



## **Traffic and Transport Assessment**

Strategic Housing Development on Lands at Glenamuck Road  
North, Carrickmines, Dublin 18

April 2022

**Waterman Moylan Consulting Engineers Limited**

Block S, Eastpoint Business Park, Alfie Byrne Road, Dublin D03 H3F4  
[www.waterman-moylan.ie](http://www.waterman-moylan.ie)





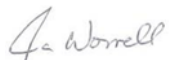
**Waterman Moylan**  
Engineering Consultants

**Client Name:** Moran Park Home Builders Ltd.  
**Document Reference:** 13-125r.010 Traffic and Transport Assessment  
**Project Number:** 13-125

### Quality Assurance – Approval Status

This document has been prepared and checked in accordance with  
Waterman Group's IMS (BS EN ISO 9001: 2015 and BS EN ISO 14001: 2015)

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Issue	Date	Prepared by	Checked by	Approved by
Issue 01	June 2021	Luke Byrne	Fernando Silva	I. Worrell
Issue 02	April 2022	Luke Byrne	Fernando Silva	I. Worrell 

### Comments

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- B. TRICS Report
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# 1. Introduction

## 1.1 Introduction

This Traffic and Transport Assessment (TTA) has been prepared by Waterman Moylan Consulting Engineers on behalf of Moran Park Home Builders for a proposed residential development on lands at Glenamuck Road North, Carrickmines, Dublin 18, to be submitted to An Bord Pleanála via the Strategic Housing Development (SHD) route.

The proposed residential development consists of:

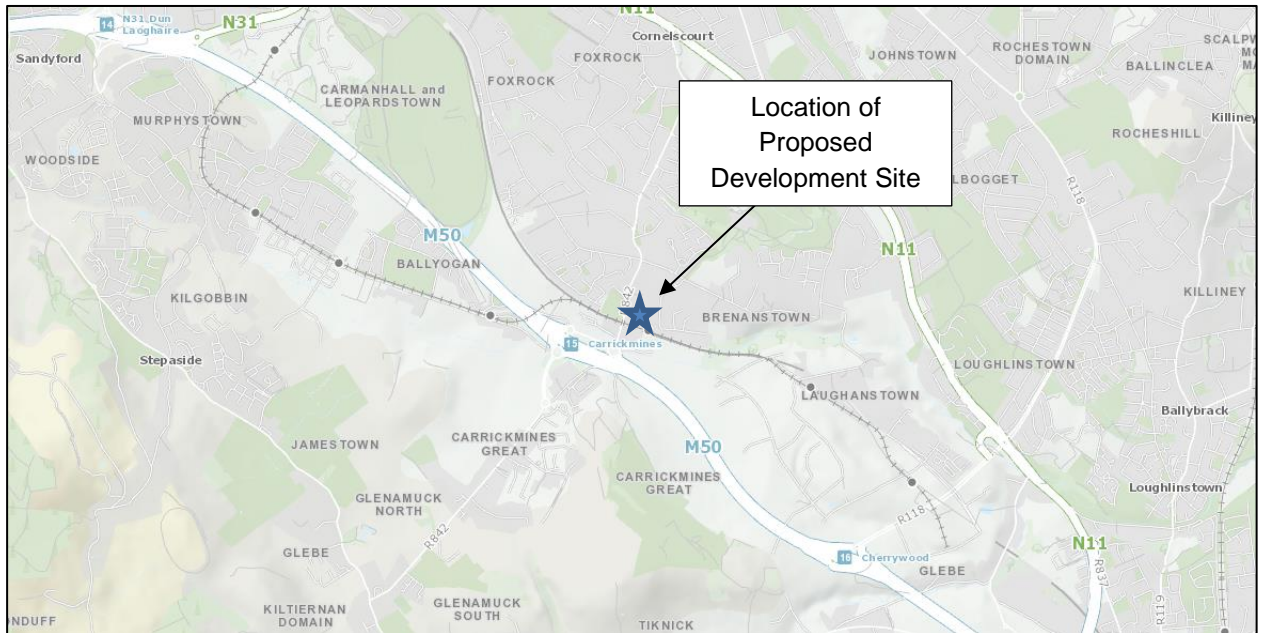
Block	1-Bedroom	2-Bedroom	3-Bedroom	Total
<b>Block - A</b>	13	28	3	44
<b>Block - B</b>	11	26	1	38
<b>Block - C</b>	10	22	4	36
<b>Total</b>	34	76	8	118 Apartments

**Table 1:** Proposed Schedule of Accommodation

## 1.2 Total Site Area and Location

The site is located in the administrative area of Dun Laoghaire Rathdown County Council.

Moran Park Homebuilders Limited intend to apply to An Bord Pleanála for planning permission for a strategic housing development on an overall site of c. 0.92 ha (c. 0.74ha relates to the main development site and c. 0.18ha relates to additional lands for drainage and access proposals) at Glenamuck Road North, Carrickmines, Dublin 18 (bounded by 'Tullybeg' to the north, 'Chigwell' to the northeast, 'Stafford Lodge' to the south and 'Carricáil' to the southeast). Refer to Figure 1 and Figure 2 for the location of the proposed development.



**Figure 1: Proposed Development Site Location**



**Figure 2: Proposed Development Site Location.**

### 1.3 Background

A planning application for the subject site has been previously submitted and approved under Reg. Ref. D16A/0260 and An Bord Pleanála Reference No. PL06D.247822. The permission provided for the construction of 6 no. houses, 36 no. apartments over two apartment blocks, a total of 89 no. car parking

spaces (73 undercroft and 16 surface level), 40 no. cycle parking spaces and a vehicular access to the site via a priority-controlled T-junction on Glenamuck Road North.

This current application seeks an increase in residential density for the subject site to accommodate 118 no. apartment units over three apartment blocks together with 103 no. car parking spaces, 5 no. motorcycle parking spaces and 280 no. cycle parking spaces (254 for residents and 26 for visitors) distributed between basements and surface level. The access junction to the site, which was previously granted under Ref. D16A/0260, has been reassessed and as part of the subject application and in order to better accommodate the new traffic demand it is proposed to be slightly amended. As indicted by Dun Laoghaire Rathdown County Council Traffic Section, a signalised access junction is premature, however, all infrastructure for future signalisation shall be provided. Details of the proposed access junction are provided later in this report.

A committed residential development to the south of the proposed development site (approved under Reg. Ref. D18A/1187 and PL06D.304995) will also benefit from the same site access junction, amended as required to facilitate the increase in traffic flows. This committed development scheme comprises of a total of 30 no. residential units (8 no. apartments and 22 no. duplexes).

This report has been produced to address any potential concerns that the local planning authority may have pertaining to the accumulative level of influence that the proposed development in parallel to the committed residential development may have upon the local transportation system.

## **1.4 Standards**

This TTA has been prepared in accordance with the requirements of Section 8.2.4.2 of the current Dun Laoghaire Rathdown County Development Plan 2016-2022, as well as the requirements of Section 12.4.2 of the pending Dun Laoghaire Rathdown County Development Plan 2022-2028, and in accordance with the 'Traffic and Transport assessment Guidelines' published by the Transport Infrastructure Ireland (TII)/National Transport Authority (NTA) in May 2014.

## **1.5 Programme**

It is programmed that construction of the subject proposed development will commence in 2022 for completion in 2024.

## **1.6 Assessment Years**

The years that have been assessed within this TTA are the following:

Opening Year (With / Without Development)	:	2024
Opening Year + 5 Years Forecast (With / Without Development)	:	2029
Opening Year + 15 Years Forecast (With / Without Development)	:	2039

These assessment years are in line with the TII 'Traffic and Transport Assessment Guidelines' (May 2014).

Details of each assessment year is presented later in this report.

## 2. Objectives

This Traffic and Transport Assessment (TTA) has been prepared to assess the impact of the proposed and committed developments on the surrounding road network.

It calculates the expected volume of traffic that will be generated by these developments and assess the impact that the additional traffic will have on two junctions in the vicinity of the site. For the purpose of this TTA, the following junctions have been assessed:

- Existing T-junction between Glenamuck Road North and Pavilion Gate;
- Proposed T-junction between Glenamuck Road North and Site Access Road.

Furthermore, this TTA will highlight sustainable forms of transportation that are accessible from the subject site which will have the potential to reduce the level of traffic impact from the proposed development onto the surrounding road network by providing the opportunity for new residents to shift away from private cars.

In preparing this report, Waterman Moylan Consulting Engineers have referred to the following documents:

- TII Publications - Traffic and Transport Assessment Guidelines – May 2014,
- Design Manual for Urban Roads and Streets (DMURS),
- Dun Laoghaire Rathdown Development Plan 2016 – 2022 and also the pending Dun Laoghaire Rathdown development Plan 2022-2028,
- TII Publications – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections – May 2019,
- Greater Dublin Area Cycle Network Plan – National Transport Authority (NTA).



### 3. Receiving Environment

#### 3.1 Traffic Survey

Due to travel restrictions that were implemented to curb the spread of COVID-19 when this report was firstly produced, a traffic count surveys was not carried out for this project. Instead, historic traffic count data from 2016 has been used to extrapolate current and anticipated volumes.

The historic traffic count data used was taken from the approved Traffic Impact Assessment prepared by Waterman Moylan for the previous planning application for the subject site (Reg. Ref. D16A/0260). This traffic survey was carried out by 'National Data Collection (NDC)' on Tuesday 2<sup>nd</sup> February 2016 at the following priority-controlled T-junction during the hours of 07:00 to 10:00 in the AM and 16:00 to 19:00 in the PM.

- Junction 1: Glenamuck Road / Pavilion Gate

The survey was carried out on the date identified above to ensure that flows were representative of normal term time and hence not affected by school holidays or other public holidays or events. As such they provide a reasonable representation of a neutral month during a period of normal school and employment activity. The survey is designed to provide representative values encompassing AM and PM periods during normal traffic conditions.

The location of the surveyed junction in relation to the subject development site is illustrated below.



**Figure 3:** Location of Surveyed Junction

The survey indicated that the peak traffic hours occurred between 08:00 to 09:00 in the morning and 17:00 to 18:00 in the evening. These traffic levels can be seen in Figure 4. Full survey is provided in Appendix A.

The survey was completed in 2016. It is assumed as part of this report that, by 2024 (Opening Year of proposed development), the traffic levels along Glanamuck Road North will be similar to the ones surveyed in 2016. This assumption is mainly due to a new link road in the surrounding network which includes alternative link the Cherrywood development opening west of the proposed development. This new link road provides better access to the N11 when compared to the Glanamuck Road North and therefore is likely to attract traffic from the Glanamuck Road North. For the purposes of this TTA, the 2016 traffic counts showed in Figure 4 below will be also representative of the traffic levels for 2024. Figure 5 shows the location of the new link road.

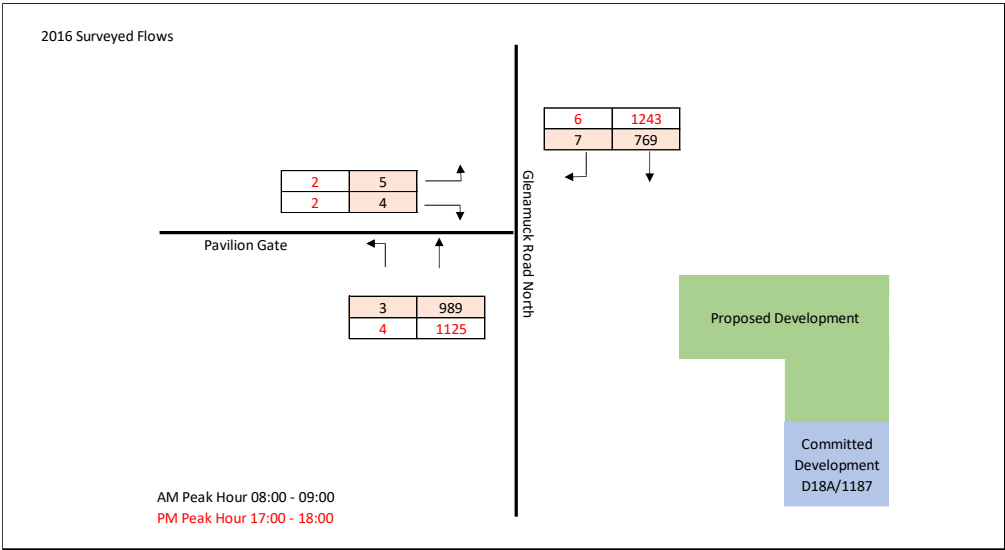


Figure 4: Traffic Survey – 2016



**Figure 5: New Link Road Connecting to the N11**

## 3.2 Existing Road Network, Pedestrian & Cycle Facilities

### 3.2.1 Existing Road Network

Glenamuck Road North is a single carriageway road, which is subject to a speed limit of 50kph and is approximately 550 metres in length. Glenamuck Road North is c. 7.2 meters wide and at the priority junction with Pavilion Gate it comprises a right turning lane from Glenamuck Road North into Pavilion Gate.

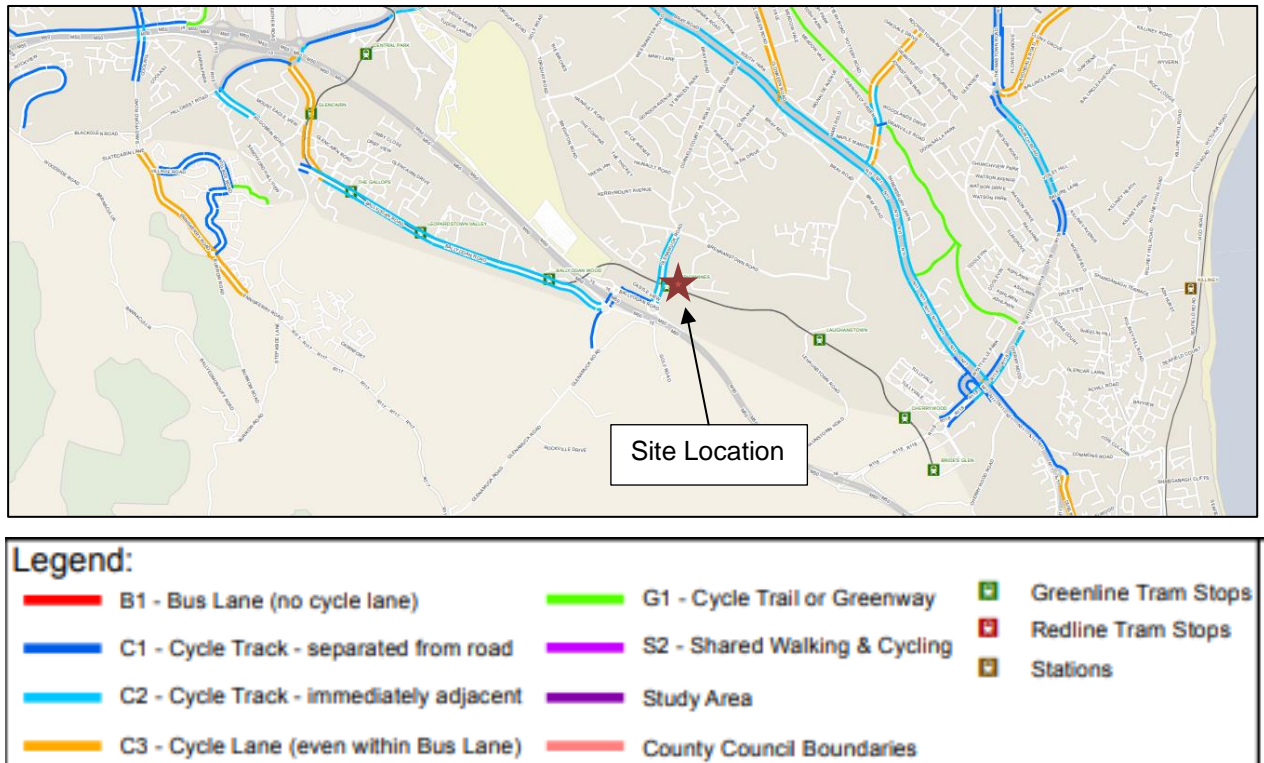
To the north of Glenamuck Road North, there is a signalised junction between Glenamuck Road North / Brighton Road / Brennanstown Road / Cornelscourt Hill Road. Both Brennanstown Road and Cornelscourt Hill Road continue to the N11 corridor approximately 1.2 km away.

