

# DLR Central Active Travel Scheme

Traffic Assessment

Dún Laoighaire Rathdown County Council

Project reference: 60661468

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<b>Revision</b>	<b>Revision date</b>	<b>Details</b>	<b>Authorized</b>	<b>Name</b>	<b>Position</b>
1	11 February 2022	Draft for Design Team Review	SG	Shaun Grima	Associate Director
2	02 March 2022	Draft for Client Review	BMcM	Brian McMahon	Associate Director
3	20 April 2022	Draft for Client Review	BMcM	Brian McMahon	Associate Director
3	15 <sup>th</sup> August 2022	Public Consultation	BMcM	Brian McMahon	Associate Director

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## 1. Introduction

AECOM Ireland Ltd on behalf of Dun Laoghaire-Rathdown County Council (DLRCC) has undertaken a Transport Assessment report, reviewing the proposed scheme against the existing traffic conditions. The purpose of the Traffic Assessment is to appraise the existing traffic conditions, understand the potential impacts associated with the emerging junction layouts to inform the preferred scheme.

The study area consists of 2.8km of roadway in the in the centre of Dun Laoghaire encompassing Kill Avenue, Mounttown Road Lower, Mounttown Road Upper and Glenageary Road Upper between the junctions of Oliver Plunkett Road and the junction of Sallynoggin Road.

The scheme aims to improve the current facilities along this busy cycling and walking route; provide an enhanced environment to cater for the increasing cycling and walking demand; and provide improved connections to other key cycling routes.

### 1.1 Project Background

The need for the scheme was identified as part of the DLRCC Development Plan, which aims to promote and provide for the development of cycling and walking as healthy sustainable attractive transport modes in the County for commuting, short utility trips, recreation trips and trips to schools/colleges. The scheme has been developed having regard to relevant policies, strategies, and plans.

A number of broad design principles contained within the National Cycle Manual, the Design Manual for Urban Roads and Streets (DMURS), and TII publications were adopted when assessing design options for the scheme, including Principles of Sustainable Safety, Quality of Service, width, integration and segregation, junctions, access and interchange, impact on other modes of transport.

The proposed study area is shown in Figure 1.1 below.



Figure 1.1: Study Area

### 1.2 Scheme Objectives

The proposed scheme being brought forward for Part 8 will help deliver the following objectives:

- To provide continuous, high-quality and consistent cycling and walking facilities;
- To provide improved public realm areas and enhance the overall visual quality;
- Promote modal shift from private vehicle to more sustainable modes including walking, cycling and public transport;

- Enhance permeability and creating a place for all ages and abilities;
- Improve bus priority along Kill Avenue up to the Bakers Corner Junction;
- Protect and enhance sensitive landscapes;
- Enhance safety for all road users including vulnerable persons.

## 2. Traffic Surveys

In order to establish the existing local road networks traffic characteristics and subsequently enable the identification of the potential impact of the proposed changes to the junction layouts development, traffic surveys were commissioned in September 2021.

The traffic surveys (weekday classified junction turning counts) were conducted by an independent survey company, IDASO over a 12-hr survey period from 07:00 – 19:00 on Wednesday 29<sup>th</sup> September 2021. The survey was undertaken at the following locations (see Figure 2.1):

- Junction 1: Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park (5-arm Signal Controlled Junction).
- Junction 2: Kill Avenue / Claremont Avenue (3-arm Signal Controlled Junction).
- Junction 3: Glenageary Road Upper / Maypark Avenue / Cualanor Avenue (4-arm Signal Controlled Junction).
- Junction 4: Kill Avenue / Rochestown Avenue / Kill Lane/ Abbey Road Junction (4-arm Signal Controlled Junction).
- Junction 5: Mounttown Road Upper / York Road / Tivoli Road / Mounttown Road Lower



Figure 2.1: Map of Traffic Survey Locations

The data collected in the traffic surveys includes traffic volume, queue length data and pedestrian movements.

## 2.1 Junction 1 - Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park

Junction 1 is a 5-arm signalised junction between Glenageary Road Upper / Oliver Plunkett Road / Highthorn Park / Kill Avenue / Mounttown Lower Junction (see Figure 2.2).

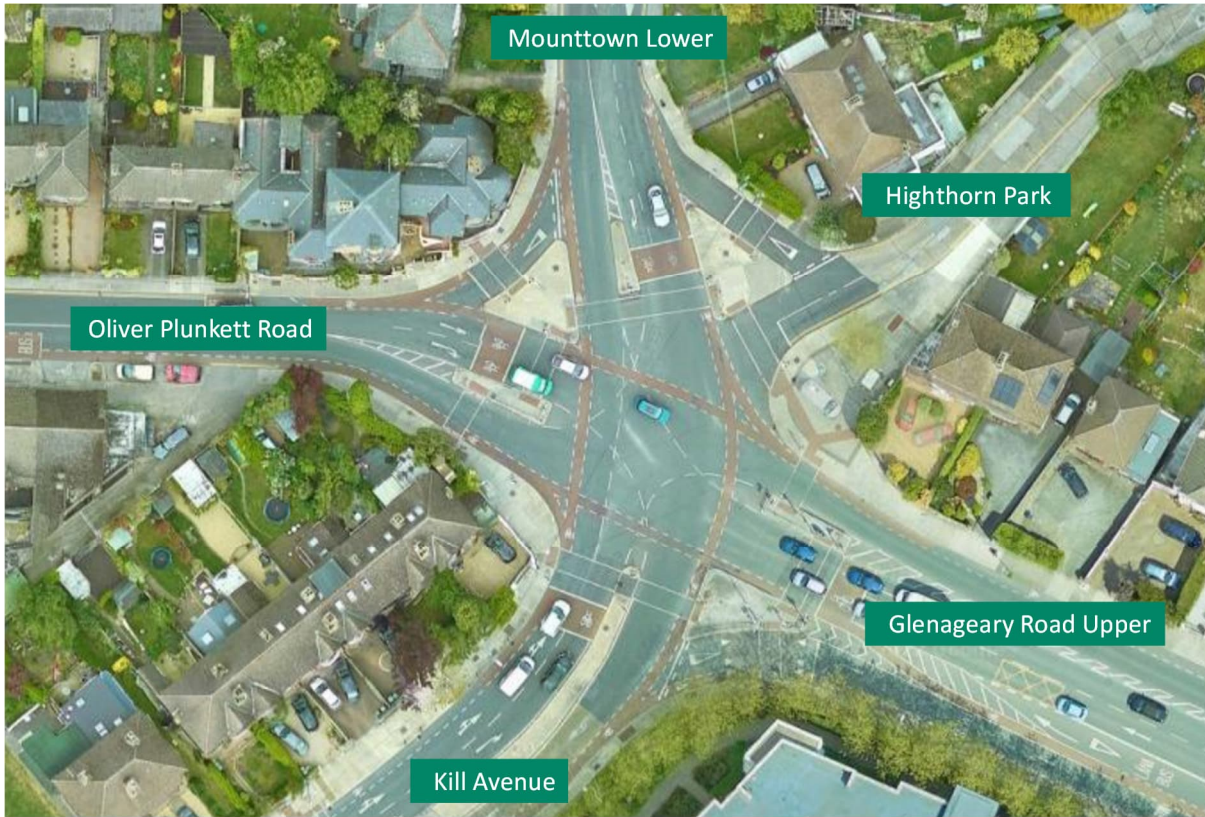


Figure 2.2: Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park Junction

### 2.1.1 Junction 1 Traffic Counts

As a first step in the analysis of the JTC data, the 15-minute flows were aggregated together to reveal the traffic hourly demand profile, Figure 2.3 below refers.

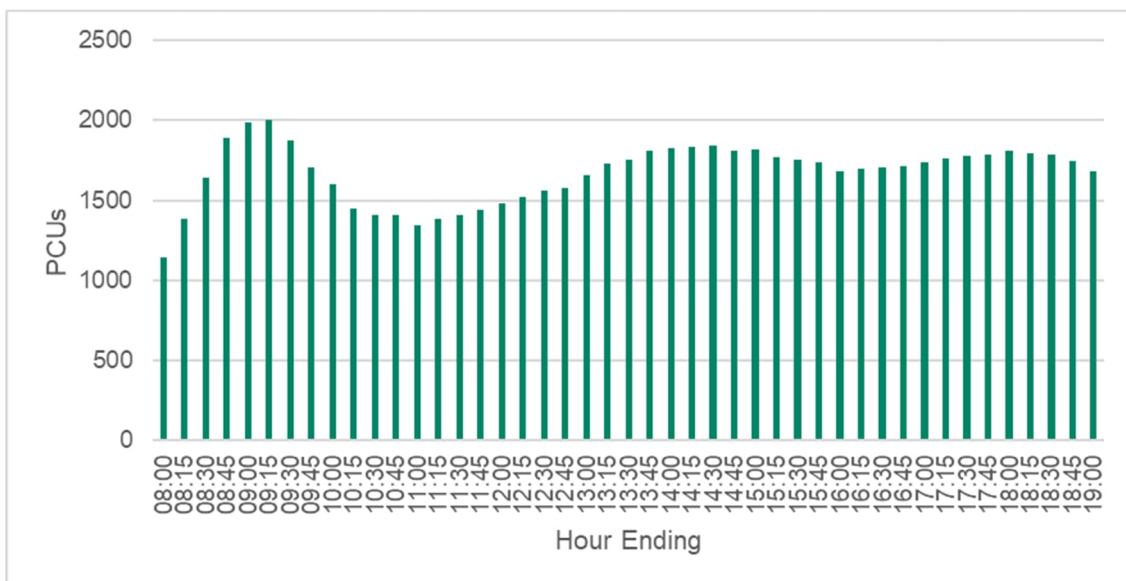


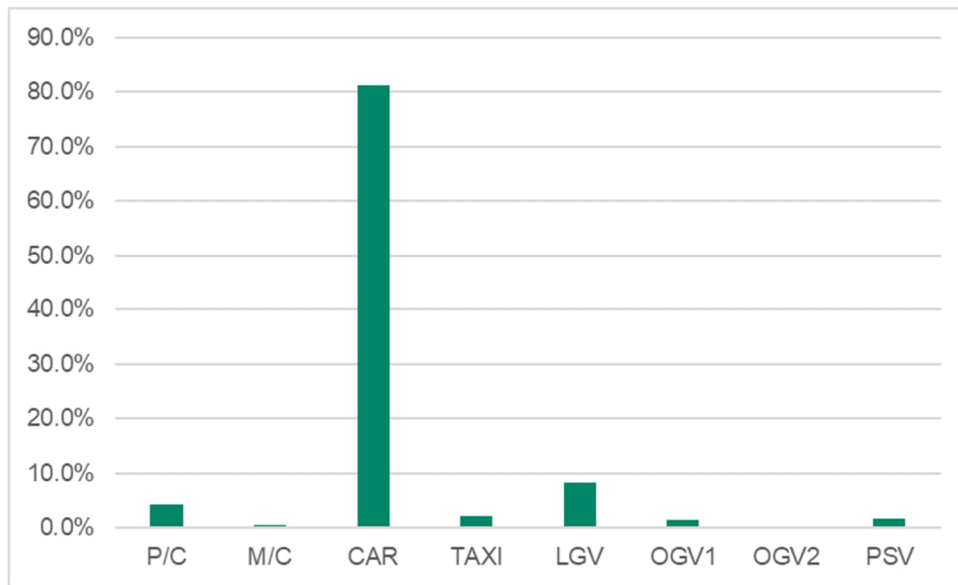
Figure 2.3: Hourly Traffic Volumes at Junction 1



The demand profile was then examined to reveal the system AM and PM peak hours. As can be seen from Figure 2.3 above, the AM and PM peak hours at Glenageary Road Upper / Oliver Plunkett Road / Highthorn Park / Kill Avenue / Mounttown Lower Junction occurs during the following hours:

- AM Peak Hour (08:15 – 09:15)
- PM Peak Hour (17:00 – 18:00)

There was a total of 19,998 vehicles counted over the 12-hour period at Junction 1. Figure 2.4 below shows a breakdown of the vehicles in their various classes. There is a high percentage of cars (81.3%) and LGVs (8.3%) traversing through the junction. In comparison, there is a low level of Heavy Goods Vehicles, with OGV1 at 1.5% and OGV2 at 0.2%. Cyclists made up 4.2% (846 cyclists) of users traversing the junction. It should however be noted that cyclists crossing the junction via the footpaths and central islands have not been counted; only cyclist using the carriageway have been accounted for.



