	Max Queue (veh)
2017 Do Nothing	13	0.1	13	0.1
2017 With Cumulative Development	16	0.2	25	0.3

It can be seen in the above table that the Prospect Road Roundabout junction is more than capable of accommodating the additional traffic flows associated with the construction of the proposed development in conjunction with the construction of other proposed developments.

7.7.7 Junction Assessment Summary

It is clear from the analyses undertaken above that all of the junctions assessed have sufficient capacity to accommodate the proposed power supply development, with RFC values and queue lengths all seen to be satisfactory.

As the construction of the proposed power supply development is expected to occur over a 14-month period, the most intensive periods at all junctions assessed will be during the construction phases in 2017, when construction workers and materials for the Apple data centre Phase 1 and construction workers and haulage for the proposed power supply development will all be present on site. However, at all of the junctions assessed, there is sufficient spare capacity and minimal queuing observed during this worst case cumulative impact scenario.

As the proposed power supply development will not generate traffic once completed, due to the nature of the development, the peak cumulative traffic impact arising from the proposed power supply development in conjunction with other proposed and potential developments (construction of the data centre Phase 1 and construction of the M17/M18 road scheme) is anticipated to be Month 6 of the construction programme. The results of the junction modelling exercise demonstrate that the surrounding road network has sufficient capacity to accommodate the peak cumulative traffic anticipated to be generated. Notwithstanding this, in order to minimise any traffic impact associated with the proposed development, some simple mitigation factors have been identified in **Section 7.9** which will reduce the impact the proposed development may have on the surrounding road network.

7.7.8 Do Nothing Scenario

In the assessment scenarios set out above, in **Tables 7.15, 7.16, 7.17 and 7.18** for the junctions at the Development Site Access, Derrydonnell Cross, Moyvilla Cross and the Prospect Road Roundabout junction respectively, the operating performance results for the junctions are presented for the 2017 ‘Do Nothing’ scenario. This set of results represents the current operation of the junctions with anticipated background traffic growth and construction traffic associated with the M17/M18.

Traffic growth from 2014 to 2017 will be 3.6% for Light Vehicles and 2.1% for heavy vehicles. The resultant background traffic, when increased by these proportions, and including construction traffic generated by the M17/M18 road scheme, will have a negligible impact on the junction operation at these locations. In the ‘Do Nothing’ scenario, without the proposed development in place, traffic growth on the surrounding road network will not adversely impact the operating capacity of these junctions.

7.8 Cumulative Impacts

For the purpose of this study, a number of possible coincidental traffic flows have been collectively assessed where appropriate, in order to ensure that the cumulative impacts associated with these traffic flows operating collectively have been examined. The various separate traffic flows included in this assessment are as follows:

- Peak construction traffic associated with the proposed power supply development, including the haulage of construction materials to the site, the removal of trees, earth, etc. associated with site clearance, and the movements of construction-related workers to and from the site.
- Construction traffic associated with the proposed Apple data centre Phase 1.
- Operational traffic associated with the proposed Apple data centre Phase 1, comprising the movements of staff to and from the site.
- Construction traffic associated with the M17/M18 scheme, comprising traffic flow along the R348 road which fronts the proposed development site, passing the site entrance en route to the M17/M18 mainline.
- Construction traffic associated with any potential future data centres. The masterplan for the proposed site anticipated that up to 8 data centres could be constructed over a 10 – 15 year period, subject to planning permission being obtained for each.
- Amenity walk users anticipated to access the proposed car-park upon Apple data centre phase 1 becoming operational.

Table 7.6 identifies the potential combinations of cumulative development which may occur. As this proposed power supply development will only be required in the event that the proposed Apple data centre proceeds, the 2017 scenario which examines the proposed power supply development also includes the peak construction traffic which will be generated by the Apple data centre Phase 1.

It has been identified that the construction of further potential data halls (which will be subject to planning permission) will not proceed in the absence of the proposed power supply development having been constructed. It has also been identified that this proposed power supply development, once constructed will not generate additional traffic on the surrounding road network.

As the proposed power supply development, during construction, is anticipated to generate a larger volume of traffic than the proposed Apple data centre Phase 1 when open and operational, the worst-case cumulative impact identified for the proposed development and other proposed or potential developments was the combination of the following proposals occurring simultaneously:

- The proposed power supply development under construction.
- The proposed Apple data centre Phase 1 under construction.
- The M17/M18 road scheme under construction.

This worst-case scenario was identified as ‘2017 Cumulative Development’ and was the scenario modelled and analysed in the previous section. The results of the analyses demonstrated that the surrounding road network has sufficient capacity to accommodate the traffic volumes anticipated to be generated by all cumulative development.

7.9 Mitigation Measures

7.9.1 General

While the analyses undertaken in this assessment show that the surrounding road network is capable of accommodating the anticipated traffic flows associated with this proposed power supply development, a number of additional measures have been included within the overall scheme design and operational setup to minimise the potential impact of traffic flow on the adjacent road network during the construction phase. These are described in the following sections.

7.9.2 Proposed Right Hand Turn Lane

As outlined elsewhere in this EIS, a ghost island right hand turn facility is proposed to be constructed on the R348 to access the proposed site. This junction forms part of the Apple data centre Phase 1 planning application. The right hand turn lane will be designed in accordance with the requirements in the NRA DMRB Document TD41-42/11. The right hand turn lane will maximise the capacity of the junction by offering sufficient carriageway space for vehicles to access the site without leading to any delay for through traffic on the R348 mainline. The right hand turn lane will be constructed on the R348 at the outset of the construction of the proposed Apple data centre Phase 1, in order to minimise the impact of construction traffic on the R348. As can be seen in the analysis above, queuing will not cause a significant impact.