To the south of Glenamuck Road North there are three roundabouts leading to the M50 Motorway northbound and southbound and continuing on to Glenamuck Road South which leads to Carrickmines Park Shopping Centre and parking for the Carrickmines Luas Station.

### 3.2.2 Existing Cycle & Pedestrian Facilities

There are currently cycle lanes travelling both directions along Glenamuck Road North. Both cycle lanes are separated from the road by a small curb for the majority of the road. The cycle lanes continue for the full length of Glenamuck Road North and ends at both the signalised junction to the north and the roundabout to the south. Figure 6 below shows the existing cycle network in the vicinity of the subject development site. As can be seen, there is a cycle network to the south of the proposed development parallel to the M50 which leads to The Park Carrickmines, Sandyford Business Park and associated facilities and employments.





**Figure 6:** Existing Facilities Map – Sheet E8, Extracted from GDA Cycle Network Plan

The existing pedestrian network along Glenamuck Road North includes pathways on both sides of the road, separated by cycle lanes. Pedestrian facilities in the surrounding area comprise of a network of footways linking the various neighbourhoods to each other, to local schools and retail centres, and to the Carrickmines Luas Station.

### 3.3 Proposed Network Improvements

The proposed development has been designed in compliance with DMURS with vulnerable road users emphasized over vehicles. In this regard, interconnectivity has been facilitated between the proposed development and the existing road network.



## 4. Proposed Development

### 4.1 Site Location

The subject site is located east of and adjacent to Glenamuck Road North. The site is bounded by residential properties to the north, south and east. To the south of the site there is the Luas track, and to the west of the Glenamuck Road North there is the Carrickmines Tennis club. The site area is approximately c. 0.92 ha (c. 0.74ha relates to the main development site and c. 0.18ha relates to additional lands for drainage and access proposals) The lands slope significantly from the north to south.



**Figure 7:** Subject Site Location

### 4.2 Development Description

The proposed development shall provide for the construction of 118 no. residential apartment units in the form of 3 no. residential blocks of apartments ranging in height from 4 storey's and transitioning to 6-7 storeys overall. The overall development proposal shall provide for the following:

Block	1-Bedroom	2-Bedroom	3-Bedroom	Total
<b>Block - A</b>	13	28	3	44
<b>Block - B</b>	11	26	1	38
<b>Block - C</b>	10	22	4	36
<b>Total</b>	34	76	8	118 Apartments

**Table 2:** Proposed Schedule of Accommodation

Each new residential unit has an associated area of private open space in the form of balcony / terrace area and set back upper floor levels.

Open space is provided by one major centrally located public open space between blocks A and B which include a play area; two further communal open space areas are provided adjoining Block B & Block C.

Communal Area located at the ground floor of Block B comprising of a shared working space, meeting rooms, a gym and changing/tea stations is also proposed.

2 no. basement level areas (approx. 2,340.9 sqm) are also proposed at lower ground / ground floor level of Blocks A, B (1,470.0 sqm) and C (834.9 sqm) and include car parking, bicycle parking, refuse storage areas, plant areas and an ESB Substation which is located between Blocks B and C.

A total of 103 no. car parking spaces (67 no. at basement level and 36 no. at surface level to include 17 no. electric power points and 5 no. accessible parking spaces) are proposed. In addition, 5 no. motorcycle parking spaces (3 no. at basement level A and B, and 2 no. at basement level C). A total of 280 no. bicycle parking spaces (254 no. at basement level and 26 no. at surface level) are also proposed.

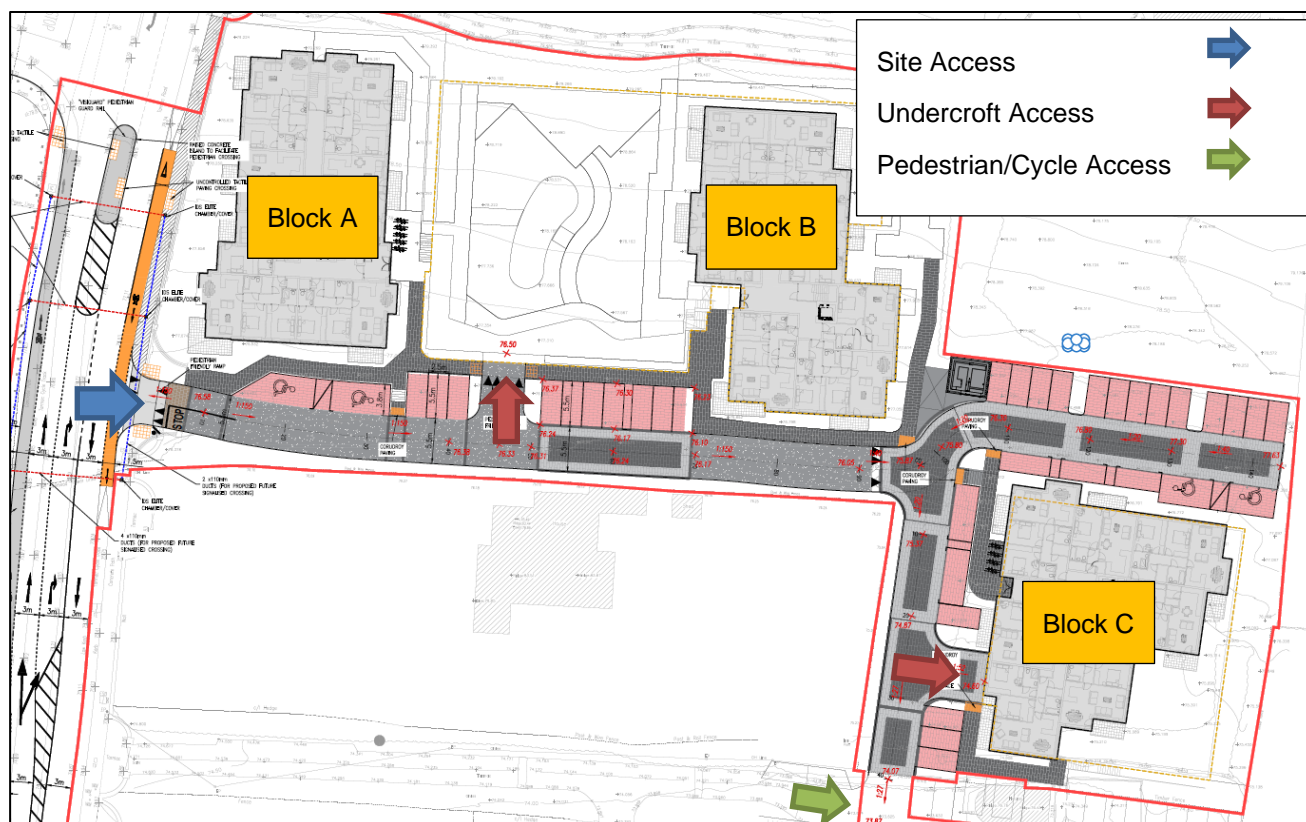
Proposals for vehicular and pedestrian access comprise via Glenamuck Road North and all associated upgrade works; The access point to the south (via Carricáil) is for pedestrians and cyclists only.

Associated site and infrastructural works including the provision for water services, foul and surface water drainage and connections; attenuation proposals; permeable paving; all landscaping works to include new tree and hedge planting; green roofs; boundary treatments; internal roads and footpaths; and electrical services.

The layout of the proposed development is shown in Figure 8 below.

### **4.3 Proposed Access Points**

The proposed development will be accessed via a single vehicle access point off Glenamuck Road North as shown in Figure 8 below. This access point will provide access for both the proposed development and the committed development (Ref. D18A/1187). There will be two undercroft parking areas, the first undercroft is for Block A and Block B and the other undercroft parking is accessed at Block C. The location of the access points for both undercroft parkings are shown in Figure 8. There is also a proposed pedestrian/cycle access point further south along Glenamuck Road North. This road, which currently serves as a private road for two existing houses is proposed to facilitate pedestrian and cyclist movements to the site. This gives access to the southern portion of the proposed development and to the adjacent committed development.



#### 4.4 Site Access Junction

#### 4.4.1 Approved Site Access Junction (D16A/0260)

As mentioned earlier, as part of the previous planning application for the subject site (approved under Ref. D16A/0260 and PL06D.247822), a new priority-controlled T-junction on Glenamuck Road North was granted. At that time, the subject junction layout was designed to accommodate a total of 42 residential units (6 houses and 36 apartments). Details of the approved junction is shown below.



**Figure 9:** Approved Site Access (Ref. D16A/0260)

After a detailed modelling exercise, it was identified that the previously approved junction layout would not have sufficient capacity to accommodate the new traffic demand arising from the proposed development (with a higher density – 118 no. residential units) and the committed development (D18A/1187 and PL06D.304995 – 30 residential units). In this regard, as part of the subject development works, in order to accommodate the new traffic demand, the approved site access junction is proposed to be slightly amended.

#### 4.4.2 Proposed/Amended Site Access Junction (Subject Application)

The proposed development will be accessed via a single vehicle access point off Glenamuck Road North. The site access from Glenamuck Road is located in a 50 km/h zone. A 2.4m x 49m sightline, which is in compliance with the requirements of the Department of Transport 'Design Manual for Urban Roads and Streets' recommendation for a road of design speed of 50 km/h, can provide safe access/egress at the access road junction onto Glenamuck Road. No development works will infringe upon this existing sightline provision.

Dun Laoghaire Rathdown County Council Traffic section has indicated that a signalised junction at the entrance to the development is premature and should only be implemented if/when the need arises. As a result, the junction entrance has been designed in accordance with Dun Laoghaire Rathdown County Council Traffic's request for a priority T junction. This design is provided on accompanying drawing 13-125-P280 (Proposed Junction Layouts). This drawing has similarly been provided to DLR Transport and Traffic



departments for formal approval in principle, as requested as part of the pre-application departmental report. Approval in principle has been received from Sean Keane on the 9<sup>th</sup> of February 2022.

A subsequent meeting was held with Sean Keane and Dermot Fennell Dun Laoghaire Rathdown County Council of the Traffic department to agree details on the 22<sup>nd</sup> of February, at which a request to review through lane widths on the Glenamuck Road was raised, and the potential to increase these beyond the currently proposed 3m, if space permits. It was advised at this meeting that the junction design worked boundary to boundary, however a review would be undertaken to see as to whether there was any opportunity to increase the widths further. Upon review, the lane widths as currently proposed, are maximised at 3m in width.

Another request made by Dun Laoghaire Rathdown County Council on the 22<sup>nd</sup> of February was to provide an uncontrolled pedestrian crossing point north of the proposed priority T entrance to the development, along with ducting to facilitate future signalisation, should this become permanent. This has been incorporated within the design, as indicated on drawing 13-125-P280.

The final layout comment made by Dun Laoghaire Rathdown County Council on the 22<sup>nd</sup> of February, was to afford pedestrians a short crossing path across the entrance, as opposed to crossing at the longer radius crossing point. This point was similarly raised in the Quality Audit discussed in Section 7.3 of the EAR accompanying the documentation package and has been updated accordingly on layout plans.



**Figure 10: Proposed Site Access Junction Design.**

The proposed priority T-junction (left-hand junction on layout 13-125-P280 – Figure 10 above) comprises of a straight through lane for northbound traffic, a straight through/left turning lane for southbound traffic, a right turning lane to facilitate access to those entering the site from south via Glenamuck Road North and footpaths & cycle lanes along both sides of the road. The junction upgrades also include an uncontrolled crossing point across Glenamuck Road North, north of the entrance to the development, as agreed with Dun Laoghaire Rathdown County Council Traffic Department.

As indicated by Dun Laoghaire Rathdown County Council Traffic Section, a signalised access junction to the site is currently premature. However, as a signalised junction may be required in the future, the provision of all infrastructure for future signalisation was required. The right-hand junction layout in drawing 13-125-P280 (Figure 10 above) illustrates the signalised option that may be required in the future. It includes pedestrian crossings with dropped kerbs and advanced stop areas for cyclists on all approaches (including the site access), a signalised straight through lane for northbound traffic, a signalised straight through/left turning lane for southbound traffic and a signalised right turning lane to facilitate access to those entering the site from south via Glenamuck Road North. Dedicated footpaths and cycle lanes will continue to be provided along both sides of the road. All possible infrastructure for the proposed future signalisation shall be provided as part of the priority T junction upgrade works, including that to the pedestrian crossing point, north of the junction entrance.

## 5. Site Accessibility

This section of the report describes the accessibility of the proposed development site for pedestrians and cyclists. It is clear that high quality and extensive provision of walking and cycling facilities are key elements to support in the reduction of the private car usage.

### 5.1 Pedestrian Accessibility

The “Guidelines for Providing for Journeys on Foot” published by the Institution of Highways & Transportation in 2000 indicates that acceptable walking distances will vary between individuals and circumstances, such as an individual’s fitness, physical ability and personal motivation; the size of the city itself and the quality of the surrounding footpath network. This document also suggests walking distances and times based on an average walking speed of 1.4m/sec (approximately 400m in five minutes). Table 3 below summarises these suggestions.