**Figure 2.4: Breakdown of vehicle classification at Junction 1**

Figure 2.5 below shows the total vehicles on all arms of the junction for the AM peak period (08:15-09:15). The total number of vehicles travelling through the junction during the AM peak is 2006 PCU. The volume of traffic turning right, from Glenageary Road Upper to Mounttown Lower is the largest movement in the AM peak, with 303 PCU in a northbound direction.

Figure 2.6 below shows the total vehicles on all arms of the junction for the PM peak period (17:00-18:00). The total number of vehicles travelling through the junction during the PM peak is 1,810 PCU. The volume of traffic turning left, from to Mounttown Lower to Glenageary Road Upper is the largest movement in the PM peak, with 286 PCU in a southeast bound direction.

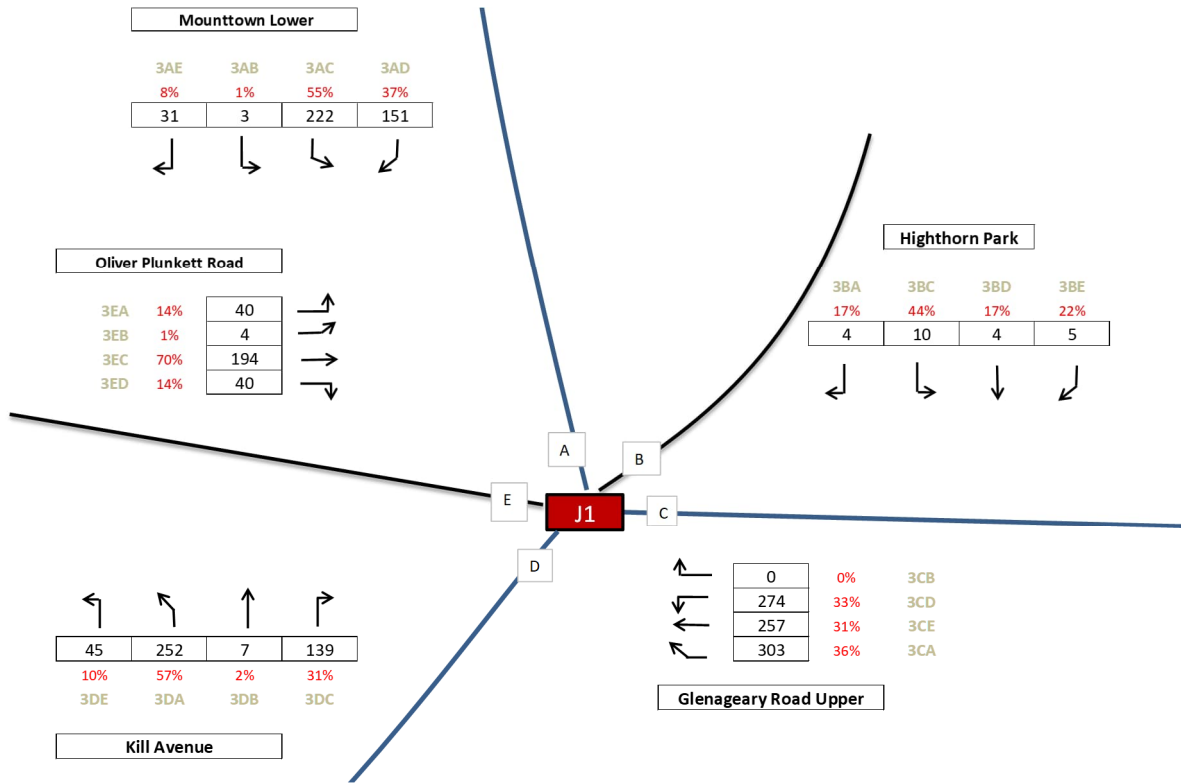


Figure 2.5: Traffic data for the AM Peak period (08:15-09:15) at Junction 1

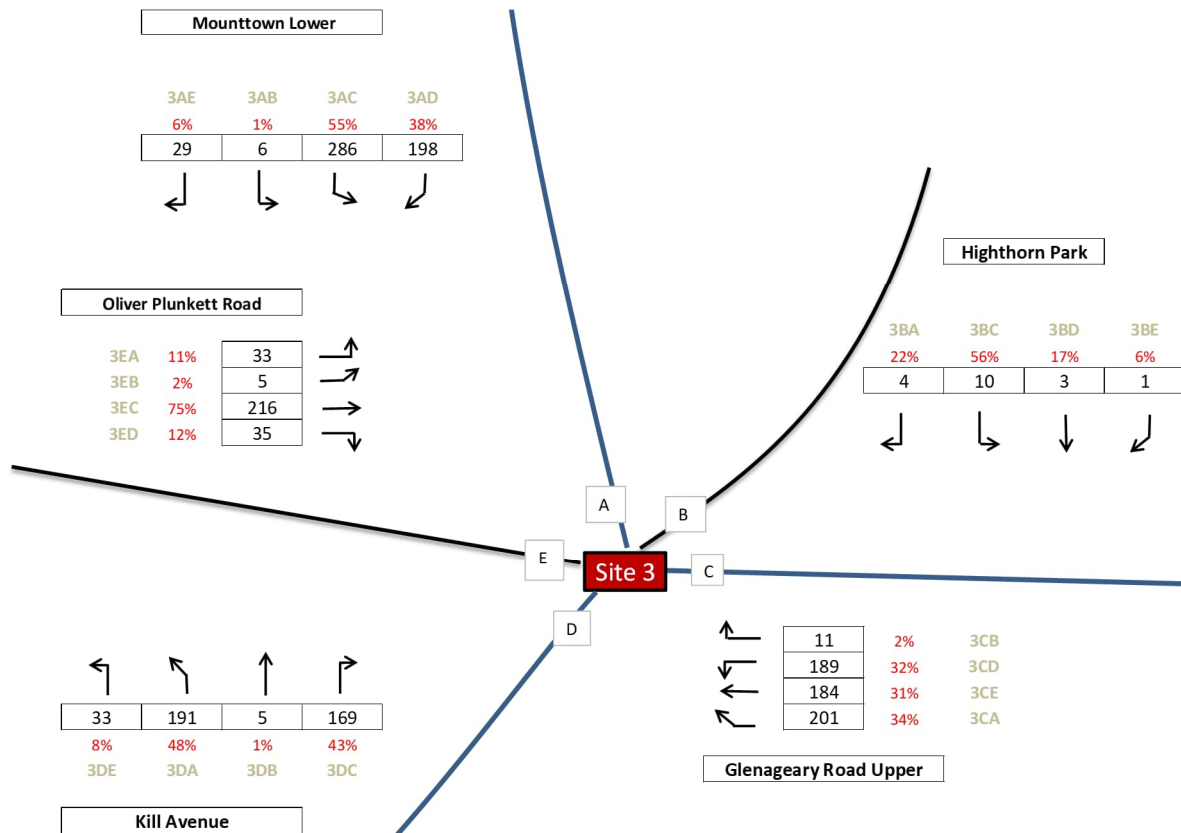


Figure 2.6: Traffic data for the PM Peak period (17:00-18:00) at Junction 1

### 2.1.2 Junction 1 Pedestrian Counts

Pedestrian Counts were undertaken at the junction over a twelve-hour period from 07:00 to 19:00 on Wednesday 29<sup>th</sup> September 2021. Ten pedestrian movements were recorded, the two movements across each of the main five arms of the junction. Pedestrians who did not cross the road carriageway were not recorded in the survey.

There were 2,267 pedestrian crossing movements recorded during the 12-hour survey period. The arm with the greatest number of pedestrian crossings is the Kill Avenue arm, with a total of 595 pedestrians crossing.

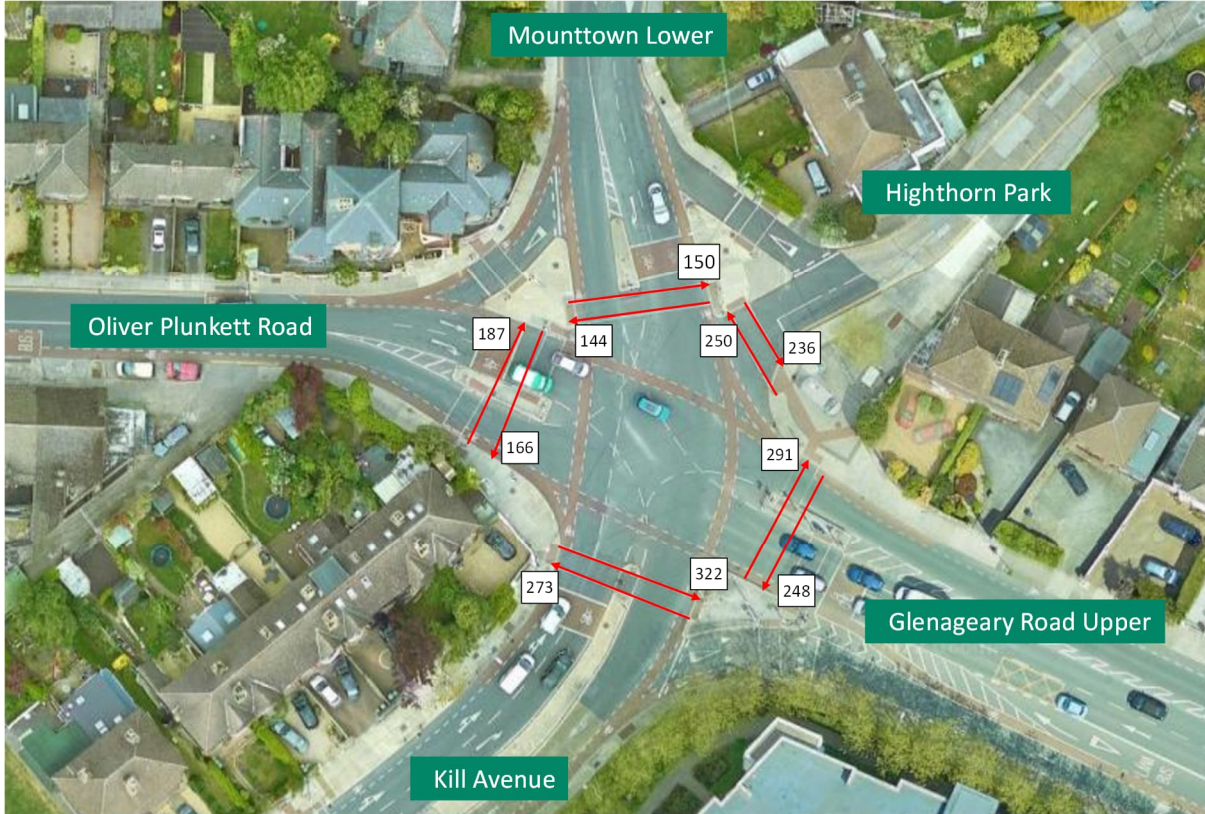


Figure 2.7: Pedestrian Movements at Junction 1

The hourly count is shown below in Figure 2.8. The busiest time of day at this junction is the morning peak of 08:00-09:00 with 289 pedestrians traversing the junction. This is closely followed by the lunchtime peak from 13:00-14:00 when 275 pedestrians traverse the junction (Figure 2.8).