A Stage 1 Road Safety Audit was undertaken as part of the Apple data centre Phase 1 planning application. This was carried out for the proposed entrance to

the site on the R348. The audit acknowledged the proposed right-turn lane to the site and that full visibility can be achieved to and from the R348. It should be noted that Galway County Council's planning grant for the Apple Data Centre (under appeal) has conditioned that a Stage 2 and a Stage 3 road safety audit be undertaken at the appropriate intervals as the data centre progresses.

7.9.3 Construction Traffic Management Plan

While construction staff and haulage/materials vehicles have been included in the analyses undertaken in this assessment, all proposals for construction-related activity will be developed and agreed with Galway County Council in advance of commencement of works on site.

As set out in **Section 7.6.1** above, HGV traffic associated with the construction of the proposed power supply scheme will be restricted to using specific routes in the surrounding road network, and will not be permitted to use the local lower order roads such the L3104 route to Clarinbridge for example, with the exception of material deliveries to the towers located to the north of the M6, which will be required to utilise some sections of the local road network. Local routes which may be used for construction traffic will be agreed with Galway County Council as part of the Construction Traffic Management Plan.

In order to mitigate against any degradation to the local roads which may be required for temporary access to the towers to the north of the existing M6, it is proposed that prior to commencement of the proposed development, the appointed Contractor in conjunction with Galway County Council will complete a pre and post construction, visual inspection of the local road network. Should any degrading of the road surface be observed as a result of the proposed development, this will be made good to the satisfaction of Galway County Council.

7.9.4 Consultation with TII PPP Contractors

It is acknowledged that the works will be undertaken adjacent to the existing M6 Motorway and the under-construction M17/M18 Motorway. It is anticipated that the M17/M18 will be completed in Q4 2017/Q1 2018 and therefore will still be under construction when the construction of the proposed power supply development commences. In light of this, all traffic management will be co-ordinated in due course with the existing contractors for the M17/M18 and the contractor for the proposed power supply development, once appointed.

Chapter 4 of this EIS identifies the proposed construction methodologies for the construction of the overhead lines across the existing M6 Motorway. There have been initial meetings with Galway County Council and Transport Infrastructure Ireland (TII) in relation to the proposed works and liaison with Galway County Council and the TII PPP Company will continue in order to finalise an agreed strategy for the execution of the works prior to the proposed works commencing. Additionally, prior to works commencing, an application in accordance with Section 53 of the Roads Act, 1993 will be made to Transport Infrastructure Ireland (TII) seeking consent to carry out works over a motorway.

7.10 Residual Impacts

7.10.1 Residual Impact on the Capacity of the Regional Road Network

As discussed in **Section 7.4.2**, the proposed power supply development is anticipated to generate negligible traffic when operational. This is due to the nature of the proposed development. Therefore any impacts to the capacity of the regional road network resulting from the proposed development will be for the duration of the construction phase only and no residual impact is anticipated.

During the construction stage, the regional road network has sufficient capacity to accommodate the volume of traffic anticipated to be generated by the proposed power supply project. In the worst case 'cumulative development' scenario, the regional road network has sufficient capacity to accommodate the volume of traffic anticipated to be generated by the proposed development together with other proposed and on-going developments.

7.10.2 Residual Impact on the National Road Network

Section 7.7 identifies the potential impact that the proposed power supply development works may have on the capacity of the road network. It is clear from this analysis, that the largest impact will occur at the exit from the development site on the R348 and that the scale of the impact will be diluted as traffic disperses to and from the site on the regional road network. While the trip distribution profile presented in **Table 7.12 and Table 7.13** identifies that some construction traffic is distributed toward the M6 Junction 17 Interchange, **Table 7.18** demonstrates that the Prospect Road Roundabout, en route to and from Junction 17, has significant spare capacity for all scenarios. As the traffic will have diluted further by the time it reaches Junction 17, it is considered that Junction 17 will have more than sufficient capacity to accommodate the proposed power supply development and the worst case cumulative development scenario.

7.10.3 Residual Impact on the Local Road Network

As discussed in **Section 7.6.1** above, it is proposed that the local road network will not be used as haul routes for construction deliveries with the exception of construction works to the 3 no. towers proposed to the north of the existing M6. Temporary access to these 3 no. towers will be required from the local road network. Prior to commencement of the proposed development, the appointed contractor will agree a Construction Traffic Management Plan (CTMP) with Galway County Council. This CTMP will include agreed access routes to the 3 no. towers.

The number of HGV movements anticipated to the 3 no. towers is relatively small (142 HGV movements per tower over several weeks), and therefore it will not have any residual impact on the local road network capacity. However, there is potential for these HGV movements to result in degradation to the local road surface. The mitigation measures proposed in **Section 7.9** will alleviate any

impact the proposed development may have on the local road network and therefore no residual impact is anticipated.

From the analysis carried out, it is clear that the residual impact, on the surrounding road network will be insignificant and that the nearest three junctions have sufficient capacity to cater for the traffic associated with the proposed power supply development and the worst case cumulative development scenario.

7.11 References

- NRA Project Appraisal Guidelines (PAG), Unit 5.5: Link-Based Traffic Growth Forecasting
- NRA Project Appraisal Guidelines (PAG), Unit 16.2: Expansion Factors for Short Period Traffic Counts
- McCarthy Hyder Tobin Consultants, 2006. Environmental Impact Statement for the M17/M18,
- National Roads Authority (NRA). TD 41-42/11 of the *Design Manual for Roads and Bridges (DMRB)*
- Arup, 2015. *Apple Data Centre Development – Athenry, Environmental Impact Statement*