	Town Centres	Commuting/School Site-seeing	Elsewhere
<b>Desirable</b>	200m (2.5-minutes)	500m (6-minutes)	400m (5-minutes)
<b>Acceptable</b>	400m (5-minutes)	1,000m (12-minutes)	800m (12-minutes)
<b>Preferred Maximum</b>	800m (10-minutes)	2,000m (24-minutes)	1,200 (15-minnutes)

**Table 3: Suggested Walking Distances (Source: Guidelines for Providing for Journeys on Foot)**

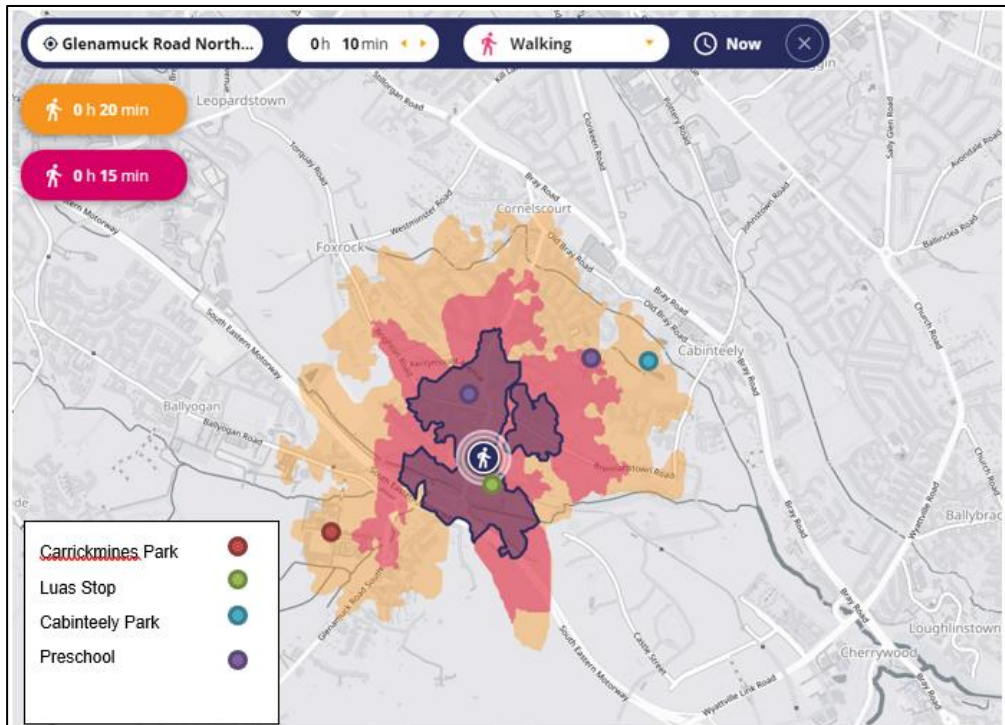
Figure 11 overleaf shows the several amenities in the area around the proposed development site within a 10-minute, 15-minute and 20-minute walk. Within the 20-minute distance there is Carrickmines Park which is a shopping centre which offers several services and shops. Also within the 20-minute walking distance there is the Cabinteely Park. There are two Preschool/Creches in the area, within the 10-minute and 15-minute walking distances. The Carrickmines Luas stop is within the 10-minute catchment.

### 5.2 Cycling Accessibility

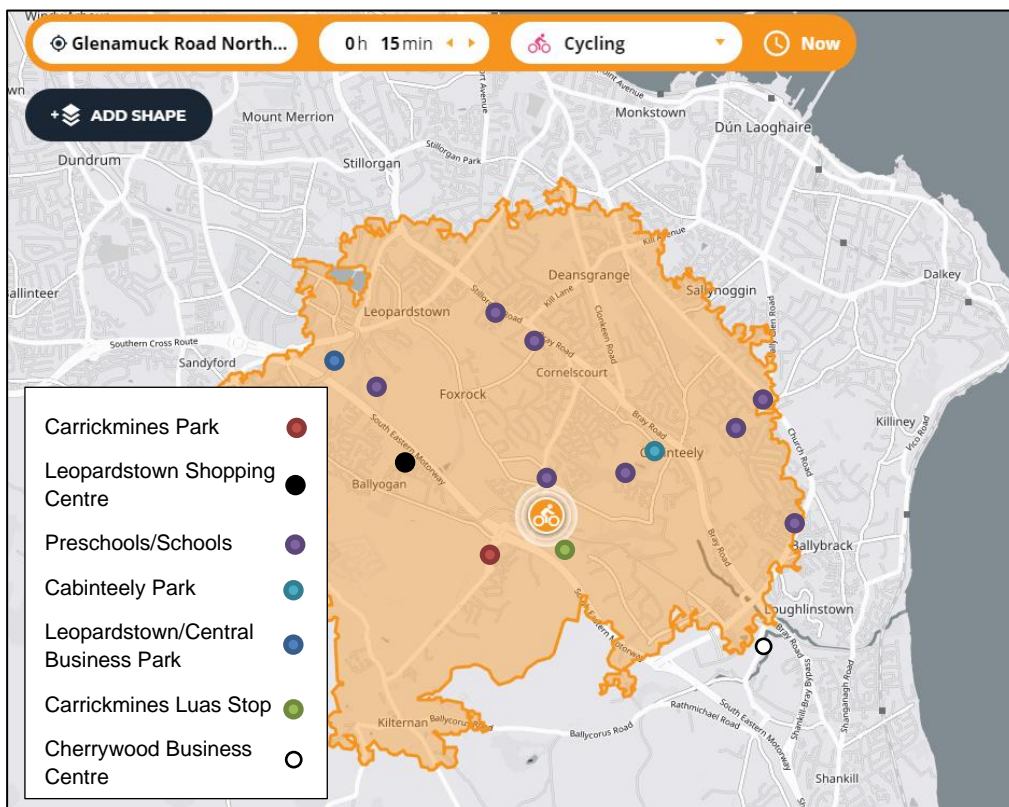
As presented for walking, a similar catchment exercise has also been undertaken for the cycling mode of transport. Based on an average cycling speed of 3.3m/sec (i.e., 15km/h), Figure 12 below illustrates a 15-minute cycling isochrone which summarises the accessibility of the site by bicycle. A 15-minute cycling time equates to a distance of approximately 3.0km.

Within the 15-minute cycle distance there are two shopping centres within the catchment, the Carrickmines Park and the Leopardstown Shopping Centre to the west of the proposed development. There are two business centres which have the potential of bringing employment to the proposed development’s residents. The Cherrywood Business Centre is to the east of the proposed development and Leopardstown/Central Business Park is to the north-west of the proposed development.

There are also several preschools and schools in the catchment areas, the main schools are St. Bridges GNS, Loreto College Foxrock, St Brigid’s Boys’ National School, St. Colmcille Junior National School, Cabinteely Community School and Johnstown Boys National School.



**Figure 11: Site Accessibility - Walking Distance**



**Figure 12: Site Accessibility – Cycle Distance**



## 6. Trip Generation and Distribution

### 6.1 Trip Generation

#### 6.1.1 Proposed Development

The traffic generation potential of the proposed development has been estimated using the TRICS software modelling database. Full trip rates, which were sourced from the TRICS Database Version 7.7.4, have been provided in Appendix B and summarised in Table 4 below.

Land Use	Peak AM Period		Peak PM Period	
	In	Out	In	Out
<b>Apartment</b>	0.062	0.270	0.254	0.089

**Table 4:** TRICS Apartment Trip Rates.

Using TRICS trip rates from Table 4 above and the number of apartment units for the proposed the development, the trip generation was calculated. This is shown in Table 5 below.

Land Use	No. of Units	Peak AM Period		Peak PM Period	
		In	Out	In	Out
<b>Apartments</b>	118	7	32	30	11

**Table 5:** Trip Generation - Proposed Development.

As can be seen in Table 5 above the proposed development is estimated to generate a total of 39 car trips in the AM peak hour (7 arriving and 32 departing) and 41 in the PM peak hour (30 arriving and 11 departing).

#### 6.1.2 Committed Development

In order to undertake a complete and conservative assessment of the analysed junctions, principally the site access, the committed development approved under Ref. D18A/1187 has also been analysed with regards to additional traffic. The traffic generation to/from the committed development was taken from the previously approved TIA submitted as part of the planning application for the site and is shown below.

Land Use	No. of Units	Peak AM Period		Peak PM Period	
		In	Out	In	Out
<b>Apartments</b>	30	4	9	9	4

**Table 6:** Trip Generation for the Committed Development (Ref: D18A/1187)

6.2 Trip Distribution

In order to determine the amount of new car trips expected to travel through each assessed junction in the vicinity of the proposed development site, the calculated car trips for the proposed and committed developments showed in Table 5 and Table 6, respectively, have been distributed.

6.2.1 Proposed Development

The trip distribution for the proposed development's trip generation was based on the traffic survey used in this report. It was assumed that 60% of the generated trips will travel north along Glenamuck Road North towards the N11 and City Centre, whilst the other 40% will travel south towards the M50.

The majority of traffic is assumed to travel north from the proposed site. While the M50 is directly south of the proposed development the Luas offers easy access to North Dublin and the City Centre. North of the proposed development provides access to the N11 corridor and south Dublin including several business parks, colleges and schools.

The distribution for the AM and PM peak hour generated traffic is detailed in Figure 13 below and the corresponding AM & PM peak hour traffic flows, based on the assumed distribution are illustrated in Figure 14. The corresponding AM & PM hours were generated using the trip distribution from Figure 13 and the trip generation calculation in Table 5 above.

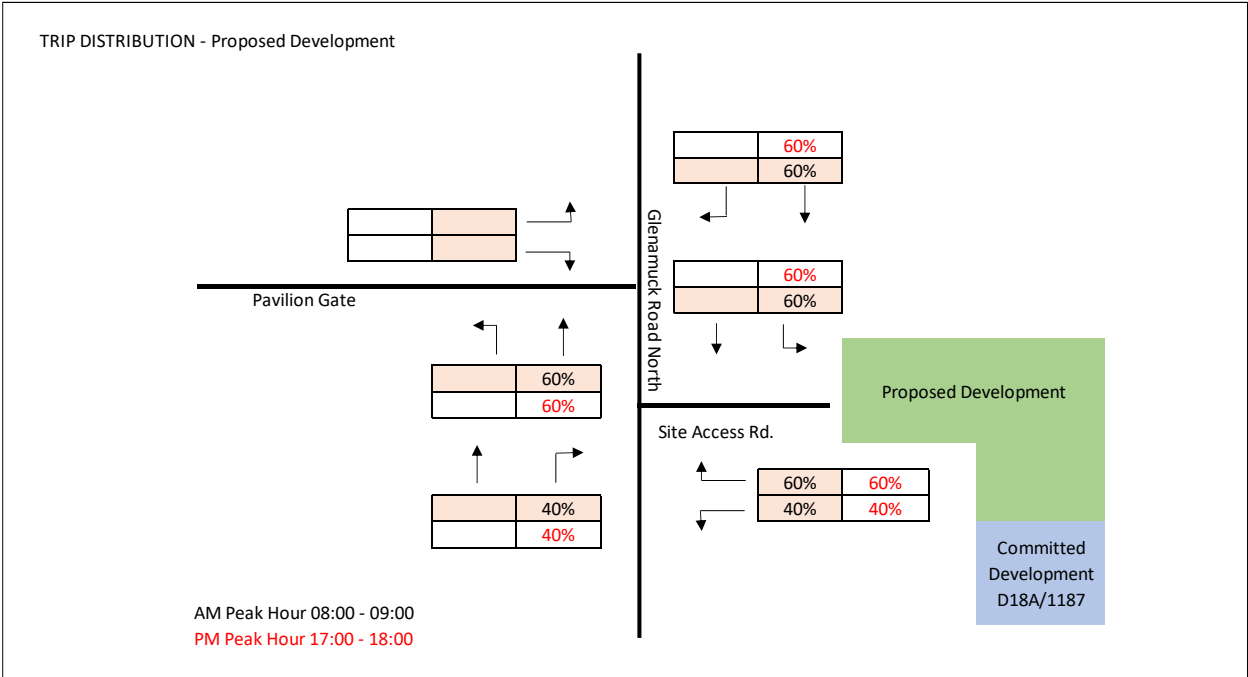
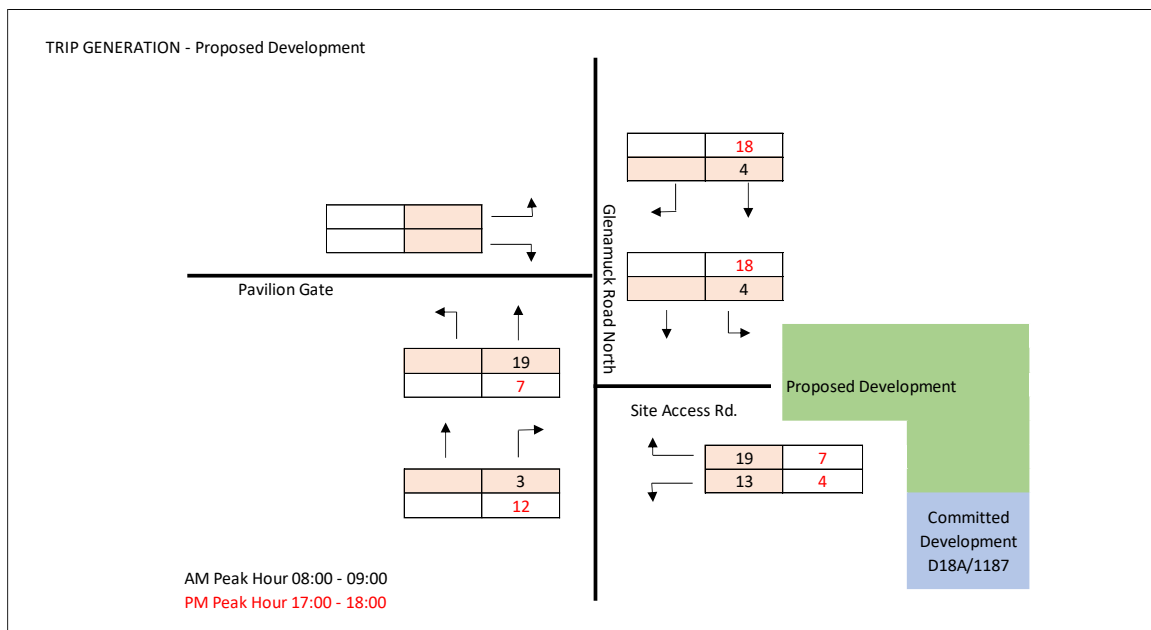