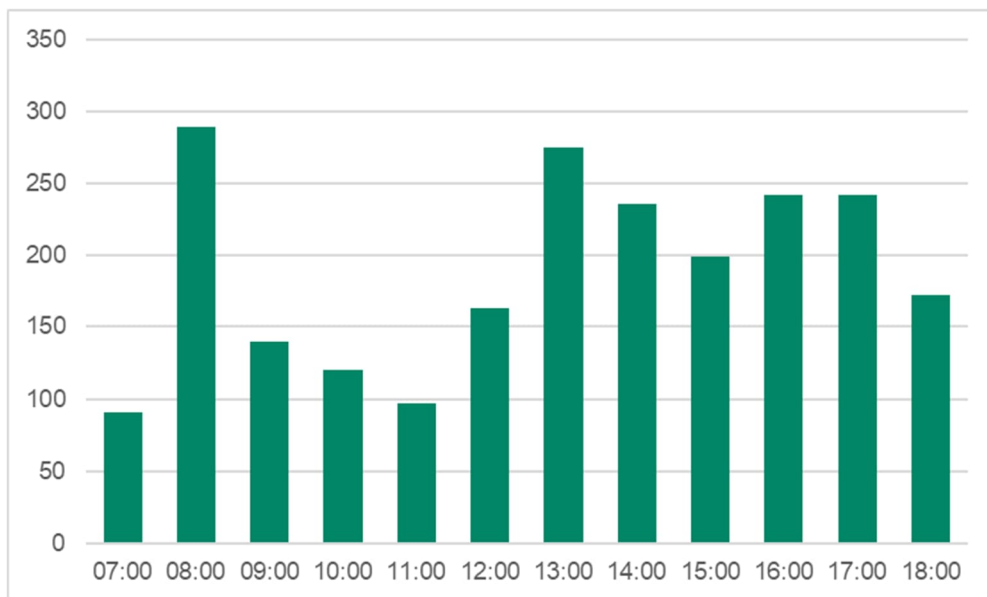


Figure 2.8: Pedestrian Count at Junction 1

### 2.1.3 Junction 1 Pedal Cycle Counts

There were 846 cyclists observed at Junction 1 in the 12-hour study period. The busiest movement for cyclists at this junction was the straight through movement from Glenageary Road Upper to Oliver Plunkett Road (C-E), (see Figure 2.9). The second busiest movement was straight through Kill Avenue to Mounttown Lower (DA).

The busiest time for cyclists at this junction was between 08:00 and 09:00, with 178 cyclists traveling through the junction in this hour.

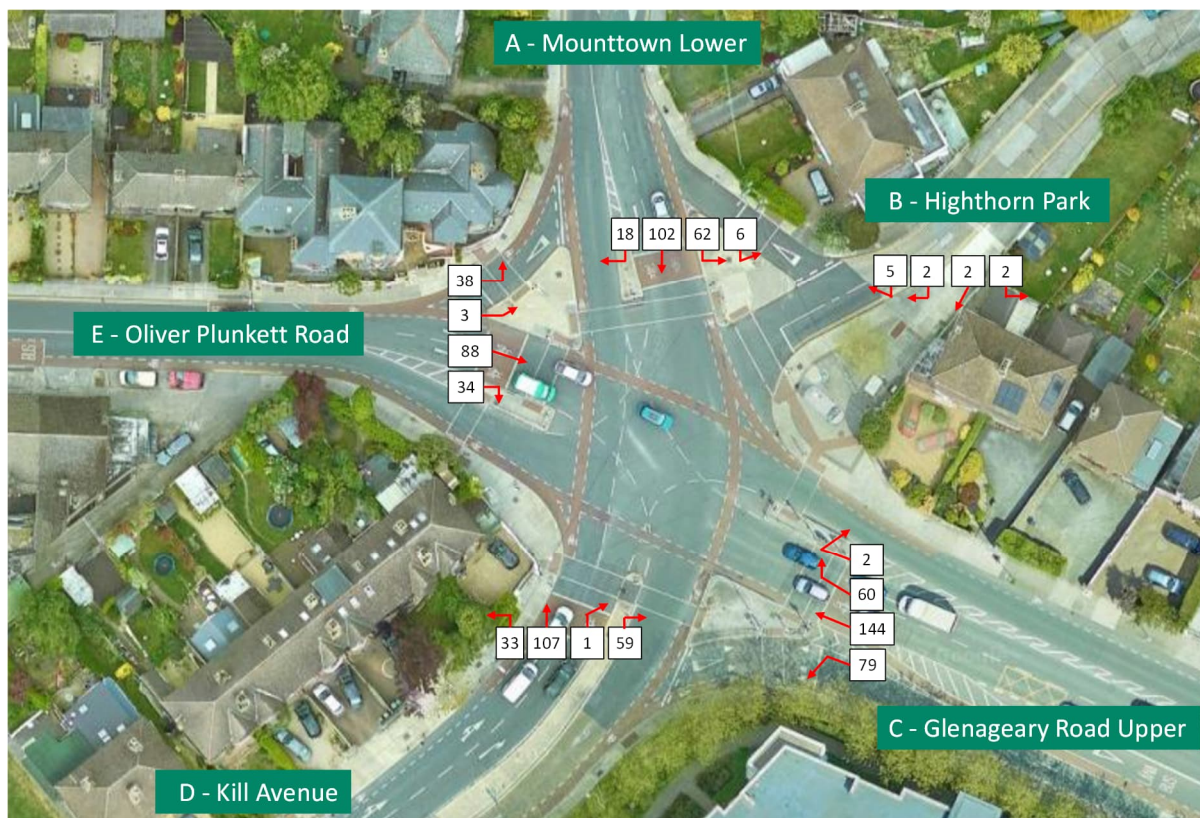


Figure 2.9: Cyclists at Junction 1

### 2.1.4 Junction 1 Bus Counts

The Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park Junction is a busy intersection for buses. There was a total of 337 buses counted during the survey, which contributed to 2.3% of overall traffic.

The movement of buses between the Kill Avenue and Mounttown Road Lower had the highest frequency, a route taken by 243 buses (72% of all buses counted at the junction). This was followed by movements between Mounttown Road Lower and Oliver Plunkett Road, a route taken by 47 buses (14% of all buses counted at the junction).

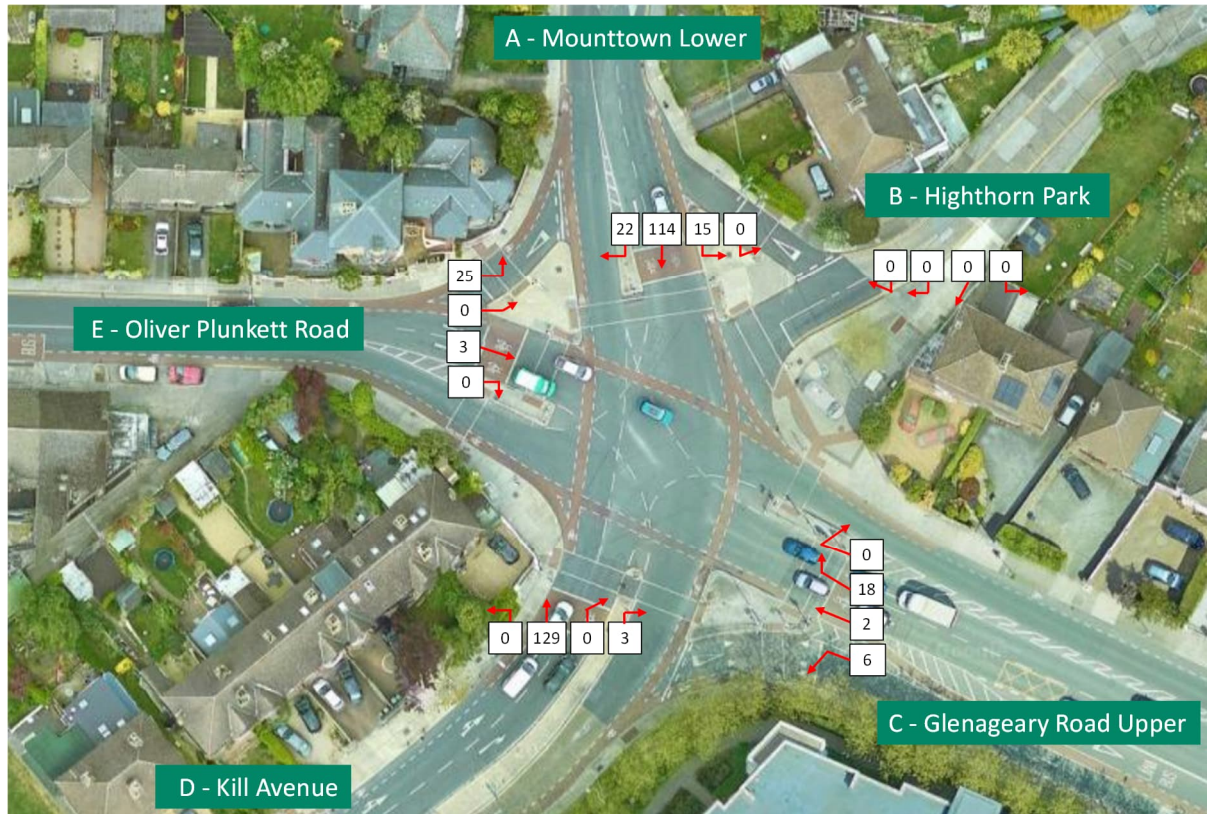


Figure 2.10: 12-hour Bus Traffic (Dublin Bus plus other buses)

Seven Dublin Bus routes travel through this junction:

Route Number	Route Destinations	Junction Arms
7D	Mountjoy Sq. - Dalkey	Kill Avenue (D) – Glenageary Road Upper (C)
111	Brides Glen Luas - Dalkey Village	Kill Avenue (D) – Glenageary Road Upper (C)
46A	Phoenix Park - Dun Laoghaire	Kill Avenue (D) - Mounttown Road Lower (A)
75	The Square Tallaght, - Dun Laoghaire Stn	Kill Avenue (D) - Mounttown Road Lower (A)
75A	The Square Tallaght - Dún Laoghaire	Kill Avenue (D) - Mounttown Road Lower (A)
63	Dun Laoghaire Stn - Kiltiernan Village	Mounttown Road Lower (A) – Oliver Plunkett Road (E)
63A	Dun Laoghaire Stn - Kiltiernan Village	Mounttown Road Lower (A) – Oliver Plunkett Road (E)

Table 2.1: Bus Routes at Junction 1

### 2.1.5 Junction 1 Traffic Queues

During the AM site visit, queuing was observed on all arms of the junction, as it typical at any major road junction in the Dublin area, during peak traffic periods. Queues exceeding 100m, were recorded on Mounttown Lower, Glenageary Road Upper, and Oliver Plunkett Road. This was captured by the cameras mounted in close proximity to the junction and the queue report attached in **Appendix A**.

Figure 2.11 shows queuing traffic on Mounttown Lower during the AM peak. It was noted that the majority of this queuing traffic cleared in one cycle, but some vehicles at the end of the queue had to wait for two cycles in order to clear.



**Figure 2.11: Mounttown Lower AM Peak Queuing**

On Glenageary Road Upper, queues of up to 200m can form both the right turning and straight-ahead lanes. Before the end of the peak period, these queues are reduced, and all traffic clears in one signal cycle.



**Figure 2.12: Glenageary Road Upper AM Peak Queuing**

On Kill Avenue the northbound queues back as far as Junction 2, during the AM peak, as shown in Figure 2.13.



**Figure 2.13: Kill Avenue AM Peak Queuing**

On Oliver Plunkett Road, no significant queuing is recorded until about 08:30, when queues start to build up. Queues exceeding 100m were recorded between 08:30 and 09:00, as shown in Figure 2.10.



**Figure 2.14: Oliver Plunkett Road AM Peak Queuing**

During the PM site visit, queuing traffic was again observed on all arms of the junction, as is typical at any major road junction in the Dublin area, during the PM peak. However, the queues on Glenageary Road Upper were not as long as those observed in the AM peak.

Figure 2.15 shows queuing traffic on Mounttown Lower during the PM peak. It was noted that the majority of this queuing traffic cleared in one staging cycle, but some vehicles at the end of the queue had to wait for two cycles in order to clear.



**Figure 2.15: Mounttown Lower PM Peak Queuing**

On Glenageary Road Upper during the PM peak, shorter queues were recorded for the majority of the peak period, with any significant queuing occurring for less than 15 minutes. As shown in Figure 2.16, short queues were recorded.



**Figure 2.16: Glenageary Road PM Peak Queuing**

On Kill Avenue the northbound queues back as far as Junction 2, during the PM peak, which is similar to the AM peak situation.

On Oliver Plunkett Road, evening queues start to build up around 16:30, and exceed 100m for the majority of the PM peak, as shown in Figure 2.17.





Figure 2.17: Oliver Plunkett Road PM Peak Queuing

## 2.2 Junction 2 - Kill Avenue and Claremont Avenue

Junction 2 is at the junction of Kill Avenue and Claremont Avenue. This is a 3-arm signalised junction (see Figure 2.18). This junction is 60m south of the Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park Junction.



Figure 2.18: Kill Avenue and Claremont Avenue Junction

### 2.2.1 Junction 2 Traffic Counts

As a first step in the analysis of the JTC data, the 15-minute flows were aggregated together to reveal the traffic hourly demand profile, Figure 2.19 below refers.

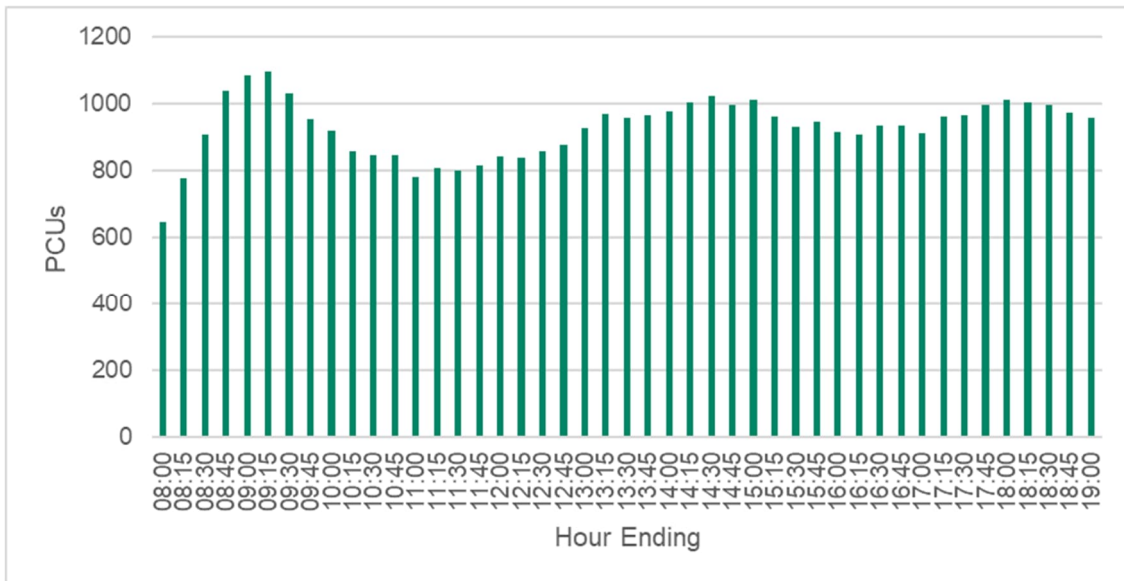


Figure 2.19: Hourly Traffic Volumes at Junction 2

The demand profile was then examined to reveal the system AM and PM peak hours. As can be seen from Figure 2.3 above, the AM and PM peak hours at Kill Avenue and Claremont Avenue Junction occurs during the following hours:

- AM Peak Hour (08:15 – 09:15)
- PM Peak Hour (17:00 – 18:00)

There was a total of 11,082 vehicles counted over the 12-hour period at Junction 2. Figure 2.20 below shows a breakdown of the vehicles in their various classes. There is a high percentage of cars (78.8%) and LGVs (8.9%) traversing through the junction. In comparison, there is a low level of Heavy Goods Vehicles, with OGV1 at 1.6% and OGV2 at 0.2%. Cyclists made up 4.8% of users traversing the junction. It should however be noted that cyclists crossing the junction via the footpaths and central islands have not been counted; only cyclist using the carriageway have been accounted for.

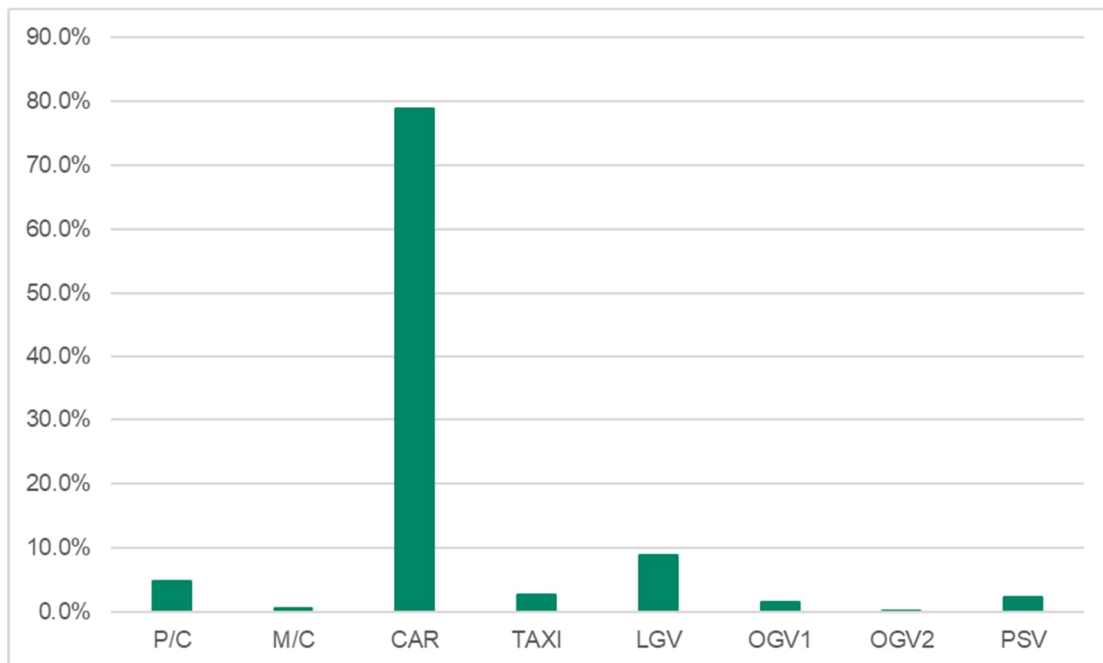


Figure 2.20: Breakdown of vehicle classification at Junction 2

Figure 2.21 below shows the total vehicles on all arms of the junction for the AM peak period (08:15-09:15). The total number of vehicles travelling through the junction during the AM peak is 1,095 PCU. The volume of traffic travelling south on Kill Avenue is the largest movement in the AM peak, with 442 PCU.

Figure 2.22 below shows the total vehicles on all arms of the junction for the PM peak period (17:00-18:00). The total number of vehicles travelling through the junction during the AM peak is 1,013 PCU. The volume of traffic travelling south on Kill Avenue is the largest movement in the AM peak, with 398 PCU.

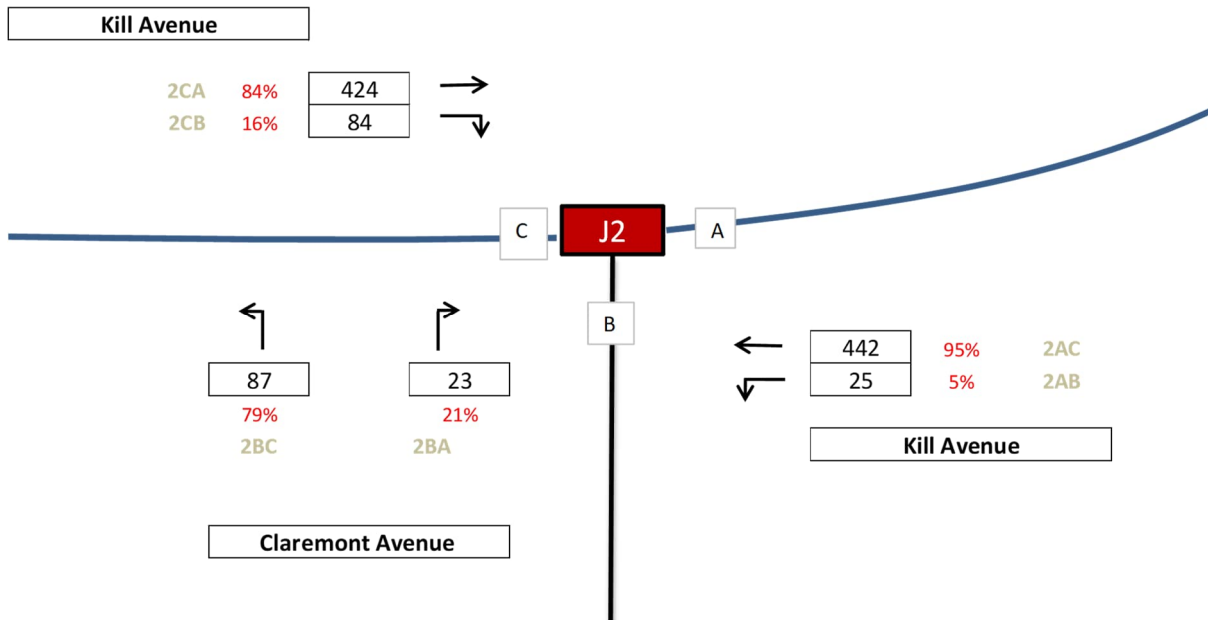


Figure 2.21: Traffic data for the AM Peak period (08:15-09:15) at Junction 2

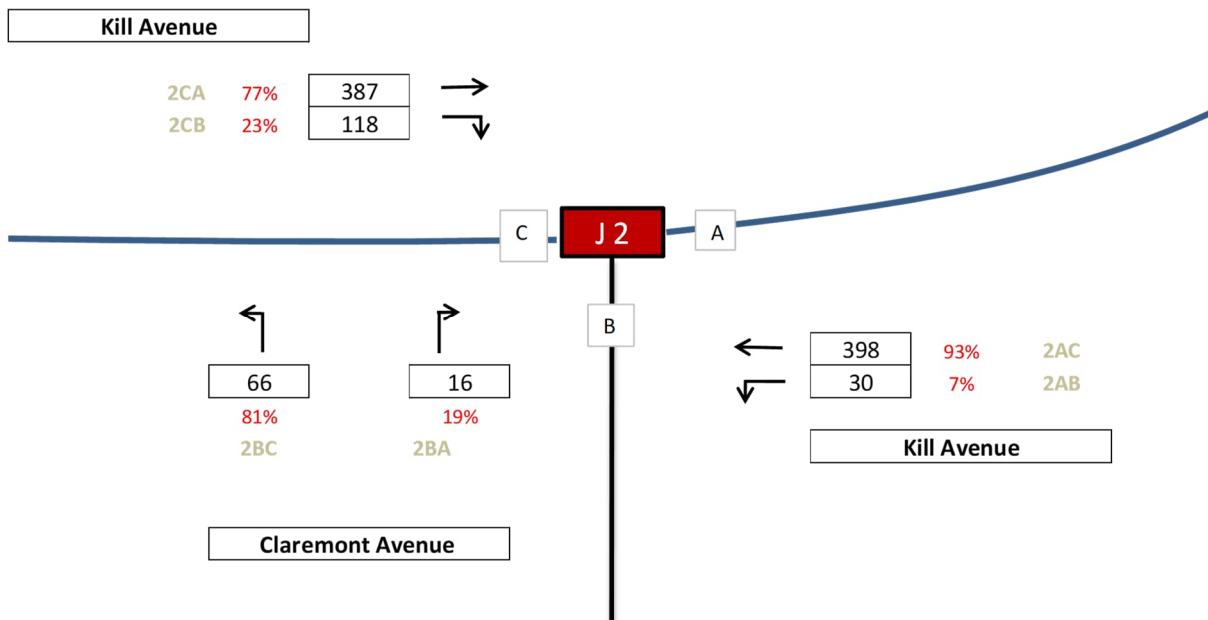


Figure 2.22: Traffic data for the PM Peak period (17:00-18:00) at Junction 2

## 2.2.2 Junction 2 Pedestrian Counts

There are 6 pedestrian movements measured at Junction 2, crossing the 3 arms of the junction (Figure 2.23). Movement No. 3 crossing Claremont Avenue is the busiest arm at the junction. Movement No. 1 crossing Kill Avenue north to south is significantly busier than movement No. 2 crossing from south to north. Pedestrian movements on the south-western arm of the junction on Kill Avenue, Movements 5 and 6, are low because there is no pedestrian crossing at this location. The busiest time of day at this junction is the evening peak of 17:00-18:00 with 210 pedestrians traversing the junction. There are local peaks at the morning and lunchtime busy periods (Figure 2.24).

Pedestrian Counts were undertaken at the junction over a twelve-hour period from 07:00 to 19:00 on Wednesday 29<sup>th</sup> September 2021. Six pedestrian movements were recorded, the two movements across each of the main three arms of the junction. Pedestrians who did not cross the road carriageway were not recorded in the survey.