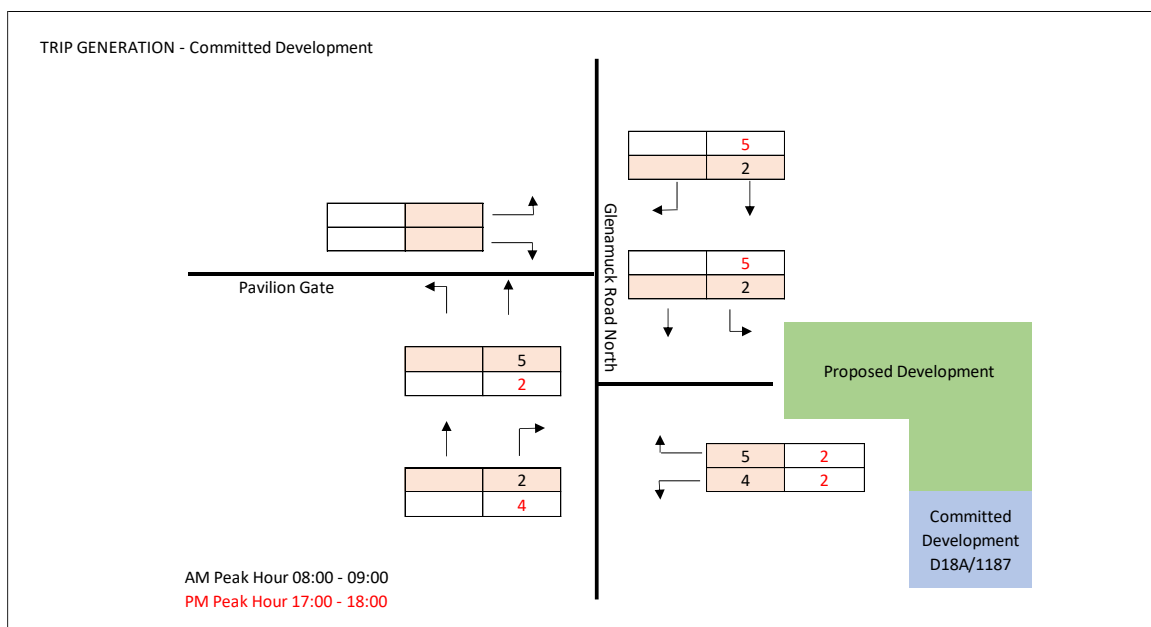
Figure 13: Proposed Development - Trip Distribution



**Figure 14: Proposed Development - Trip Allocation**

## 6.2.2 Committed Development

The committed development will use the same site access road as the proposed development and, for the purpose of this assessment, it was assumed that it will share the same trip distribution profile set out for the proposed development as shown in Figure 13 above. Figure 15 below shows the trip allocation for the committed development (Ref: D18A/1187 and PL06D.304995). This was generated using the trip distribution in Figure 13 and trip generation in Table 6.



**Figure 15: Committed Development (Ref: D18A/1187) - Trip Allocation**

## 7. Traffic Growth

It has been assumed within this Traffic and Transport Assessment that the proposed development will be constructed over a period of approximately 3 years. Therefore, the assumed year of opening is 2024.

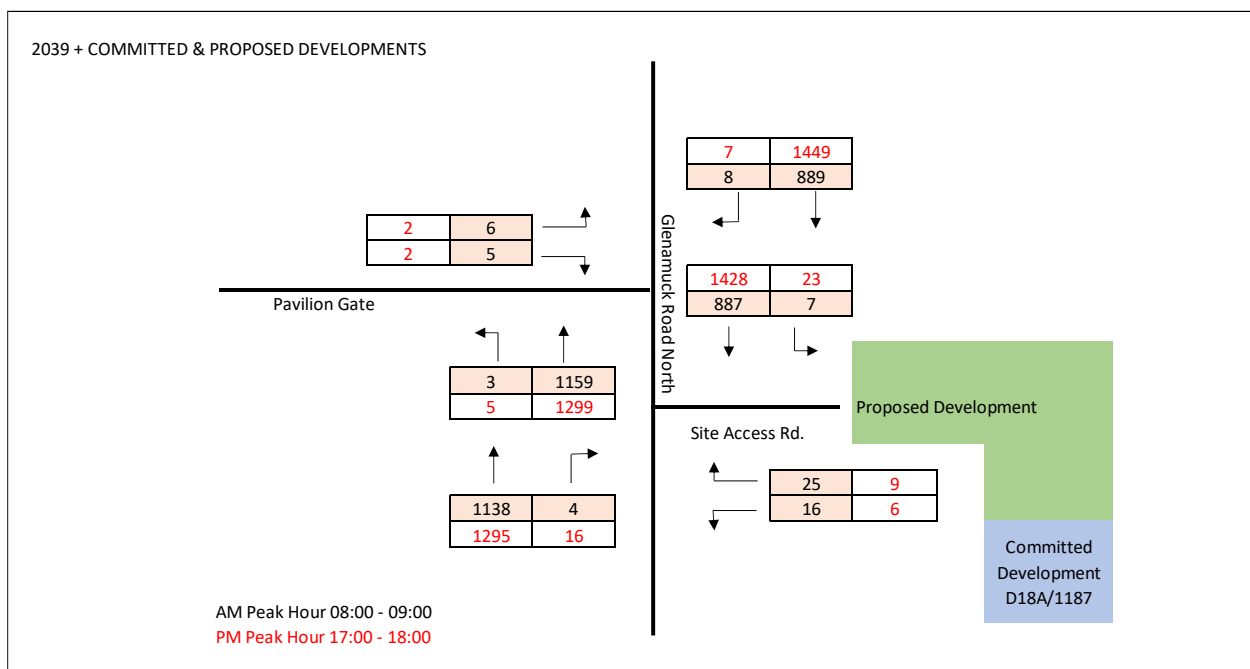
In line with the 'Traffic and Transport Assessment Guidelines (May 2014)' which this TTA is based on, the junctions were also assessed for the future design years of 2029 (Opening Year +5 Years) and 2039 (Opening Year +15 Years).

As mentioned in Section 3.1 Traffic Survey of this TTA, it is assumed as part of this report that, by 2024, the traffic levels along Glanamuck Road North will continue to be similar to the ones surveyed in 2016. Therefore, the growth rates for the year 2029 and 2039 are taken from 2024 as the baseline.

The background traffic growth used to factor up the 2024 baseline flows is in accordance with the 'Table 6.1: Link-Based Growth Rates: Metropolitan Area Annual Growth Rates' within the TII Publications – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (May 2019). These are:

- 1.084 (Central Growth) growth factor from 2024 to 2029
- 1.147 (Central Growth) growth factor from 2024 to 2039

Figure 16 below illustrates the AM and PM forecast traffic flows for the future assessment year of 2039 which includes the 2024 baseline flows extrapolated into 2039, the trips generated by the Proposed Development and the trips generated by the Committed Development.



**Figure 16: 2039 Traffic Forecast (Opening Year + 15 years)**

## 8. Junction Assessment

### 8.1 Introduction

#### 8.1.1 Junctions Assessed

The junctions assessed in this TTA are the following:

- **Junction 1 (Priority T-junction):** Glenamuck Road North / Pavilion Gate.
- **Junction 2 (Proposed Priority T-junction):** Glenamuck Road North / Proposed Development Access Road.

#### 8.1.2 Methodology

There are various modelling software packages available to assess every type of junction. Waterman Moylan uses PICADY to analyse priority junctions and TRANSYT to analyse signalised junctions.

PICADY is a software for modelling priority-controlled junctions. This programme utilises junction's geometry and traffic flows input by the user to determine Ratio of Flow to Capacity (RFC) and queue length for each junction.

Typically, a junction is said to be working satisfactorily when the RFC of each link does not exceed 0.85. Acceptable RFC values are considered to be in the range of 0.85 to 1.0 with higher values indicating restrained movement.

#### 8.1.3 Cumulative Impact

The extent of traffic impact arising from the proposed & committed developments has been determined by initially checking where generated would exceed 10% of the traffic flow on the adjoining road or 5% on the road where congestion exists, or the location is sensitive. This is in line with the NTA Traffic and Transport Assessment Guidelines (May 2104), which this TTA is based on. A summary of the existing two-way traffic and the expected traffic increase at each assessed junction is presented below.

Junction	Existing Traffic AM	Existing Traffic PM	Additional Traffic AM	Additional Traffic PM	% Increased AM	% Increased PM
<b>Junction 1</b>	1777	2382	30	32	1.69%	1.34%
<b>Junction 2</b>	1765	2374	52	54	2.95%	2.27%

**Table 7: Cumulative Impact of Committed and Proposed Developments**

As can be seen from the above both assessed junctions are expected to receive a traffic increase lower than 5% and therefore no further assessment is warranted. However, as Junction 2 is a new junction proposed as part of the subject application and will be the only vehicular access to both the proposed and the committed developments, it has been modelled and the results are detailed in the following section.

### 8.1.4 Assessment Scenarios

The performance of the modelled Junction 2 has been analysed for the critical AM Peak Hour and the PM Peak hour (08:00-09:00 and 17:00-18:00) for the following scenarios:

- **2024 + Committed Development (Ref. D18A/1178) + Proposed Development.**
- **2029 + Committed Development (Ref. D18A/1178) + Proposed Development.**
- **2039 + Committed Development (Ref. D18A/1178) + Proposed Development.**

## 8.2 Analysis Results

### 8.2.1 Junction 2: Glenamuck Road North / Site Access Road

Junction 2 is a three-armed priority-controlled junction with dedicated right turning lane proposed to provide access to the committed and proposed developments. This junction has been modelled based on its proposed configuration as illustrated in Figure 10 and the PICADY analysis results are summarised in Table 8 below. The arms of the proposed junction were labelled as follows within the PICADY model:

- Arm A: Glenamuck Road North (N)
- Arm B: Proposed Dev. Site Access Road
- Arm C: Glenamuck Road North (S)

Stream	AM			PM		
	Queue (veh.)	Delay (sec.)	RFC	Queue (veh.)	Delay (sec.)	RFC
2024 + Committed Development + Proposed Development						
<b>B-AC</b>	0.2	15.30	0.15	0.1	28.67	0.11
<b>C-B</b>	0.0	7.19	0.01	0.0	9.61	0.04
2029 + Committed Development + Proposed Development						
<b>B-AC</b>	0.2	17.16	0.16	0.2	43.37	0.15
<b>C-B</b>	0.0	7.41	0.01	0.0	10.27	0.04
2039 + Committed Development + Proposed Development						
<b>B-AC</b>	0.2	18.94	0.18	0.3	74.65	0.24
<b>C-B</b>	0.0	7.59	0.01	0.0	10.85	0.05

**Table 8:** Proposed Priority-controlled T-junction (Junction 2) – PICADY Analysis Results.

The analysis results in Table 8 above indicate that, the priority-controlled T-junction proposed to provide access to the committed and proposed development would operate within capacity for the 2024 + Committed Development + Proposed Development scenario with the highest RFC at 0.15 and a corresponding queue of 0.2 vehicle occurring on the Site Access Road (Stream B-AC) in the AM Peak Hour. RFCs would remain below the threshold (0.85) for both future scenarios, however the recorded delays on the Site Access Road (B-AC) for the 2029 and 2039 scenarios in the PM peak hour are at 43.37 seconds and 74.65 seconds, respectively, which is considered relatively high. Residents would have to wait for a gap on the Glenamuck Road North to egress the development, however, this is likely to occur only during the PM peak period. Full PICADY output report is provided in Appendix C.

### 8.3 Construction Phase

When considering a development of this nature, the potential traffic impact on the surrounding area must also be considered for the construction phase.

During the construction phase of the proposed development, some construction traffic movements will be undertaken by heavy goods vehicles, though there will also be vehicle movements associated with the appointed contractors and their staff.

An estimate of the day-to-day traffic movements associated with the construction activities, based on movements to and from the application site will be approximately 50 in number, which with an allowance for shared journeys could equate to a maximum of around 25.

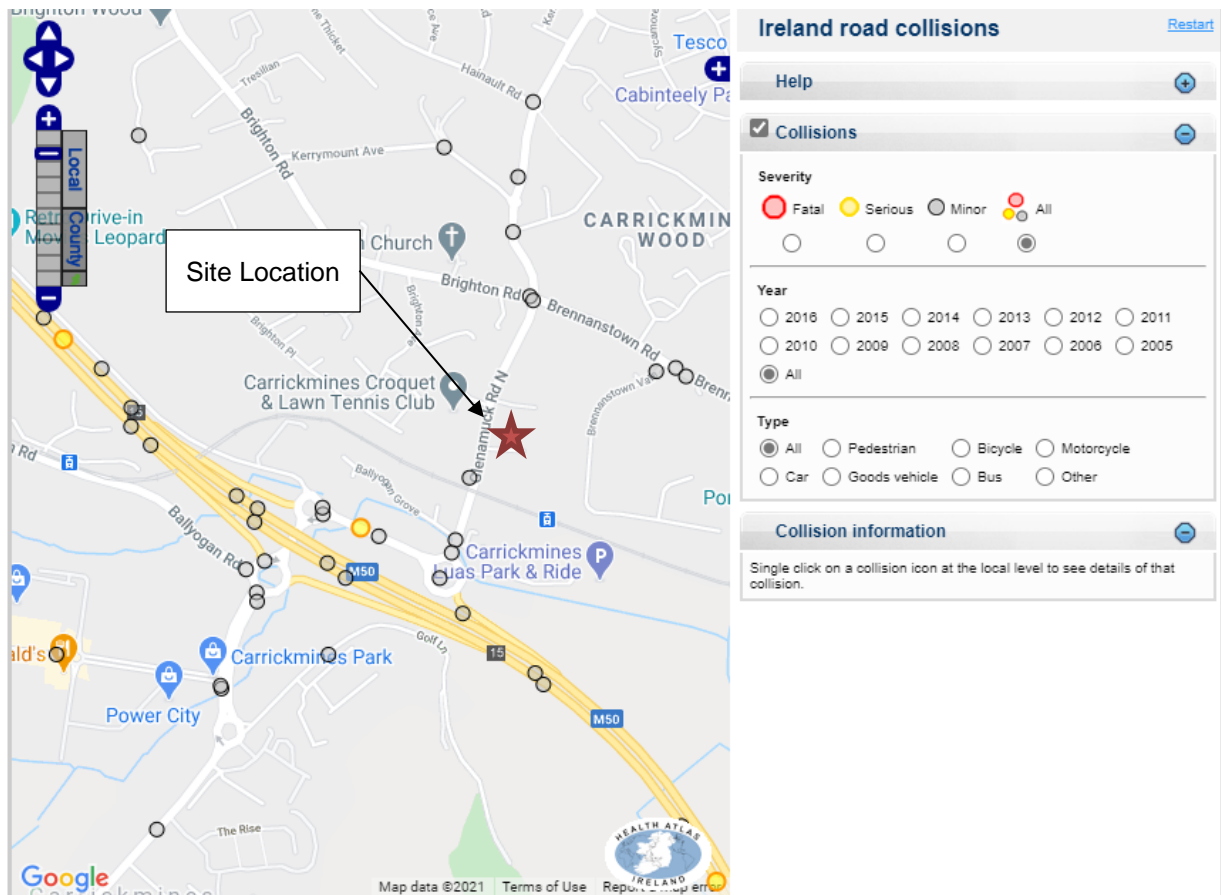
The number of construction vehicle movements is low compared to the number of vehicular trips to be generated by the proposed development during the operational phase. It should be noted that the majority of such construction vehicle movements would be undertaken outside of the traditional AM and PM peak hours. Therefore, it is not considered that the level of construction traffic would result in any operational problem. In this regard, no junction assessment for the construction phase was undertaken. A construction car park will be created on the start of works by the laying of a temporary surface for vehicles. Care will be taken to ensure existing pedestrian and cycling routes are suitably maintained or appropriately diverted as necessary during the construction period. It is likely that construction will have a negligible impact on pedestrian and cycle infrastructure.