There were 1,683 pedestrian crossing movements recorded during the 12-hour survey period. The arm with the greatest number of pedestrian crossings is the Kill Avenue arm, with a total of 964 pedestrians crossing.

A total of 45 pedestrians were noted to cross the Kill Avenue arm of the junction, where no pedestrian crossing facilities are currently provided, while 674 pedestrians cross at the pedestrian crossing. This would suggest that the existing pedestrian crossing does cater for the majority of pedestrians at this location.



**Figure 2.23: Pedestrian Movements at Junction 2**

The hourly count is shown below in Figure 2.24. The busiest time of day at this junction is the evening peak of 17:00-18:00 with 210 pedestrians traversing the junction. This is closely followed by the lunchtime peak from 13:00-14:00 when 189 pedestrians traverse the junction (Figure 2.24).

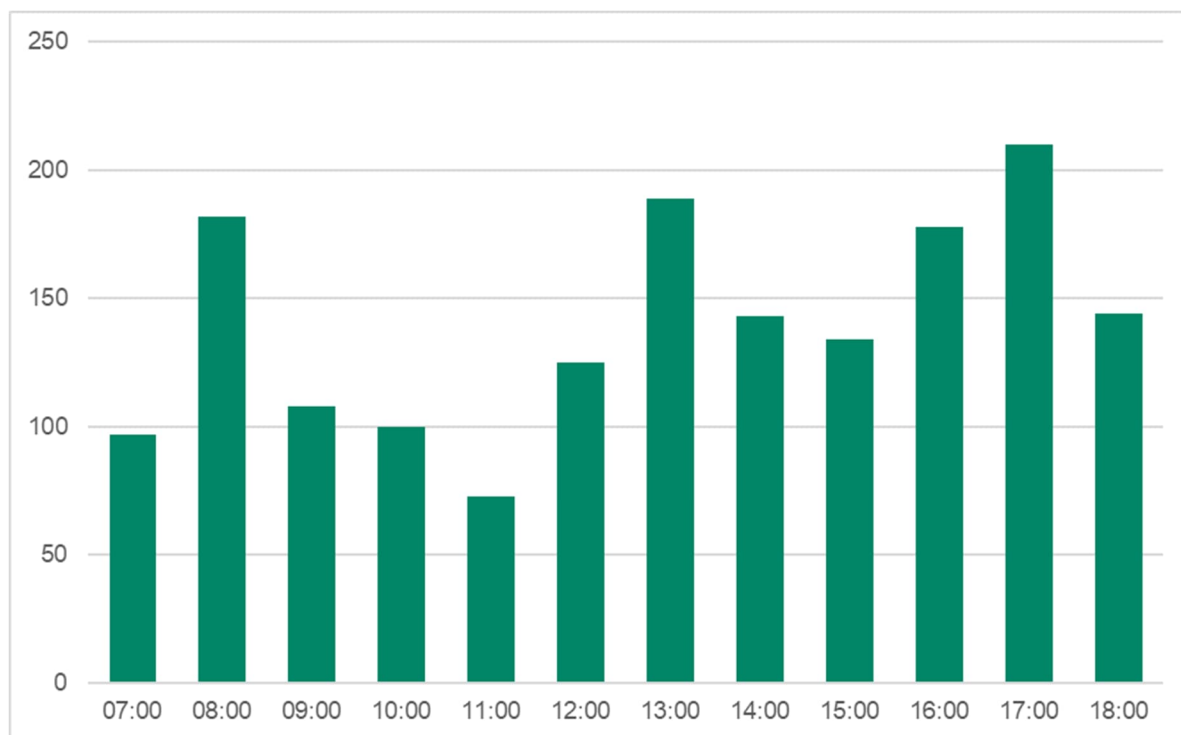


Figure 2.24: Pedestrian Count at Junction 2

### 2.2.3 Junction 2 Pedal Cycle Counts

There were 529 cyclists observed at Junction 2 in the 12-hour study period. The majority of these (65%) were travelling north and south on Kill Avenue. 109 cyclist journeys at this junction were made between 08:00 and 09:00, which was the busiest time for cyclists.



Figure 2.25: Cyclists at Junction 2

### 2.2.4 Junction 2 Buses Counts

No buses travel down Claremont Avenue. The buses on Kill Avenue have been accounted for in Section 2.1.4.

### 2.2.5 Junction 2 Traffic Queues

During the AM and PM site visits, queuing was observed on the Kill Avenue arms of the junction, with only minor queuing observed on the Claremont Avenue Arm of the junction. This was captured by the cameras mounted in close proximity to the junction and the queue report attached in **Appendix A**.

Due to the location of this junction being only 60m south of the Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park Junction, queues were noted blocking back from the bigger junction through the Kill Avenue Northbound arm. On Kill Avenue, southbound traffic often queued back from the pedestrian crossing back onto the Glenageary Road Upper. On the Claremont Avenue Arm of the junction, there is no significant queuing recorded. A maximum of an 85m queue was recorded and all vehicles were able to clear the junction in one cycle. This applies to both the morning (Figure 2.26) and evening (Figure 2.27) peaks.



Figure 2.26: Claremont Avenue AM Peak Queues



Figure 2.27: Claremont Avenue PM Peak Queues

### 2.3 Junction 3 - Glenageary Road Upper / Maypark Avenue / Cualanor Avenue Junction

Junction 3 is at the crossroads between Glenageary Road Upper and Maypark Avenue/Cualanor Avenue (Figure 2.28).



Figure 2.28: Junction 3

#### 2.3.1 Junction 3 Traffic Counts

As a first step in the analysis of the JTC data, the 15-minute flows were aggregated together to reveal the traffic hourly demand profile, Figure 2.29 below refers.

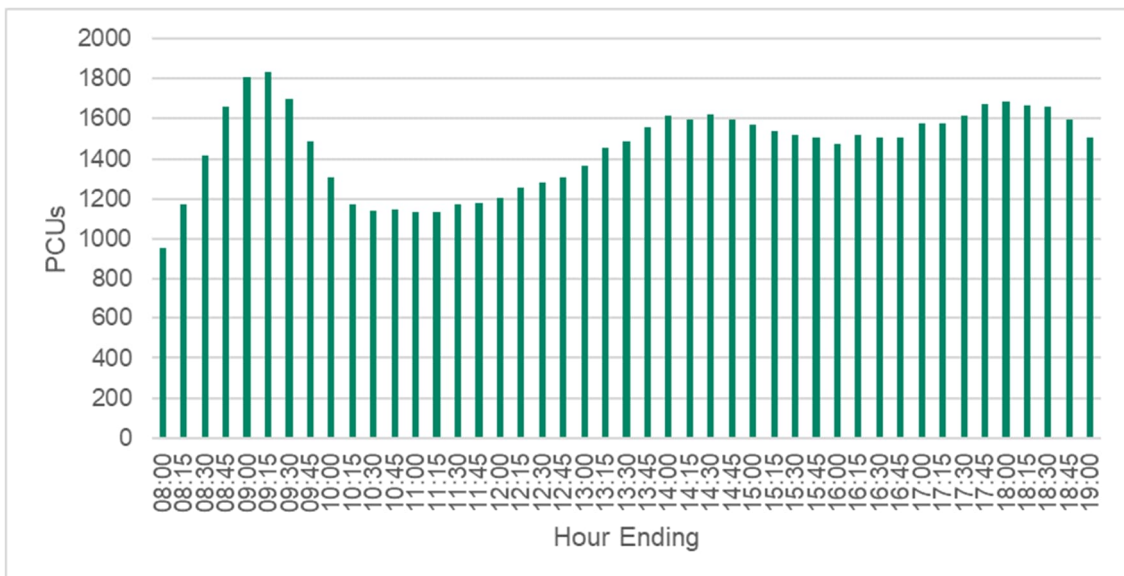
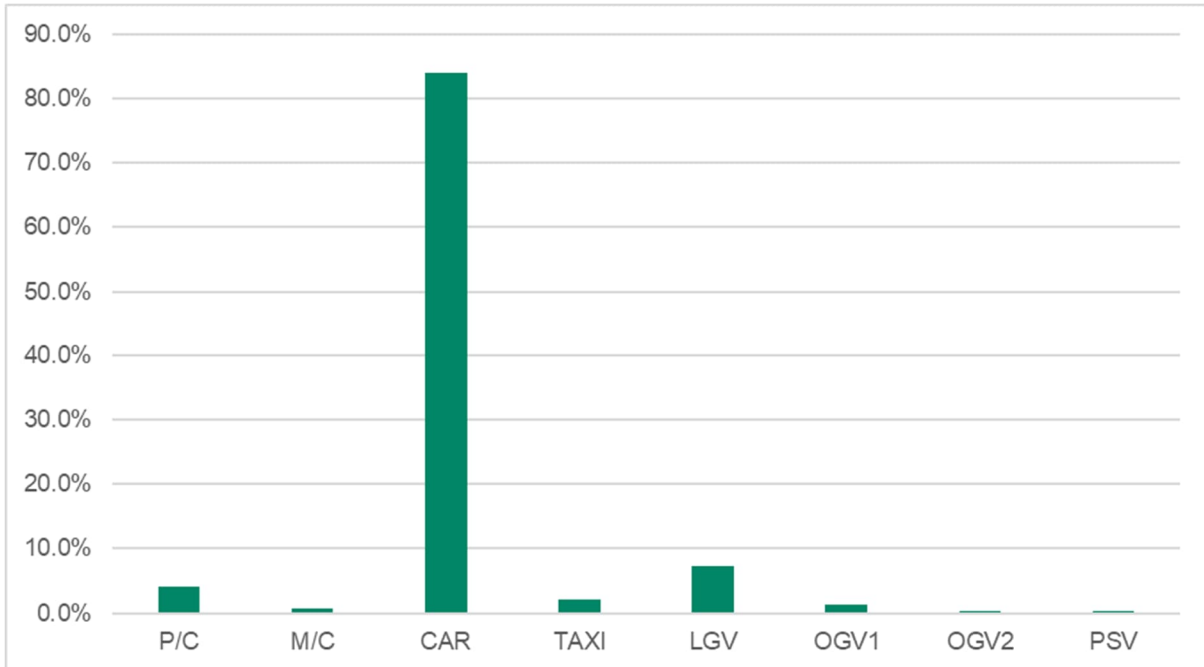


Figure 2.29: Traffic Volumes at Junction 3

The demand profile was then examined to reveal the system AM and PM peak hours. As can be seen from Figure 2.29 above, the AM and PM peak hours at Glenageary Road Upper / Maypark Avenue / Cualanor Avenue Junction occurs during the following hours:

- AM Peak Hour (08:00 – 09:00)
- PM Peak Hour (17:00 – 18:00)

There was a total of 17,605 vehicles counted over the 12-hour period at Junction 1. Figure 2.30 below shows a breakdown of the vehicles in their various classes. There is a high percentage of cars (84.0%) and LGVs (7.4%) traversing through the junction. In comparison, there is a low level of Heavy Goods Vehicles, with OGV1 at 1.3% and OGV2 at 0.3%. Cyclists made up 4.0% of users traversing the junction. It should however be noted that cyclists crossing the junction via the footpaths and central islands have not been counted; only cyclist using the carriageway have been accounted for.



**Figure 2.30: Breakdown of vehicle classification at Junction 3**

**Figure 2.31** below shows the total vehicles on all arms of the junction for the AM peak period (08:15-09:15). The total number of vehicles travelling through the junction during the AM peak is 1,834 PCU. The volume of traffic travelling northbound on Glenageary Road Upper is the largest movement in the AM peak, with 653 PCU.

**Figure 2.32** below shows the total vehicles on all arms of the junction for the PM peak period (17:00-18:00). The total number of vehicles travelling through the junction during the AM peak is 1,687 PCU. The volume of traffic travelling southbound on Glenageary Road Upper is the largest movement in the AM peak, with 555 PCU.



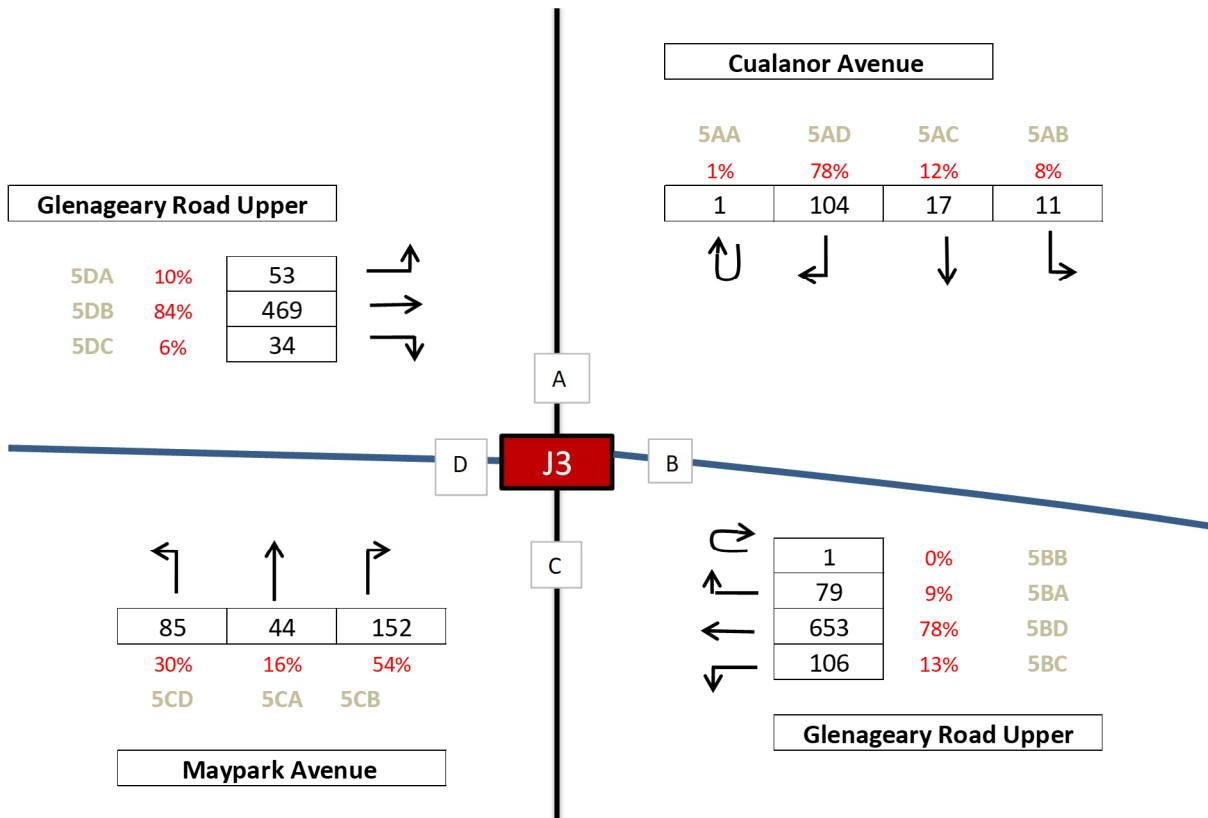


Figure 2.31: Traffic data for the AM Peak period (08:00-09:00) at Junction 3

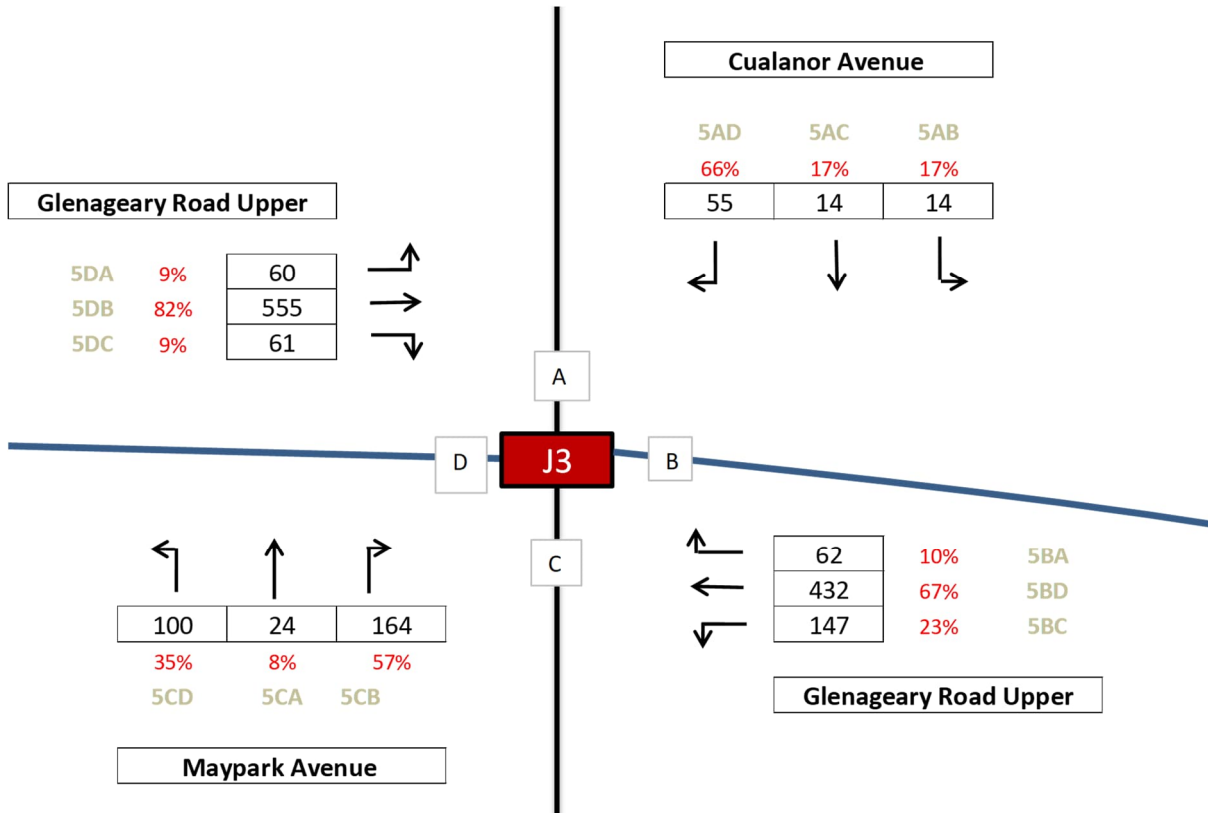


Figure 2.32: Traffic data for the PM Peak period (17:00-18:00) at Junction 3

### 2.3.2 Junction 3 Pedestrian Counts

Pedestrian Counts were undertaken at the junction over a twelve-hour period from 07:00 to 19:00 on Wednesday 29<sup>th</sup> September 2021. Eight pedestrian movements were recorded, the two movements across each of the main four arms of the junction. Pedestrians who did not cross the road carriageway were not recorded in the survey.

There were 2,396 pedestrian crossing movements recorded during the 12-hour survey period. The arm with the greatest number of pedestrian crossings is the Glenageary Road Upper (D), with a total of 911 pedestrians crossing.

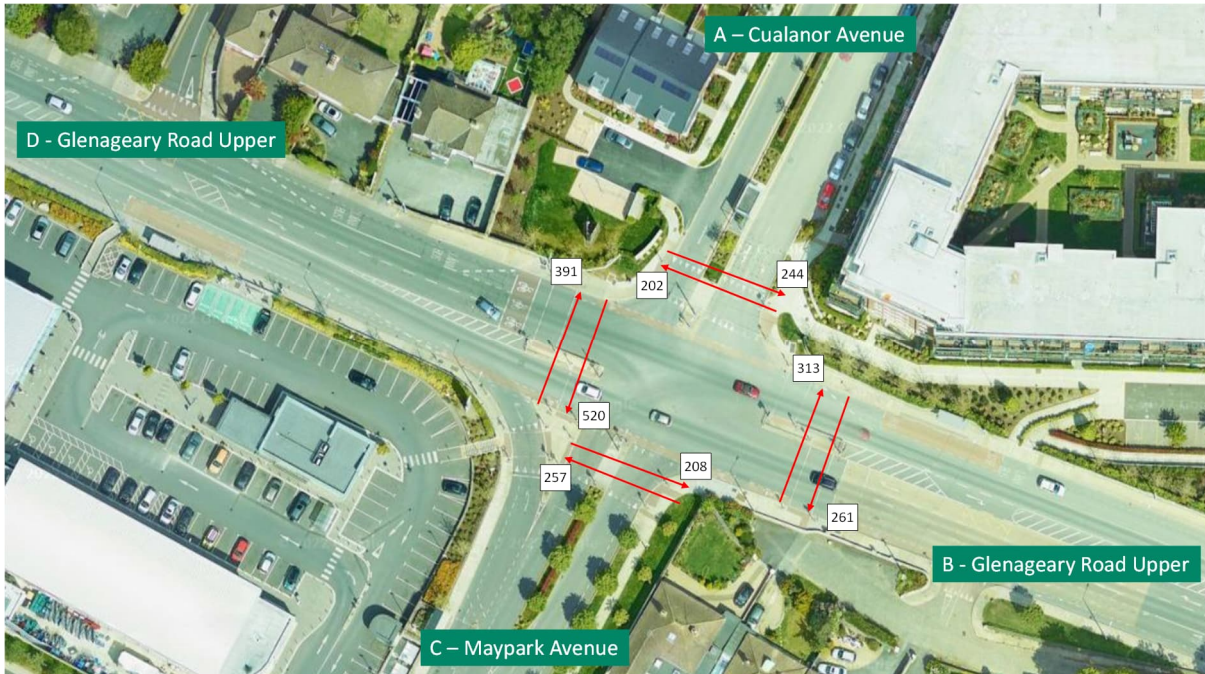


Figure 2.33: Pedestrian Movements at Junction 3

The hourly count is shown below in Figure 2.34. The busiest time of day at the junction is the morning peak of 08:00-09:00 with 309 pedestrians traversing the junction. This is followed by the lunchtime peak from 14:00-15:00 when 279 pedestrians traverse the junction (Figure 2.33).

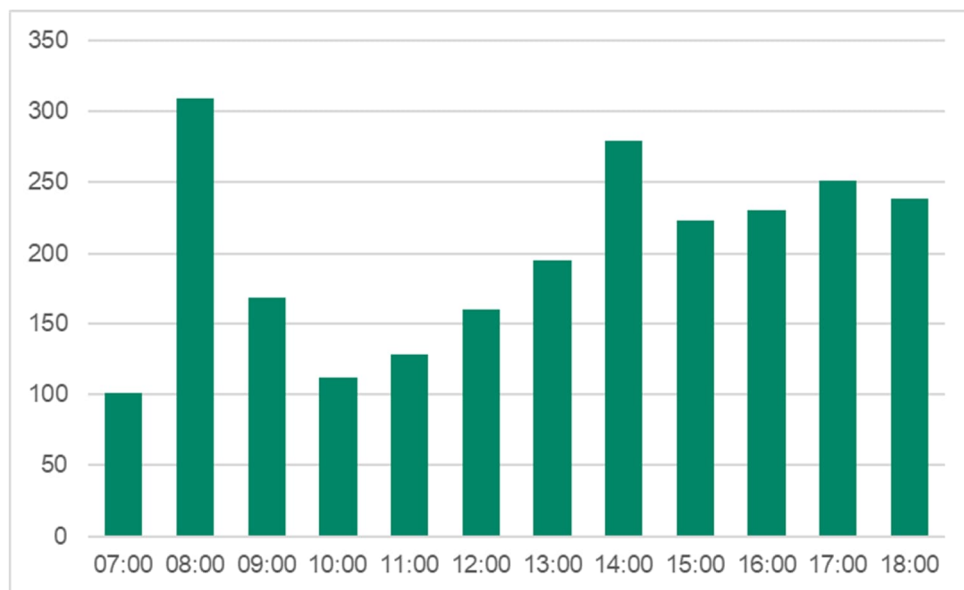


Figure 2.34: Pedestrian Count at Junction 3

### 2.3.3 Junction 3 Pedal Cycle Counts

There were 713 cyclists observed at Junction 3 in the 12-hour study period. The busiest movement for cyclists at this junction was the straight through movement on Glenageary Road Upper westbound (BD) and eastbound (DB) (see **Figure 2.35**). The busiest time for cyclists at this junction was between 08:00 and 09:00, with 177 cyclists travelling through the junction at this time.