All construction traffic and transport will be managed strictly according to the proposed development's management plan. For further details, please refer to Waterman Moylan's Preliminary Construction Management Plan" – report.

## 9. Road Safety, Public Transport, Pedestrian and Cyclist Facilities

### 9.1 Road Safety

Traffic collision data has been reviewed for the period 2005-2016 from the Road Safety Authority (RSA) traffic collision database. This review will assist to identify any potential safety concerns in relation to the existing road network. These incidents are categorised into class of severity, which includes minor, serious, or fatal collisions. The analysis is shown in Figure 17.



**Figure 17: Road Safety Authority Traffic Collision Database**

As can be seen in Figure 17 above there have been some minor accidents that occurred in the vicinity of the site during the period between 2005 and 2016, however there were no serious or fatal accidents along Glenamuck Road North.

There is record of one serious collision to the south-west of the site just after the roundabout located at the end of the Glenamuck Road North.



## 9.2 Public Transport

### 9.2.1 Bus Service

#### *Existing Bus Services*

The site is directly served by an existing bus route running along the Glenamuck Road North. It is approximately a 150m walk (c. 1-minute walk) from the proposed site entrance to the bus stops travelling both directions. The subject bus stops - which are located on Glenamuck Road North, are served by Route 63. This bus route connects Kilternan to Dun Laoghaire via different itineraries.

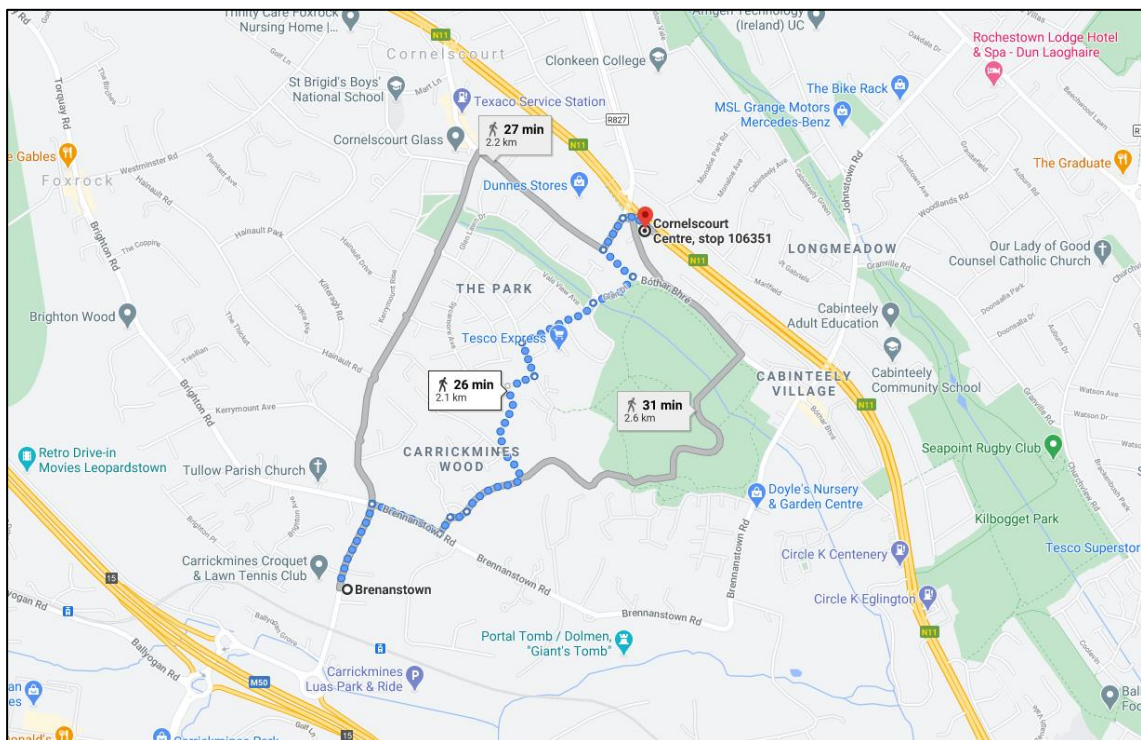
There are additional bus routes along the N11 corridor which provide access to Dublin City centre via bus routes 84A, 84x, 145 and 155. The walking distance to the closest bus stop on N11 is approximately 2.1 km (c. 26-minutes). There are no public cycle parking spaces available within the area of the bus stop, so cycling to this bus stop for a cycle-bus commute type is not viable. Dedicated footpaths with dedicated crossing points are currently provided along the walking route to N11. Table 9 shows the frequency of each aforementioned bus routes while Figure 18 and Figure 19 show the walking distances the bus stops on Glenamuck Road North and on the N11, respectively.

Bus Route No.	To	From	Weekday Avg. Frequency	Saturday Avg. Frequency	Sunday Avg. Frequency
<b>63</b>	Kilternan	Dun Laoghaire	30 mins	45 mins	45 mins
	Dun Laoghaire	Kilternan	30 mins	45 mins	45 mins
<b>84/a</b>	Blackrock	Newcastle	30 mins - 1 hour	1 hour	1 hour
	Newcastle	Blackrock	30 mins - 1 hour	1 hour	1 hour
<b>84X</b>	Hawkins Street	Newcastle / Kilcoole	30 mins – 45 mins	-	-
	Newcastle / Kilcoole	Hawkins Street	30 mins – 45 mins	-	-
<b>145</b>	Heuston Rail Station	Ballywaltrim	10 mins until 21:00, 1 hour after	15 mins – 20 mins	20 mins – 30 mins
	Ballywaltrim	Heuston Rail Station	10 mins until 21:00, 1 hour after	15 mins – 20 mins	20 mins – 30 mins
<b>155</b>	Ikea	Bray Rail Station	20 mins	20 mins	20 mins
	Bray Rail Station	Ikea	20 mins	20 mins	20 mins

**Table 9:** Avg. Frequency of Nearby Bus Routes.



**Figure 18: Walking Distance to nearest Bus Stop from Proposed Development**



**Figure 19: Walking Distance to N11 Bus Stop from Proposed Development**

### Future Bus Services

The Bus Connects project currently being implemented by the National Transport Authority (NTA) aims to deliver a much-enhanced bus service to the Greater Dublin Area (GDA). The route proposed to serve the development area is L26 and L27, which is planned to connect Kilternan to Blackrock and Ballyogan to Dun Laoghaire, respectively. The Bus Route E1 will also be available from the N11 corridor and will provide a service from Northwood through the City Centre to Ballywaltrim. All routes are shown Figure 20 below.



**Figure 20:** BusConnect Routes Map.

The frequency of each aforementioned bus route is shown below in Table 10. Walking times and routes to the bus stops on both Glenamuck Road North and N11 are assumed to be as showed in Figures 18 and 19.

Bus Route No.	To	From	Weekday Avg. Frequency	Saturday Avg. Frequency	Sunday Avg. Frequency
L26	Kilternan	Blackrock	30 mins	30 mins	30 mins
L27	Ballyogan	Dun Laoghaire	30 mins	30 mins	30 mins
E1	Northwood	Ballywaltrim	8 mins – 10 mins	10 mins – 15 mins	15 mins – 20 mins

**Table 10:** Bus Connects Routes Frequency

According to BusConnects, “the benefits of the Network Redesign include an overall increase in bus services of 25%, increased peak hour capacity, increased evening and weekend services, 24-hour operations on some routes, a 16% increase in the number of residents located within 400m of a frequent bus service to the city centre, new connections to schools, hospitals and other essential services and increased access to jobs and education.”

## 9.2.2 Rail Service (Luas Green Line)

### **Carrickmines Station**

The proposed development is directly served by the Luas service. The Carrickmines Luas Station is located directly south of the proposed site. The Carrickmines Luas is part of the Luas Green line and provides a route from Bride's Glen to Broombridge, which also serves Dundrum Shopping Centre, Dublin City Centre and many other stations along the route.

Walking time from the proposed site entrance to the Carrickmines Luas Station is approximately 2-minute (160m walk). There are dedicated footpaths connecting the proposed development to the Carrickmines Luas Station.

Table 11 below shows the Green Line Service Frequency at Carrickmines Luas Station.

Time	Total No of Trams per Hour	Total Number of Trams
05:30-07:00	3	4
07:00-08:00	5	5
08.00-09.00	10	10
09.00-10.00	6	6
10:00-16:00	5	30
16:00-19:00	6	18
19:00-00:00	5	25
Total (northbound)		98
Time	Total No of Trams per Hour	Total Number of Trams
05:30-07:00	5	7
07:00-10:00	6.66	20
10:00-16:00	4.6	28
16:00-19:00	6	18
19:00-01:18	4.6	29
Total (southbound)		102

**Table 11: Green Line Service Frequency at Carrickmines Luas Station**

There are some 100 services per day in each direction between Brides Glen to Sandyford, which increases to some 200 per day per direction on the Sandyford – City Centre section.



From Table 11 above, the peak frequency on the Luas Green Line northbound (inbound) between Brides Glen and Sandyford Depot is 10 trams per hour equivalent to an average frequency of 6 minutes.

### **Historic Overcrowding 2010 - 2017**

Surveys by the National Transport Authority (NTA) of passenger demand and conditions on the Luas Green Line some years after opening, indicated that the line was operating at capacity or above during peak periods, with crowding experience between the Balally and Ranelagh stops. This crowding resulted in passengers being unable or unwilling to board at these stops.

### **Green Line Capacity Enhancement Scheme 2017 – 2021**

The Green Line Capacity Enhancement Scheme was launched in 2017 and completed by Transport Infrastructure Ireland (TII) in 2021.

The Capacity Enhancement Scheme provided for the replacement of the original 44 metres long trams each with a capacity of 319 passengers with 55 metres long trams each with a capacity of 408 passengers.

### **Tram Capacity 2022**

Figures provided by Luas Operations in 2022 advise that while the extended 55 metres long trams have a nominal carrying capacity of 408 passengers per tram, the operational capacity used is 315 passengers per tram allowing for what Luas call a 'comfort factor'.

### **Green Line Capacity 2022 (Brides Glen to Sandyford)**

Based on 10 trams per hour x 315 passengers per tram, the capacity of the Green Line between Brides Glen and Sandyford is 3,150 passengers per direction per hour during the AM Peak, which increases to 6,300 passengers per direction per hour during the AM Peak from Sandyford to City Centre (20 trams per hour x 315 passengers per tram).

### **Future Capacity 2022 – 2024**

In March 2019, Ann Graham, Chief Executive Office, National Transport Authority, advised at Oireachtas Committee that *"It is projected that the number of people seeking to travel on the Green Line in future years will exceed the carrying capacity of the Luas system, requiring an upgrade. However, that upgrade is not expected to be needed for some time – perhaps twenty years or so."*

### **Recorded Passenger Demand**

The pre-Covid peak passenger numbers recorded by Luas on the Green Line during the AM Peak Hour (8 – 9) are outlined below. The passenger numbers recorded have not yet reached the figures as predicted by the Railway Procurement Agency in November 2012 in their 'Updated Detailed Business Case', which was 5,270 passengers per hour at Ranelagh Stop (inbound) and 2,330 passengers per hour at Cowper Stop (outbound).

	Brides Glen - Sandyford	Sandyford - City Centre
<b>Inbound</b>	1,618 passengers per hour (Glencairn – Central Park)	4,648 passengers per hour (Milltown - Cowper)
<b>Outbound</b>	896 passengers per hour (Sandyford – Central Park)	2,100 passengers per hour (Milltown – Windy Arbour)

**Table 12: Recorded Passenger Numbers – Green Line - 2019**

From Table 12 above, it is notable that the location and time of peak passenger demand on the Luas Green Line is the inbound service between Sandyford and City Centre during the AM Peak Hour between 08h00 and 09h00 on a weekday.

#### ***Future Passenger Demand – Carrickmines Stop***

The subject proposed development comprises of 118 no. residential apartments. Based on the Irish Water standard of 2.7 persons per unit, the projected population of the development is predicted to be some 319 persons.

Based on data from TRICS adjusted for the proposed quantum of car parking and the proximity of the high-capacity Green Line, some 50% of residents are expected to travel during the AM Peak Hour 08h00 – 09h00. Given the type and location of the subject development it is expected that 40% of these trips will be made by Luas, which equates to a total of some 64 passengers during the AM peak hour.

#### ***External Trips from Surrounding Area - Carrickmines Stop***

A demand of up to 100 passengers per hour for local residents traveling to work or education from outside the proposed development has been assumed for the AM Peak Hour between 08h00 and 09h00.

#### ***Direction of Travel - Carrickmines Stop***

For the purpose of this report, it has been assumed during the AM Peak Hour between 08h00 and 09h00 that some 80% of passengers boarding at Carrickmines Stop will travel northbound towards the City Centre and 20% southbound towards Cherrywood. Based on that, some 131 passengers are assumed to travel northbound (80 from local residents outside the proposed development and 51 from the proposed development) and some 33 are assumed to travel southbound (20 from local residents outside the proposed development and 13 from the proposed development).

#### ***Demand v Capacity - Carrickmines Stop***

From Brides Glen to Sandyford, the peak inbound demand during the AM Peak Hour 08h00 – 09h00 occurs between Glencairn and Central Park (at 1,618 passengers). The relevant demand v capacity data is summarised below:

• Peak Inbound Demand (2019)	:	1,618 passengers per hour
• Future Boardings at Carrickmines Stop	:	131 passengers per hour
• Total Inbound Demand	:	1,749 persons per hour
• Inbound Capacity	:	3,150 passengers per hour
• Spare Capacity:	:	1,401 passengers per hour
• % Spare capacity	:	44% of 3,150 passengers per hour

The peak outbound demand occurs on the adjoining section between Sandyford and Central Park but is significantly lower than the peak inbound demand.

In the Luas Green Line section between Sandyford and City Centre, the peak inbound demand during the AM Peak Hour (08h00 to 09h00) occurs between Milltown and Cowper (at 4,648 passengers). The relevant demand v capacity data is summarised below:

- Peak Inbound Demand (2019) : 4,648 passengers per hour
- Future Boardings at Carrickmines Stop : 131 passengers per hour
- Total Inbound Demand : 4,779 persons per hour
- Inbound Capacity : 6,300 passengers per hour
- Spare Capacity: : 1,521 passengers per hour
- % Spare Capacity : 24% of 6,300 passengers per hour

The peak outbound demand occurs on the adjoining section between Milltown and Windy Arbour but is significantly lower than the inbound demand.