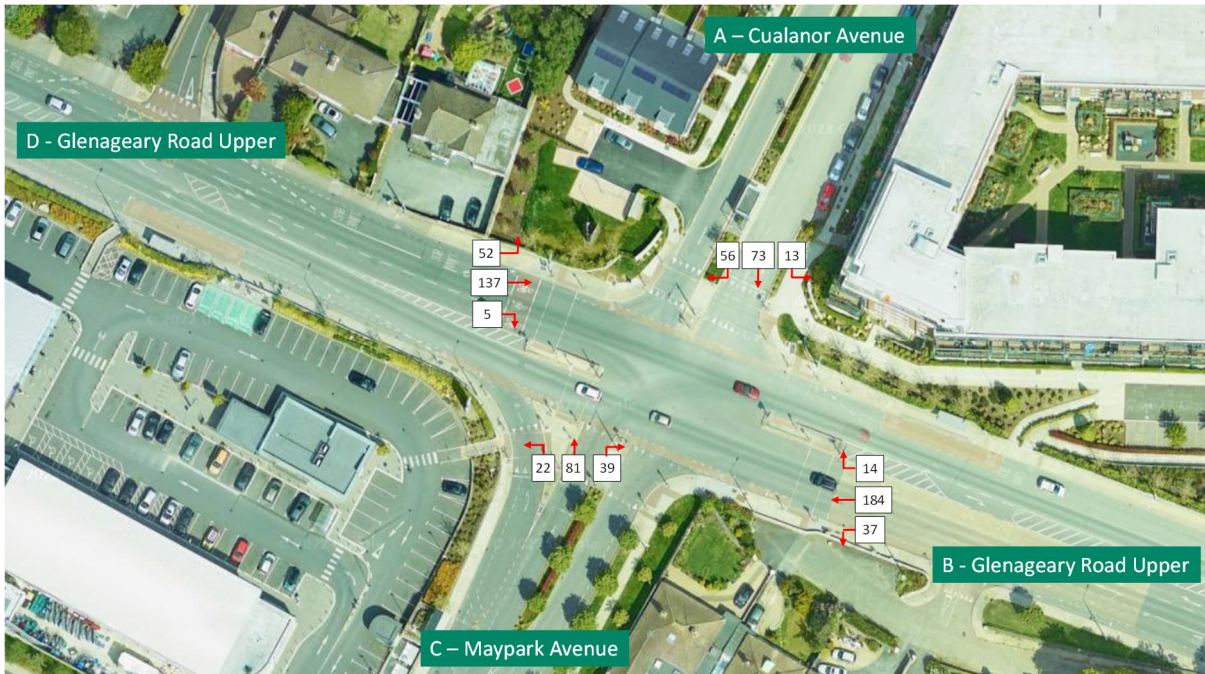


Figure 2.35: Cyclists at Junction 3

### 2.3.4 Junction 3 Bus Count

The Glenageary Road Upper / Maypark Avenue / Cualanor Avenue Junction is not a busy junction for buses. There was a total of 47 buses counted during the survey, which contributed to 0.3% of overall traffic. Buses at Junction 3 travel along the Glenageary road and do not turn off onto Maypark Avenue or Cualanor Avenue. The Dublin Bus no. 7D and the Go-Ahead No. 111 are the only bus services currently operating on Glenageary Road Upper.

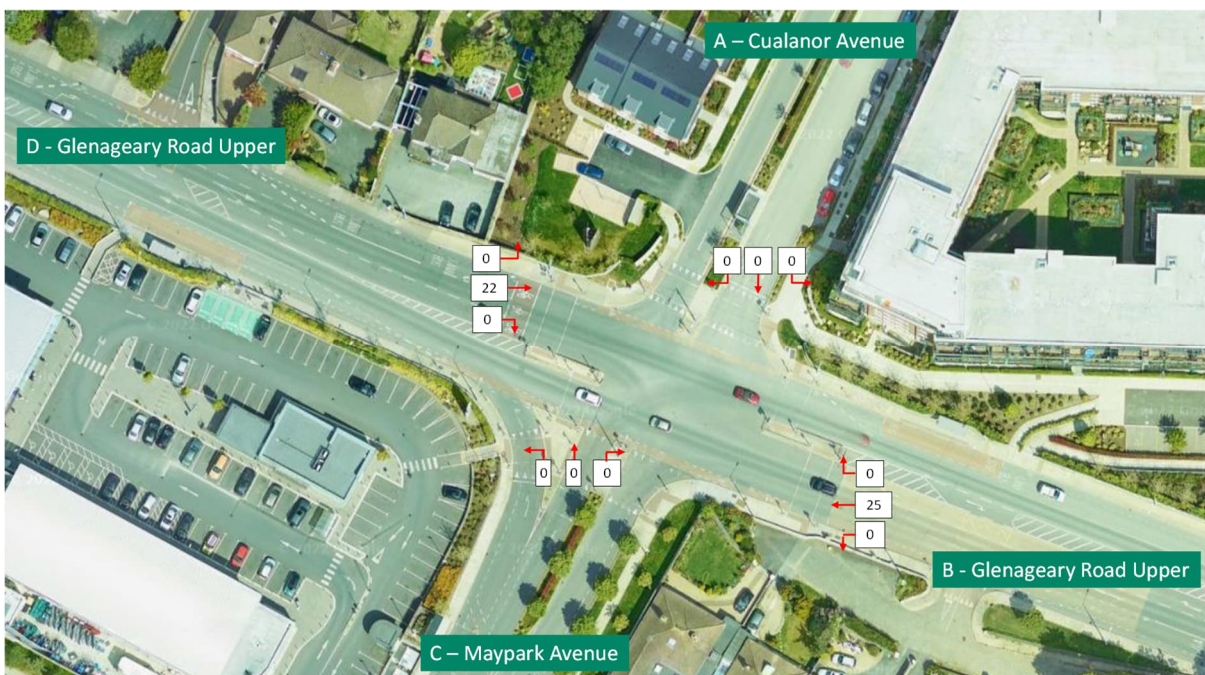


Figure 2.36: Bus Count at Junction 3

### 2.3.5 Junction 3 Traffic Queues

During the AM site visit, queuing was observed on both of the Glenageary Road arms of the junction, as it typical at any major road junction in the Dublin area, during peak traffic periods. Queues exceeding 100m, were recorded on, Glenageary Road Upper, eastern and western arms. This was captured by the cameras mounted in close proximity to the junction and the queue report attached in **Appendix A**.

On the eastern arm of Glenageary Road, during the AM peak, queues of up to 100m long in the straight-ahead lane were recorded but these queues cleared the junction in one staging cycle for the majority of the peak hour. During the middle of the AM peak (between 08:15 and 08:40), some of queuing traffic was only cleared after two staging cycles. The queuing on the eastern arm of Glenageary Road is shown in Figure 2.37.



**Figure 2.37: Glenageary Road East during the AM Peak**

During the AM peak, on the western arm of Glenageary Road, similar queue of exceeding 100m were recorded, but the majority of the queuing traffic cleared in one staging cycle. The queuing on the eastern arm of Glenageary Road is shown in Figure 2.38.



**Figure 2.38: Glenageary Road West during the AM Peak**

During the PM Peak, on the eastern arm of Glenageary Road, queues were recorded in excess of 100m in the centre lane but clearing the junction in one cycle.

On the Glenageary western arm queues of in excess of 190m were recorded, with some vehicles requiring two signal staging cycles to clear the junction. The queuing on the Glenageary western arm is shown in Figure 2.39.



**Figure 2.39: Glenageary Road West during the PM Peak**

## 2.4 Junction 4 – Kill Avenue / Rochestown Avenue / Kill Lane/ Abbey Road Junction

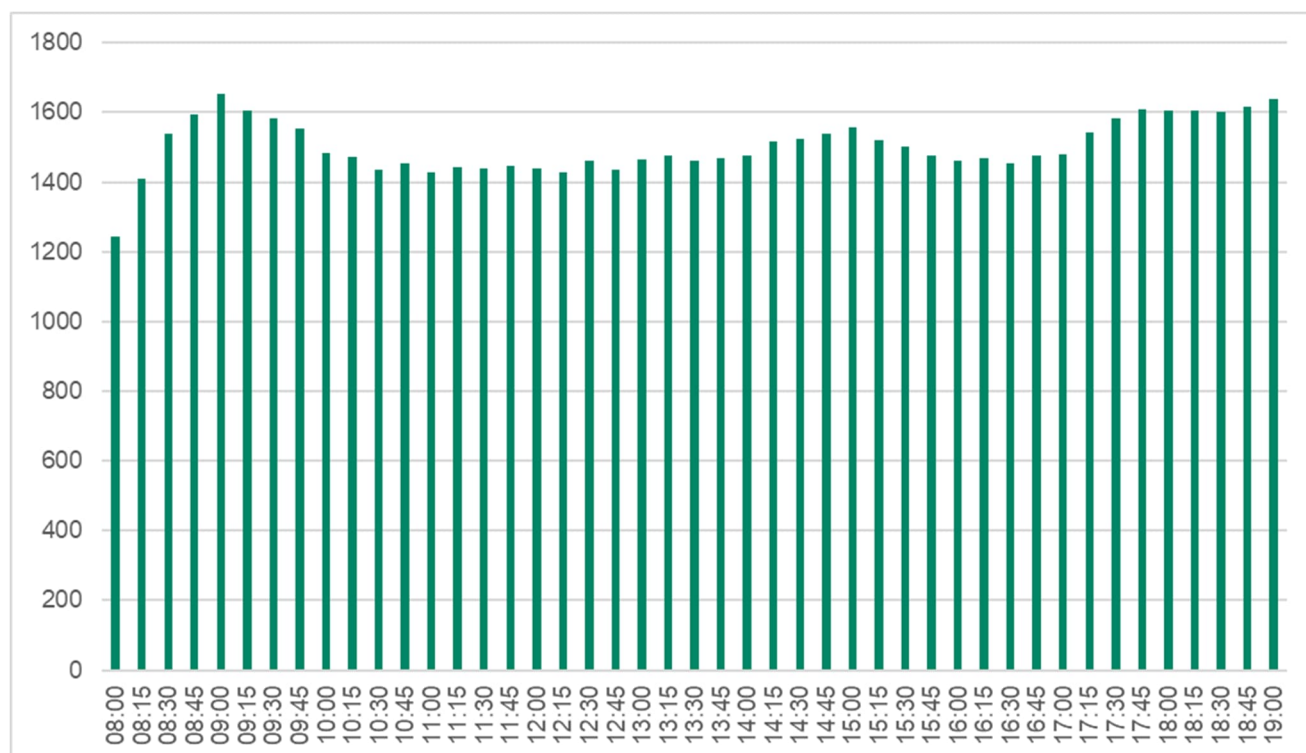
Junction 4 is at the crossroads between Kill Avenue / Rochestown Avenue / Abbey Road (Figure 2.40).



Figure 2.40: Junction 4

### 2.4.1 Junction 4 Traffic Counts

As a first step in the analysis of the JTC data, the 15-minute flows were aggregated together to reveal the traffic hourly demand profile, Figure 2.41 below refers.