In summary it can be concluded that, post development, the Luas Green Line will continue to operate within capacity at the Carrickmines Stop, and at the locations of peak loading between both the sections between Brides Glen Stop and Sandyford and between the Sandyford and City Centre.

### 9.2.3 Go Car Services

There is one Go Car station within the vicinity of the proposed development which is located at the Carrickmines Park Shopping Centre. This is 1 km away (c.14-minute walk) from the subject site. At the time of writing this report, the Go Car provides one car, and one van at this station.

## 9.3 Pedestrian and Cyclist Facilities

### 9.3.1 Pedestrian

#### *Existing Facilities*

In the vicinity of the proposed development, pedestrians can benefit from the provision of a good standard footpaths with well-located public street lighting. Footpaths along Glenamuck Road North are separated from the road by a kerbed cycle lane and continue south towards Carrickmines Park Shopping Centre which is approximately 1 km away (c.14-minute walk).

To the North of Glenamuck Road North, there are dedicated signalised pedestrian crossings provided. These pedestrian crossings include dropped kerbs and tactile paving facilities which currently facilitate the movement of all users.

#### *Future Pedestrian Facilities*

Footpaths proposed within the subject development will be provided in accordance with Section 4.3.1 of DMURS which suggests that a minimum 1.8m footpath should be provided on all footways. In this regard, footpaths proposed are generally provided with a width of 2.0m. In addition, proposed crossing points are located at various points within the development such that unimpeded pedestrian movement is facilitated.

### 9.3.2 Cyclist

#### *Existing Cycle Facilities*

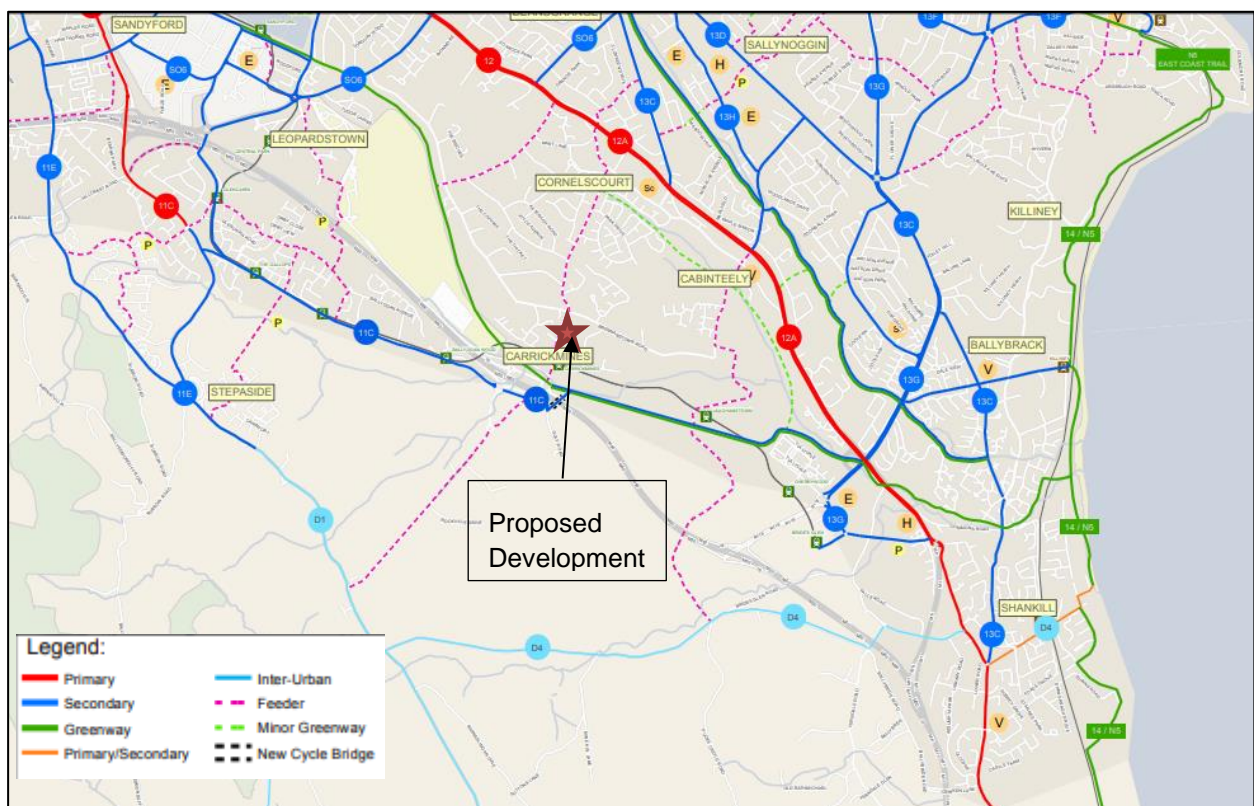
There is currently a cycle lane immediately adjacent to Glenamuck Road North as part of the existing cycle network. Figure 6 – presented in Section 3.2 of this report, shows that there are no cycle lanes to the north

or to the east of the site. There are cycle lanes provided up to Carrickmines Park Shopping Centre and also to the west, leading to Sandyford.

#### *Future Cycle Facilities*

The Greater Dublin Area Cycle Network Plan (GDA) proposes to expand the cycle network to provide new connections between zones in the Greater Dublin Area, Figure 21 below provides an overview of the proposals for the area of Southeast of Dublin planned as part of the GDA Cycle Network Plan.

These proposals include a greenway directly south of the proposed development site which continues in the westerly direction towards Sandyford. Immediately adjacent to Glenamuck Road North there is a proposal of a feeder cycle route connecting up to the N11 corridor - a primary cycle route which connects the area to Dublin City Centre.



**Figure 21:** Proposed Cycle Network - Dublin Southeast - Sheet 8



## 10. Parking Provision

### 10.1 Car Parking

#### 10.1.1 Dun Laoighre-Rathdown Development Plan 2016-2022 Standards

Table 8.2.3 Residential Land Use – Car Parking Standards within Chapter 8.2 of the Dun Laoghaire Rathdown Development Plan 2016-2022 outlines the car parking standards for various types of developments.

Based on these standards Table 13 below details the car parking spaces required for the proposed development.

Land Use	Units	Parking Standards	Car Parking Required
<b>Apartments – 1 Bed</b>	34	1 per unit	34
<b>Apartments – 2 Bed</b>	76	1.5 per unit	114
<b>Apartments – 3 Bed+</b>	8	2 per unit	16
<b>Total</b>	118	-	164

**Table 13: DLRCC Development Plan (2016-2022) Standards**

Based on the current Development Plan the total number of spaces that would be required to serve the proposed development would be 164.

In the pending (at time of writing) draft DLRCC 2022-2028 development plan, the subject site (Zone 2, near public transport) development maximum parking standards require 1 space per 1-bed & 2-bed and 2 spaces per 3+ bed. This equates to 126 spaces overall.

#### 10.1.2 Sustainable Urban Housing: Design Standards for New Apartments – Dec 2020

As per the Design Standards for New Apartments – Guidelines for Planning authorities – December 2020, the subject proposed development meets criteria for reasonable grounds to minimise car parking provisions. It is located within 2 minutes' walk of a bus stop and 2 minutes' walk of the LUAS station which provides direct access to the City Centre. The proposed development is located within a 14-minute walk of Carrickmines Park – a centre for various amenities and service. An extract from the Design Standards for New Apartments is provided below:

*'In suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre), as per guidelines mentioned above, planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard.'*

### 10.1.3 Car Parking Proposed

Based on the Dun Laoghaire Rathdown Development Plan and the Sustainable Urban Housing: Design Standards for New Apartments – December 2020 as summarised above; the number of car parking spaces proposed is 103 spaces which equates to 0.87 spaces per unit. This is broken down further in Table 14 below.

Parking Area	No. of Car Parking
<b>Basement Parking</b>	67 (44 at basement Blocks A and B and 23 at basement Block C)
<b>Surface Parking</b>	36 (surface level)
<b>Total</b>	103

**Table 14: Proposed Car Parking**

Based on the Dun Laoghaire Rathdown Development Plan and the Design Standards for new Apartments, the number of car parking spaces proposed is assumed to be sufficient to serve the proposed development due to the location of the site in relation to public transport facilities and employment centres.

17 no. car parking spaces (16.5%) will have fully operational electric charging points for electric vehicles (10 no. in the basement of Block B and 7 no in the basement of Block C).

A total of 5 no. disabled parking spaces are also proposed within the development (4 no. at surface level and 1 no. in the basement of Block B). Refer to Waterman Moylan Drg No. 13-125-P201 accompanying the documentation package

## 10.2 Cycle Parking

### 10.2.1 Dun Laoghaire-Rathdown Council Cycling Policy Guidelines and Standards

Standards for cycle parking in a new development are set out in Table 4.1 of the Standards for Cycle Parking and associated Cycling Facilities for New Developments published by Dun Laoghaire Rathdown County Council Municipal Services Department in January 2018. The cycle parking standards for the subject proposed development are shown in Table 15 below.

Land Use	No. of Units	Standards	Spaces Required
<b>Apartments 1 – Bed</b>	34	1 space per unit	34
<b>Apartments 2 – Bed</b>	76	1.5 spaces per unit	114
<b>Apartments 3 – Bed</b>	8	2 spaces per unit	16
<b>Total</b>	-	-	164

**Table 15: DLRCC Development Plan (2016-2022) Standards**

### 10.2.2 Sustainable Urban Housing: Design Standards for New Apartments - Dec 2020

The Design Standards for New Apartments – December 2020 sets out cycle parking standards for new apartments. Cycling provides a flexible, efficient and attractive transport option for urban living and these guidelines require that this transport mode is fully integrated into the design and operation of all new apartment development schemes.

An extract from the design standards – “a general minimum standard of 1 cycle storage space per bedroom shall be applied. For studio units, at least 1 cycle storage space shall be provided. Visitor cycle parking shall also be provided at a standard of 1 space per 2 residential units. Any deviation from these standards shall be at the discretion of the planning authority and shall be justified with respect to factors such as location, quality of facilities proposed, flexibility for future enhancement/enlargement, etc.”

Based on the standards set out above, the proposed development is required to provide a total of 269 cycle parking spaces (210 for residents and 59 for visitors).

### 10.2.3 Cycle Parking Proposed

A total of 280 cycle parking spaces and 5 motorcycle spaces are proposed. This proposal exceeds the requirements set out in both the Dun Laghaire-Rathdown County Council Cycling Policy and Standards and the Design Standards for New Apartments and is considered appropriate to serve the subject proposed development. The cycle/motorcycle parking spaces are broken down in Table 16 below.

Parking Area	No. of Cycle Parking
<b>Basement Parking (Blocks A &amp; B)</b>	202
<b>Surface Parking (Block A)</b>	10
<b>Surface Parking (Block B)</b>	8
<b>Basement Parking (Block C)</b>	52
<b>Surface Parking (Block C)</b>	8
<b>Motorcycle Basement Parking (Blocks A &amp; B)</b>	3
<b>Motorcycle Basement Parking (Block C)</b>	2
<b>Total</b>	280 Cycle Parking Spaces and 5 Motorcycle Parking Spaces

**Table 16:** Cycle and Motorcycle Parking Spaces Proposed.

Bicycle parking is provided by a combination of short-stay spaces externally at ground level and by long-term storage in bicycle stores located at basement level. The level of bicycle storage is provided at a rate of 2.15 spaces per apartment along with 26 no. of visitor spaces at entrance level to each Block externally.

Long term cycle parking is provided in the basements of both Blocks B & C. The bicycle storage area will be provided with 10% charging points to accommodate electric bicycles for residents. Sheffield Stands will be used at surface level with two tier cycle racks in the storage areas as indicated on the site layout plan and floor plans accompanying the documentation package.

## 11. Conclusion

Waterman Moylan Consulting Engineers have been appointed by Moran Park Home Builders to prepare this Traffic and Transport Assessment (TTA) in support of a planning application for a proposed residential development at Chigwell, Carrickmines, Dublin 18, Co. Dublin.

The proposed development will consist of 118 apartments separated in 3 blocks. Access to the proposed development will be provided from Glenamuck Road North via a new priority-controlled T-junction with dedicated right turning lane. There is a committed development (Ref 18A/1187 and PL06D.304995) connected to the proposed development which will use the same access point. The committed development is for 30 residential units (8 Apartments and 22 duplexes).

The volume of traffic expected to be generated by the proposed development has been derived using the trip rates from TRICS database and from the approved TIA prepared for the committed development.

The trips generated by the proposed development are 7 arrivals and 32 departures for the AM Peak Hour, and 30 arrivals and 11 departures for the PM Peak Hour.

The below two junctions were investigated in this TTA:

**Junction 1 (Existing Priority T-junction):** Glenamuck Road North / Pavilion Gate.

**Junction 2 (Proposed Priority T-junction):** Glenamuck Road North / Proposed Development Access Road.

Traffic increase generated by the committed and proposed developments were estimated to be lower than 5% on both junctions and therefore no further analysis was required. However, as Junction 2 is the proposed site access and will be the only access point to the site, it was modelled.

The analysis results indicated that the proposed priority T-junction (Junction 2) would operate with RFCs way below the threshold (0.85) during all assessed scenarios (2024, 2029 and 2039 + Committed and Proposed Developments). Queue lengths were also recorded very low; however, the delays at the Site Access Road were recorded at relatively high levels for the future 2039 and 2039 scenarios. This is due to the already elevated traffic demand on both sides of the Glenamuck Road North. High levels of delays on the Site Access Road indicate that residents would have to wait for a gap opportunity to enter the Glenamuck Road North, which can be very inconvenient. However, from the analysis carried out in this TTA, this is expected to occur only for a short period of time during the PM peak.

Dun Laoghaire-Rathdown County Council Traffic Section indicated that a signalised access junction to the site is currently premature. However, as a signalised junction may be required in the future, the provision of all infrastructure for future signalisation is required. In this regard, the layout of the proposed priority-controlled T-junction is designed in a way that can be easily converted to a signalised T-junction when needed.

The total number of parking spaces proposed for the subject development is: 103 car parking spaces, 280 bicycle parking spaces and 5 motorcycle parking spaces. Based on the Dun Laoghaire Rathdown County Council Parking Standards and the Sustainable Urban Housing: Design Standards for New Apartments – December 2020, and the location of the proposed development in relation to good quality public transport and employment areas, the number of car and cycle parking spaces proposed are considered sufficient to serve the subject development.

## **APPENDICES**

## **A. Traffic Survey**

Site No. 1  
Location Glenamuck Road(N) / Pavilion Gate / Glenamuck Road(S)  
Date Tuesday 2 February 2016

Time	A to C - Glenamuck Road(N) to Glenamuck Road(S)		Veh. Total	A to B - Glenamuck Road(N) to Pavilion Gate		Veh. Total
	LV	HV		LV	HV	
07:00	51	1	52	0	0	0
07:15	81	0	81	1	0	1
07:30	101	3	104	0	0	0
07:45	140	0	140	0	0	0
08:00	179	1	180	4	0	4
08:15	197	2	199	2	0	2
08:30	254	3	257	1	0	1
08:45	132	1	133	0	0	0
09:00	104	0	104	0	0	0
09:15	69	3	72	1	0	1
09:30	61	1	62	2	0	2
09:45	66	0	66	0	0	0
Total	1435	15	1450	11	0	11

Peak Hour 08:00 to 09:00

08:00	179	1	180	4	0	4
08:15	197	2	199	2	0	2
08:30	254	3	257	1	0	1
08:45	132	1	133	0	0	0
Total	762	7	769	7	0	7

Date Tuesday 2 February 2016

Time	A to C - Glenamuck Road(N) to Glenamuck Road(S)		Veh. Total	A to B - Glenamuck Road(N) to Pavilion Gate		Veh. Total
	LV	HV		LV	HV	
16:00	125	1	126	0	0	0
16:15	133	2	135	1	0	1
16:30	172	1	173	1	0	1
16:45	234	1	235	0	0	0
17:00	277	3	280	0	0	0
17:15	293	2	295	2	0	2
17:30	316	3	319	3	0	3
17:45	332	2	334	1	0	1
18:00	291	4	295	0	0	0
18:15	243	2	245	0	0	0
18:30	215	3	218	2	0	2
18:45	187	2	189	1	0	1
Total	2818	26	2844	11	0	11

Peak Hour 17:15 to 18:15

17:15	293	2	295	2	0	2
17:30	316	3	319	3	0	3
17:45	332	2	334	1	0	1
18:00	291	4	295	0	0	0
Total	1232	11	1243	6	0	6

Site No. 1  
Location Glenamuck Road(N) / Pavilion Gate / Glenamuck Road(S)  
Date Tuesday 2 February 2016

Time	B to A - Pavilion Gate to Glenamuck Road(N)		Veh. Total	B to C - Pavilion Gate to Glenamuck Road(S)		Veh. Total
	LV	HV		LV	HV	
07:00	0	0	0	1	0	1
07:15	1	0	1	0	0	0
07:30	0	0	0	0	0	0
07:45	2	0	2	0	0	0
08:00	1	0	1	1	0	1
08:15	1	0	1	2	0	2
08:30	1	0	1	0	0	0
08:45	2	0	2	1	0	1
09:00	0	0	0	0	0	0
09:15	1	0	1	0	0	0
09:30	0	0	0	0	0	0
09:45	0	0	0	1	0	1
Total	9	0	9	6	0	6

Peak Hour 08:00 to 09:00

08:00	1	0	1	1	0	1
08:15	1	0	1	2	0	2
08:30	1	0	1	0	0	0
08:45	2	0	2	1	0	1
Total	5	0	5	4	0	4

Date Tuesday 2 February 2016

Time	B to A - Pavilion Gate to Glenamuck Road(N)		Veh. Total	B to C - Pavilion Gate to Glenamuck Road(S)		Veh. Total
	LV	HV		LV	HV	
16:00	0	0	0	0	0	0
16:15	1	0	1	2	0	2
16:30	1	0	1	0	0	0
16:45	0	0	0	1	0	1
17:00	0	0	0	0	0	0
17:15	1	0	1	0	0	0
17:30	0	0	0	1	0	1
17:45	0	0	0	0	0	0
18:00	1	0	1	1	0	1
18:15	0	0	0	3	0	3
18:30	2	0	2	1	0	1
18:45	0	0	0	2	0	2
Total	6	0	6	11	0	11

Peak Hour 17:15 to 18:15

17:15	1	0	1	0	0	0
17:30	0	0	0	1	0	1
17:45	0	0	0	0	0	0
18:00	1	0	1	1	0	1
Total	2	0	2	2	0	2



Site No. 1  
Location Glenamuck Road(N) / Pavilion Gate / Glenamuck Road(S)  
Date Tuesday 2 February 2016

Time	C to B - Glenamuck Road(S) to Pavilion Gate		Veh. Total	C to A - Glenamuck Road(S) to Glenamuck Road(N)		Veh. Total
	LV	HV		LV	HV	
07:00	0	0	0	64	2	66
07:15	1	0	1	90	1	91
07:30	1	0	1	150	1	151
07:45	0	0	0	170	5	175
08:00	2	0	2	215	3	218
08:15	0	0	0	241	4	245
08:30	1	0	1	263	5	268
08:45	0	0	0	252	6	258
09:00	0	0	0	201	3	204
09:15	0	0	0	148	4	152
09:30	1	0	1	127	2	129
09:45	2	0	2	88	3	91
Total	8	0	8	2009	39	2048

Peak Hour 08:00 to 09:00

08:00	2	0	2	215	3	218
08:15	0	0	0	241	4	245
08:30	1	0	1	263	5	268
08:45	0	0	0	252	6	258
Total	3	0	3	971	18	989

Date Tuesday 2 February 2016

Time	C to B - Glenamuck Road(S) to Pavilion Gate		Veh. Total	C to A - Glenamuck Road(S) to Glenamuck Road(N)		Veh. Total
	LV	HV		LV	HV	
16:00	0	0	0	117	2	119
16:15	1	0	1	128	2	130
16:30	2	0	2	143	1	144
16:45	1	0	1	195	3	198
17:00	0	0	0	241	1	242
17:15	1	0	1	268	2	270
17:30	0	0	0	289	1	290
17:45	2	0	2	302	3	305
18:00	1	0	1	258	2	260
18:15	2	0	2	223	3	226
18:30	0	0	0	188	4	192
18:45	1	0	1	163	2	165
Total	11	0	11	2515	26	2541

Peak Hour 17:15 to 18:15

17:15	1	0	1	268	2	270
17:30	0	0	0	289	1	290
17:45	2	0	2	302	3	305
18:00	1	0	1	258	2	260
Total	4	0	4	1117	8	1125

Site No. 1  
Location Glenamuck Road(N) / Pavilion Gate / Glenamuck Road(S)  
Date Tuesday 2 February 2016

Time	To Arm A - Glenamuck Road(N)		Veh. Total	From Arm A - Glenamuck Road(N)		Veh. Total
	LV	HV		LV	HV	
07:00	64	2	66	51	1	52
07:15	91	1	92	82	0	82
07:30	150	1	151	101	3	104
07:45	172	5	177	140	0	140
08:00	216	3	219	183	1	184
08:15	242	4	246	199	2	201
08:30	264	5	269	255	3	258
08:45	254	6	260	132	1	133
09:00	201	3	204	104	0	104
09:15	149	4	153	70	3	73
09:30	127	2	129	63	1	64
09:45	88	3	91	66	0	66
Total	2018	39	2057	1446	15	1461

Peak Hour 08:00 to 09:00

08:00	216	3	219	183	1	184
08:15	242	4	246	199	2	201
08:30	264	5	269	255	3	258
08:45	254	6	260	132	1	133
Total	976	18	994	769	7	776

Date Tuesday 2 February 2016

Time	To Arm A - Glenamuck Road(N)		Veh. Total	From Arm A - Glenamuck Road(N)		Veh. Total
	LV	HV		LV	HV	
16:00	117	2	119	125	1	126
16:15	129	2	131	134	2	136
16:30	144	1	145	173	1	174
16:45	195	3	198	234	1	235
17:00	241	1	242	277	3	280
17:15	269	2	271	295	2	297
17:30	289	1	290	319	3	322
17:45	302	3	305	333	2	335
18:00	259	2	261	291	4	295
18:15	223	3	226	243	2	245
18:30	190	4	194	217	3	220
18:45	163	2	165	188	2	190
Total	2521	26	2547	2829	26	2855

Peak Hour 17:15 to 18:15

17:15	269	2	271	295	2	297
17:30	289	1	290	319	3	322
17:45	302	3	305	333	2	335
18:00	259	2	261	291	4	295
Total	1119	8	1127	1238	11	1249

Site No. 1  
Location Glenamuck Road(N) / Pavilion Gate / Glenamuck Road(S)  
Date Tuesday 2 February 2016

Time	To Arm B - Pavilion Gate		Veh. Total	From Arm B - Pavilion Gate		Veh. Total
	LV	HV		LV	HV	
07:00	0	0	0	1	0	1
07:15	2	0	2	1	0	1
07:30	1	0	1	0	0	0
07:45	0	0	0	2	0	2
08:00	6	0	6	2	0	2
08:15	2	0	2	3	0	3
08:30	2	0	2	1	0	1
08:45	0	0	0	3	0	3
09:00	0	0	0	0	0	0
09:15	1	0	1	1	0	1
09:30	3	0	3	0	0	0
09:45	2	0	2	1	0	1
Total	19	0	19	15	0	15

Peak Hour 08:00 to 09:00

08:00	6	0	6	2	0	2
08:15	2	0	2	3	0	3
08:30	2	0	2	1	0	1
08:45	0	0	0	3	0	3
Total	10	0	10	9	0	9

Date Tuesday 2 February 2016

Time	To Arm B - Pavilion Gate		Veh. Total	From Arm B - Pavilion Gate		Veh. Total
	LV	HV		LV	HV	
16:00	0	0	0	0	0	0
16:15	2	0	2	3	0	3
16:30	3	0	3	1	0	1
16:45	1	0	1	1	0	1
17:00	0	0	0	0	0	0
17:15	3	0	3	1	0	1
17:30	3	0	3	1	0	1
17:45	3	0	3	0	0	0
18:00	1	0	1	2	0	2
18:15	2	0	2	3	0	3
18:30	2	0	2	3	0	3
18:45	2	0	2	2	0	2
Total	22	0	22	17	0	17

Peak Hour 17:15 to 18:15

17:15	3	0	3	1	0	1
17:30	3	0	3	1	0	1
17:45	3	0	3	0	0	0
18:00	1	0	1	2	0	2
Total	10	0	10	4	0	4

Site No. 1  
Location Glenamuck Road(N) / Pavilion Gate / Glenamuck Road(S)  
Date Tuesday 2 February 2016

Time	To Arm C - Glenamuck Road(S)		Veh. Total	From Arm C - Glenamuck Road(S)		Veh. Total
	LV	HV		LV	HV	
07:00	52	1	53	64	2	66
07:15	81	0	81	91	1	92
07:30	101	3	104	151	1	152
07:45	140	0	140	170	5	175
08:00	180	1	181	217	3	220
08:15	199	2	201	241	4	245
08:30	254	3	257	264	5	269
08:45	133	1	134	252	6	258
09:00	104	0	104	201	3	204
09:15	69	3	72	148	4	152
09:30	61	1	62	128	2	130
09:45	67	0	67	90	3	93
Total	1441	15	1456	2017	39	2056

Peak Hour 08:00 to 09:00

08:00	180	1	181	217	3	220
08:15	199	2	201	241	4	245
08:30	254	3	257	264	5	269
08:45	133	1	134	252	6	258
Total	766	7	773	974	18	992

Date Tuesday 2 February 2016

Time	To Arm C - Glenamuck Road(S)		Veh. Total	From Arm C - Glenamuck Road(S)		Veh. Total
	LV	HV		LV	HV	
16:00	125	1	126	117	2	119
16:15	135	2	137	129	2	131
16:30	172	1	173	145	1	146
16:45	235	1	236	196	3	199
17:00	277	3	280	241	1	242
17:15	293	2	295	269	2	271
17:30	317	3	320	289	1	290
17:45	332	2	334	304	3	307
18:00	292	4	296	259	2	261
18:15	246	2	248	225	3	228
18:30	216	3	219	188	4	192
18:45	189	2	191	164	2	166
Total	2829	26	2855	2526	26	2552

Peak Hour 17:15 to 18:15

17:15	293	2	295	269	2	271
17:30	317	3	320	289	1	290
17:45	332	2	334	304	3	307
18:00	292	4	296	259	2	261
Total	1234	11	1245	1121	8	1129

## **B. TRICS Report**



Calculation Reference: AUDIT-561501-210218-0235

## TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL  
 Category : C - FLATS PRIVATELY OWNED

### TOTAL VEHICLES

#### Selected regions and areas:

<b>11</b>	<b>SCOTLAND</b>	
	EB	CITY OF EDINBURGH
		1 days
<b>15</b>	<b>GREATER DUBLIN</b>	
	DL	DUBLIN
		6 days

*This section displays the number of survey days per TRICS® sub-region in the selected set*

## Primary Filtering selection:

*This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.*

Parameter: No of Dwellings  
 Actual Range: 20 to 140 (units: )  
 Range Selected by User: 18 to 150 (units: )

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

#### Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/12 to 22/11/16

*This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.*

#### Selected survey days:

Tuesday	6 days
Wednesday	1 days

*This data displays the number of selected surveys by day of the week.*

#### Selected survey types:

Manual count	7 days
Directional ATC Count	0 days

*This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.*

#### Selected Locations:

Suburban Area (PPS6 Out of Centre)	5
Neighbourhood Centre (PPS6 Local Centre)	2

*This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.*

#### Selected Location Sub Categories:

Residential Zone	6
Built-Up Zone	1

*This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.*

**Secondary Filtering selection:**

Use Class:

C3 7 days

*This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.*

Population within 500m Range:

All Surveys Included

Population within 1 mile:

20,001 to 25,000 1 days  
25,001 to 50,000 6 days

*This data displays the number of selected surveys within stated 1-mile radii of population.*

Population within 5 miles:

250,001 to 500,000 2 days  
500,001 or More 5 days

*This data displays the number of selected surveys within stated 5-mile radii of population.*

Car ownership within 5 miles:

0.6 to 1.0 3 days  
1.1 to 1.5 4 days

*This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.*

Travel Plan:

No 7 days

*This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.*

PTAL Rating:

No PTAL Present 7 days

*This data displays the number of selected surveys with PTAL Ratings.*

LIST OF SITES relevant to selection parameters

<b>1</b>	<b>DL-03-C-11</b>	<b>BLOCK OF FLATS</b>	<b>DUBLIN</b>
	WYCKHAM WAY		
	DUBLIN		
	DUNDRUM		
	Neighbourhood Centre (PPS6 Local Centre)		
	Residential Zone		
	Total No of Dwellings:	96	
	Survey date: TUESDAY	10/09/13	Survey Type: MANUAL
<b>2</b>	<b>DL-03-C-12</b>	<b>BLOCK OF FLATS</b>	<b>DUBLIN</b>
	BOOTERSTOWN AVENUE		
	DUBLIN		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	47	
	Survey date: TUESDAY	10/09/13	Survey Type: MANUAL
<b>3</b>	<b>DL-03-C-13</b>	<b>BLOCK OF FLATS</b>	<b>DUBLIN</b>
	SANDYFORD ROAD		
	DUBLIN		
	Neighbourhood Centre (PPS6 Local Centre)		
	Built-Up Zone		
	Total No of Dwellings:	52	
	Survey date: TUESDAY	10/09/13	Survey Type: MANUAL
<b>4</b>	<b>DL-03-C-14</b>	<b>BLOCKS OF FLATS</b>	<b>DUBLIN</b>
	BALLINTEER ROAD		
	DUBLIN		
	DUNDRUM		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	140	
	Survey date: TUESDAY	10/09/13	Survey Type: MANUAL
<b>5</b>	<b>DL-03-C-15</b>	<b>BLOCKS OF FLATS</b>	<b>DUBLIN</b>
	MONKSTOWN ROAD		
	DUBLIN		
	MONKSTOWN		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	20	
	Survey date: WEDNESDAY	01/10/14	Survey Type: MANUAL
<b>6</b>	<b>DL-03-C-16</b>	<b>BLOCKS OF FLATS</b>	<b>DUBLIN</b>
	BOTANIC AVENUE		
	DUBLIN		
	DRUMCONDRA		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	31	
	Survey date: TUESDAY	22/11/16	Survey Type: MANUAL
<b>7</b>	<b>EB-03-C-01</b>	<b>BLOCKS OF FLATS</b>	<b>CITY OF EDINBURGH</b>
	MYRESIDE ROAD		
	EDINBURGH		
	CRAIGLOCKHART		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total No of Dwellings:	32	
	Survey date: TUESDAY	26/05/15	Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

**TOTAL VEHICLES****Calculation factor: 1 DWELLS****BOLD print indicates peak (busiest) period**

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	60	0.057	<b>7</b>	<b>60</b>	<b>0.280</b>	7	60	0.337
08:00 - 09:00	7	60	0.062	7	60	0.270	7	60	0.332
09:00 - 10:00	7	60	0.050	7	60	0.096	7	60	0.146
10:00 - 11:00	7	60	0.024	7	60	0.069	7	60	0.093
11:00 - 12:00	7	60	0.038	7	60	0.055	7	60	0.093
12:00 - 13:00	7	60	0.065	7	60	0.089	7	60	0.154
13:00 - 14:00	7	60	0.074	7	60	0.060	7	60	0.134
14:00 - 15:00	7	60	0.108	7	60	0.060	7	60	0.168
15:00 - 16:00	7	60	0.093	7	60	0.053	7	60	0.146
16:00 - 17:00	7	60	0.122	7	60	0.065	7	60	0.187
17:00 - 18:00	7	60	0.187	7	60	0.050	7	60	0.237
18:00 - 19:00	<b>7</b>	<b>60</b>	<b>0.254</b>	7	60	0.089	<b>7</b>	<b>60</b>	<b>0.343</b>
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.134			1.236			2.370

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is:  $COUNT/TRP*FACT$ . Trip rates are then rounded to 3 decimal places.

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**Parameter summary**

Trip rate parameter range selected:	20 - 140 (units: )
Survey date range:	01/01/12 - 22/11/16
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

**CARS**

**Calculation factor: 1 DWELLS**

**BOLD print indicates peak (busiest) period**

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	60	0.005	<b>7</b>	<b>60</b>	<b>0.033</b>	<b>7</b>	<b>60</b>	<b>0.038</b>
08:00 - 09:00	7	60	0.005	7	60	0.017	7	60	0.022
09:00 - 10:00	7	60	0.010	7	60	0.007	7	60	0.017
10:00 - 11:00	7	60	0.010	7	60	0.014	7	60	0.024
11:00 - 12:00	7	60	0.010	7	60	0.012	7	60	0.022
12:00 - 13:00	7	60	0.012	7	60	0.019	7	60	0.031
13:00 - 14:00	7	60	0.014	7	60	0.012	7	60	0.026
14:00 - 15:00	7	60	0.017	7	60	0.005	7	60	0.022
15:00 - 16:00	7	60	0.019	7	60	0.010	7	60	0.029
16:00 - 17:00	7	60	0.014	7	60	0.012	7	60	0.026
17:00 - 18:00	<b>7</b>	<b>60</b>	<b>0.022</b>	7	60	0.012	7	60	0.034
18:00 - 19:00	7	60	0.012	7	60	0.007	7	60	0.019
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:	0.150			0.160			0.310		

*This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.*

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP\*FACT. Trip rates are then rounded to 3 decimal places.*



## **C. PICADY Output Report**

Junctions 9									
PICADY 9 - Priority Intersection Module									
Version: 9.5.1.7462 © Copyright TRL Limited, 2019									
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk									
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution									

Filename: Junction 2.j9

Path: M:\Projects\13\13-125\Design\Traffic\Junction Analysis\2022 - Junction Analysis\February 2022

Report generation date: 09/02/2022 23:19:38

»JUNCTION 2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, AM  
 »JUNCTION 2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM  
 »JUNCTION 2 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, AM  
 »JUNCTION 2 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM  
 »JUNCTION 2 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, AM  
 »JUNCTION 2 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM

### Summary of junction performance

	AM					PM				
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Set ID	Queue (Veh)	Delay (s)	RFC	LOS
	JUNCTION 2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS									
Stream B-AC	D1	0.2	15.30	0.15	C	D2	0.1	28.67	0.11	D
Stream C-B		0.0	7.19	0.01	A		0.0	9.61	0.04	A
	JUNCTION 2 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS									
Stream B-AC	D3	0.2	17.16	0.16	C	D4	0.2	43.37	0.15	E
Stream C-B		0.0	7.41	0.01	A		0.0	10.27	0.04	B
	JUNCTION 2 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS									
Stream B-AC	D5	0.2	18.94	0.18	C	D6	0.3	74.65	0.24	F
Stream C-B		0.0	7.59	0.01	A		0.0	10.85	0.05	B

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

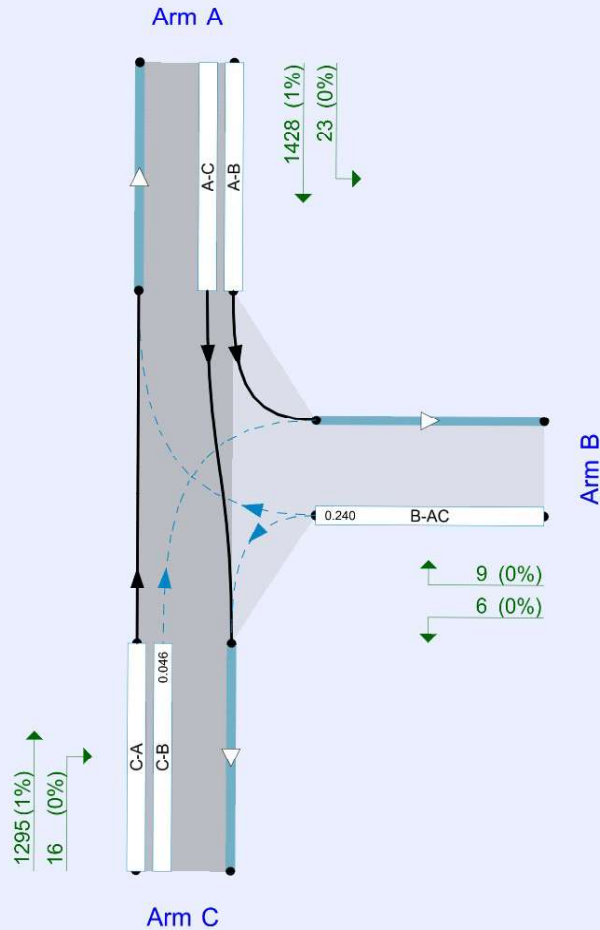
### File summary

#### File Description

Title	
Location	
Site number	
Date	07/02/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DOMAINf.silva
Description	

## Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin



Flows show original traffic demand (Veh/hr).  
Streams (downstream end) show RFC (l).

The junction diagram reflects the last run of Junctions.

## Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

## Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Single time segment only
D1	2024 + COMMITTED & PROPOSED DEVELOPMENTS	AM	FLAT	08:00	09:00	60	✓
D2	2024 + COMMITTED & PROPOSED DEVELOPMENTS	PM	FLAT	17:00	18:00	60	✓
D3	2029 + COMMITTED & PROPOSED DEVELOPMENTS	AM	FLAT	08:00	09:00	60	✓
D4	2029 + COMMITTED & PROPOSED DEVELOPMENTS	PM	FLAT	17:00	18:00	60	✓
D5	2039 + COMMITTED & PROPOSED DEVELOPMENTS	AM	FLAT	08:00	09:00	60	✓
D6	2039 + COMMITTED & PROPOSED DEVELOPMENTS	PM	FLAT	17:00	18:00	60	✓

## Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	JUNCTION 2	100.000



# JUNCTION 2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D4 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D6 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 6: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

## Junction Network

### Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.36	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Arms

### Arms

Arm	Name	Description	Arm type
A	untitled		Major
B	untitled		Minor
C	untitled		Major

### Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	9.00		✓	3.00	100.0		-

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

### Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.75	50	50



## Slope / Intercept / Capacity

### Priority Intersection Slopes and Intercepts

Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	506	0.080	0.202	0.127	0.289
B-C	639	0.085	0.215	-	-
C-B	687	0.231	0.231	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Single time segment only
D1	2024 + COMMITTED & PROPOSED DEVELOPMENTS	AM	FLAT	08:00	09:00	60	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		✓	780	100.000
B		✓	41	100.000
C		✓	996	100.000

## Origin-Destination Data

### Demand (Veh/hr)

	To			
		A	B	C
	A	0	7	773
	B	25	0	16
	C	992	4	0

## Vehicle Mix

### Heavy Vehicle Percentages

	To			
		A	B	C
	A	0	0	1
	B	0	0	0
	C	1	0	0

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS
B-AC	0.15	15.30	0.2	C
C-A				
C-B	0.01	7.19	0.0	A
A-B				
A-C				

### Main Results for each time segment

08:00 - 09:00

Stream	Total Demand (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	41	276	0.149	41	0.2	15.297	C
C-A	992			992			
C-B	4	505	0.008	4	0.0	7.190	A
A-B	7			7			
A-C	773			773			

# JUNCTION 2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D4 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D6 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 6: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

## Junction Network

### Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.24	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Single time segment only
D2	2024 + COMMITTED & PROPOSED DEVELOPMENTS	PM	FLAT	17:00	18:00	60	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		✓	1268	100.000
B		✓	15	100.000
C		✓	1145	100.000

## Origin-Destination Data

### Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	23	1245
	B	9	0	6
	C	1129	16	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
		A	B	C
	A	0	0	1
	B	0	0	0
	C	1	0	0

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS
B-AC	0.11	28.67	0.1	D
C-A				
C-B	0.04	9.61	0.0	A
A-B				
A-C				

### Main Results for each time segment

#### 17:00 - 18:00

Stream	Total Demand (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	15	140	0.107	15	0.1	28.666	D
C-A	1129			1129			
C-B	16	391	0.041	16	0.0	9.608	A
A-B	23			23			
A-C	1245			1245			

# JUNCTION 2 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D4 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D6 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 6: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

## Junction Network

### Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.37	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Single time segment only
D3	2029 + COMMITTED & PROPOSED DEVELOPMENTS	AM	FLAT	08:00	09:00	60	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		✓	845	100.000
B		✓	41	100.000
C		✓	1079	100.000

## Origin-Destination Data

### Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	7	838
	B	25	0	16
	C	1075	4	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
		A	B	C
	A	0	0	1
	B	0	0	0
	C	1	0	0

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS
B-AC	0.16	17.16	0.2	C
C-A				
C-B	0.01	7.41	0.0	A
A-B				
A-C				

### Main Results for each time segment

#### 08:00 - 09:00

Stream	Total Demand (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	41	250	0.164	41	0.2	17.159	C
C-A	1075			1075			
C-B	4	489	0.008	4	0.0	7.415	A
A-B	7			7			
A-C	838			838			

# JUNCTION 2 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D4 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D6 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 6: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

## Junction Network

### Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.31	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Single time segment only
D4	2029 + COMMITTED & PROPOSED DEVELOPMENTS	PM	FLAT	17:00	18:00	60	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		✓	1372	100.000
B		✓	15	100.000
C		✓	1239	100.000

## Origin-Destination Data

### Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	23	1349
	B	9	0	6
	C	1223	16	0



## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
		A	B	C
	A	0	0	1
	B	0	0	0
	C	1	0	0

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS
B-AC	0.15	43.37	0.2	E
C-A				
C-B	0.04	10.27	0.0	B
A-B				
A-C				

### Main Results for each time segment

#### 17:00 - 18:00

Stream	Total Demand (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	15	98	0.154	15	0.2	43.369	E
C-A	1223			1223			
C-B	16	366	0.044	16	0.0	10.274	B
A-B	23			23			
A-C	1349			1349			

# JUNCTION 2 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D4 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D6 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 6: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

## Junction Network

### Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.38	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Single time segment only
D5	2039 + COMMITTED & PROPOSED DEVELOPMENTS	AM	FLAT	08:00	09:00	60	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		✓	894	100.000
B		✓	41	100.000
C		✓	1142	100.000

## Origin-Destination Data

### Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	7	887
	B	25	0	16
	C	1138	4	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
		A	B	C
	A	0	0	1
	B	0	0	0
	C	1	0	0

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS
B-AC	0.18	18.94	0.2	C
C-A				
C-B	0.01	7.59	0.0	A
A-B				
A-C				

### Main Results for each time segment

#### 08:00 - 09:00

Stream	Total Demand (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	41	231	0.178	41	0.2	18.943	C
C-A	1138			1138			
C-B	4	478	0.008	4	0.0	7.594	A
A-B	7			7			
A-C	887			887			

# JUNCTION 2 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D2 - 2024 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 2: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D4 - 2029 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 4: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?
Warning	Demand Sets	D6 - 2039 + COMMITTED & PROPOSED DEVELOPMENTS, PM	Demand Set 6: Scenario Name includes Time Period Name ('PM'). Are you sure this is correct?

## Junction Network

### Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.46	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Single time segment only
D6	2039 + COMMITTED & PROPOSED DEVELOPMENTS	PM	FLAT	17:00	18:00	60	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		✓	1451	100.000
B		✓	15	100.000
C		✓	1311	100.000

## Origin-Destination Data

### Demand (Veh/hr)

	To			
	A	B	C	
From	A	0	23	1428
	B	9	0	6
	C	1295	16	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	A	B	C	
	0	0	1	
	0	0	0	
	1	0	0	

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS
B-AC	0.24	74.65	0.3	F
C-A				
C-B	0.05	10.85	0.0	B
A-B				
A-C				

### Main Results for each time segment

#### 17:00 - 18:00

Stream	Total Demand (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	15	63	0.240	15	0.3	74.646	F
C-A	1295			1295			
C-B	16	348	0.046	16	0.0	10.846	B
A-B	23			23			
A-C	1428			1428			

# UK and Ireland Office Locations