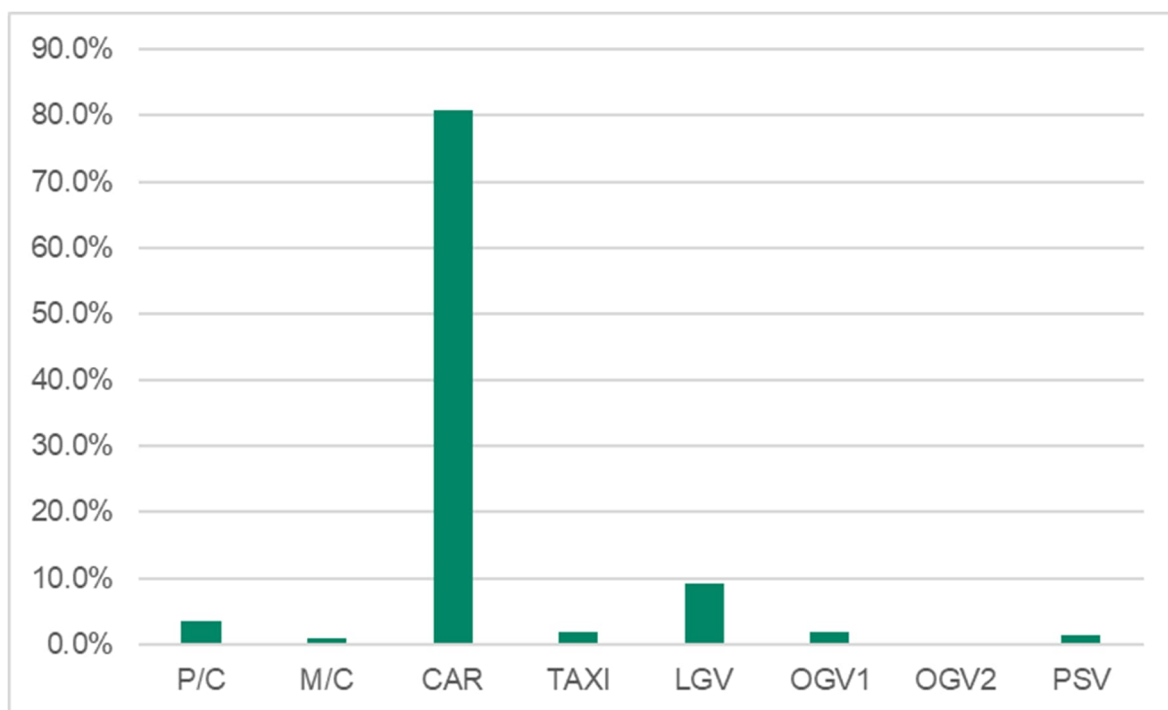


**Figure 2.41: Traffic Volumes at Junction 4**

The demand profile was then examined to reveal the system AM and PM peak hours. As can be seen from Figure 2.41 above, the AM and PM peak hours at Kill Avenue / Rochestown Avenue / Abbey Road Junction occurs during the following hours:

- AM Peak Hour (08:00 – 09:00)
- PM Peak Hour (18:00 – 19:00)

There was a total of 17,959 vehicles counted over the 12-hour period at Junction 4. Figure 2.42 below shows a breakdown of the vehicles in their various classes. There is a high percentage of cars (80.7%) and LGVs (9.2%) traversing through the junction. In comparison, there is a low level of Heavy Goods Vehicles, with OGV1 at 1.9% and OGV2 at 0.3%. Cyclists made up 3.5% of users traversing the junction. It should however be noted that cyclists crossing the junction via the footpaths and central islands have not been counted; only cyclist using the carriageway have been accounted for.



**Figure 2.42: Breakdown of vehicle classification at Junction 4**

Figure 2.43 below shows the total vehicles on all arms of the junction for the AM peak period (08:00-09:00). The total number of vehicles travelling through the junction during the AM peak is 1,652 PCU. The volume of traffic travelling northbound on Rochestown Avenue onto Abbey Road is the largest movement in the AM peak, with 373 PCU.

Figure 2.44 below shows the total vehicles on all arms of the junction for the PM peak period (18:00-17:00). The total number of vehicles travelling through the junction during the AM peak is 1,638 PCU. There are equal volumes of traffic travelling north/south (Abbey Road – Rochestown Avenue) and east/west (Kill Lane/Kill Avenue) in the PM peak, with 323 PCU travelling on each arm.



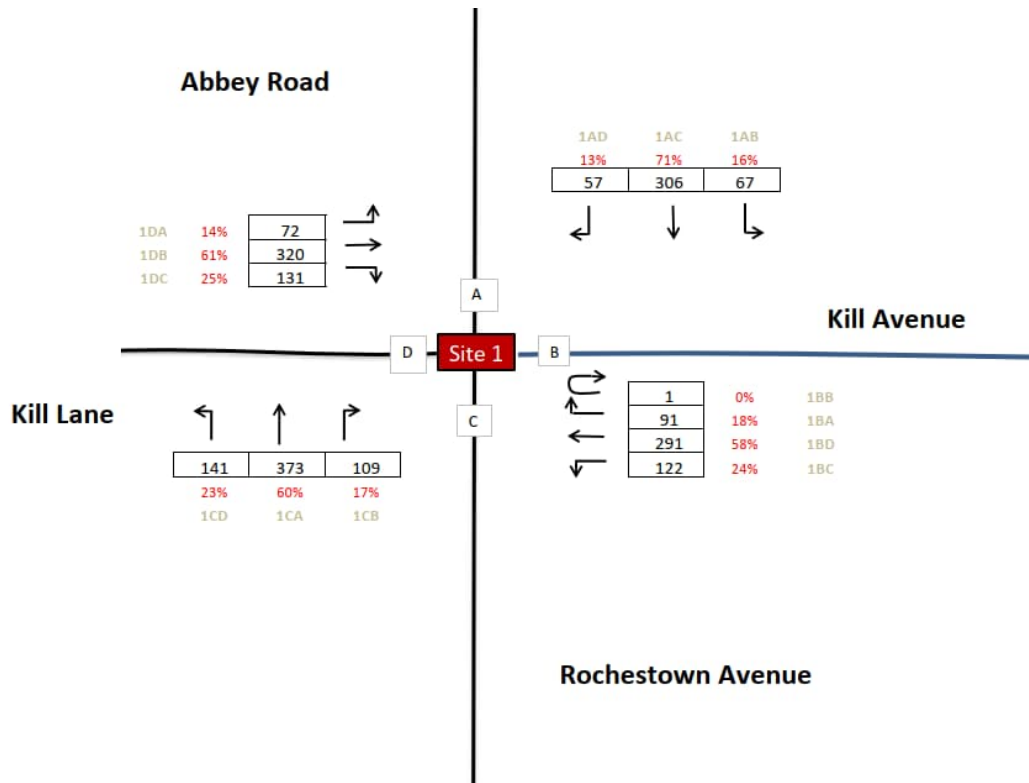


Figure 2.43: Traffic data for the AM Peak period (08:00-09:00) at Junction 4

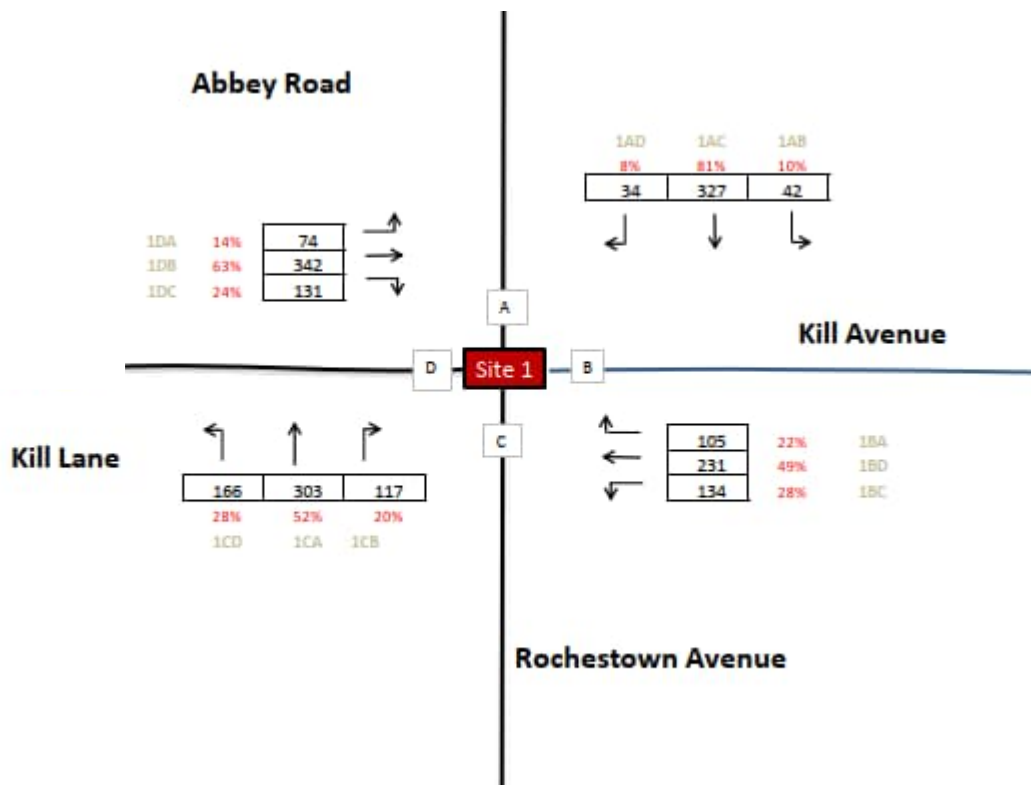


Figure 2.44: Traffic data for the PM Peak period (18:00-19:00) at Junction 4

### 2.4.2 Junction 4 Pedestrian Counts

Pedestrian Counts were undertaken at the junction over a twelve-hour period from 07:00 to 19:00 on Wednesday 29<sup>th</sup> September 2021. Eight pedestrian movements were recorded, the two movements across each of the main four arms of the junction. Pedestrians who did not cross the road carriageway were not recorded in the survey.

There were 1,219 pedestrian crossing movements recorded during the 12-hour survey period. The arm with the greatest number of pedestrian crossings is the Kill Avenue Arm, with a total of 427 pedestrians crossing.

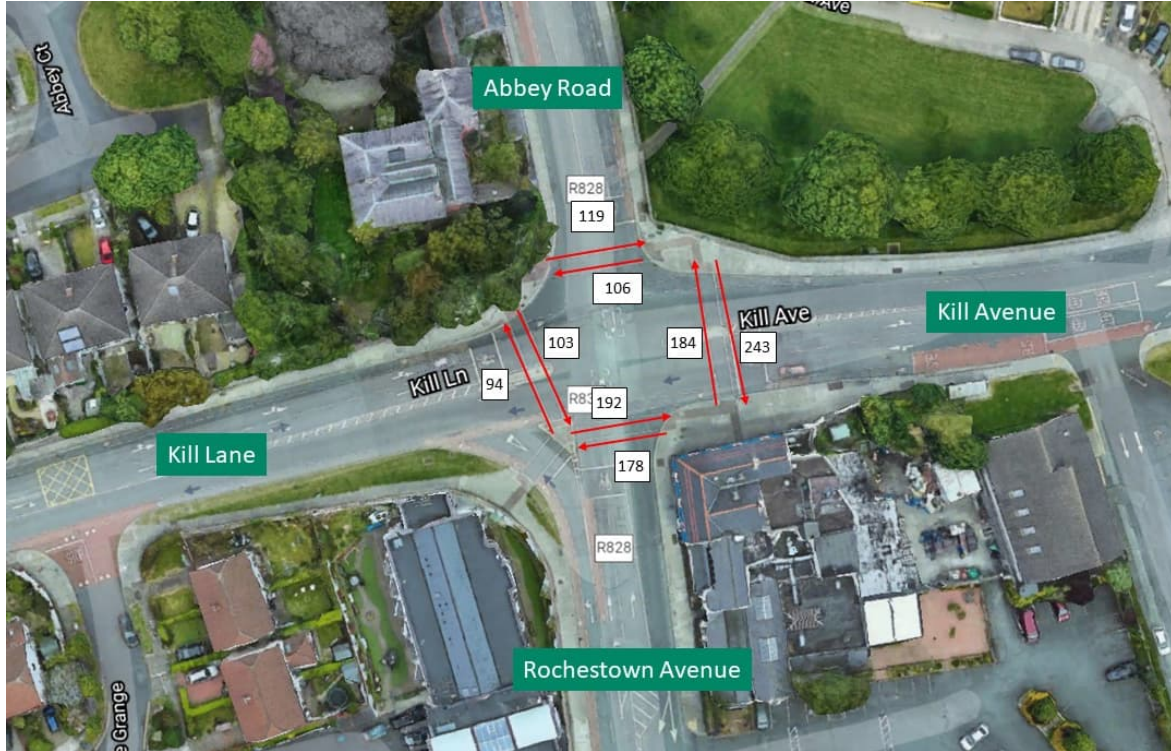


Figure 2.45: Pedestrian Movements at Junction 4

The hourly count is shown below in Figure 2.46. The busiest time of day at the junction is the morning peak of 08:00-09:00 with 154 pedestrians traversing the junction. This is followed by the lunchtime peak from 13:00-14:00 when 152 pedestrians traverse the junction (Figure 2.46).

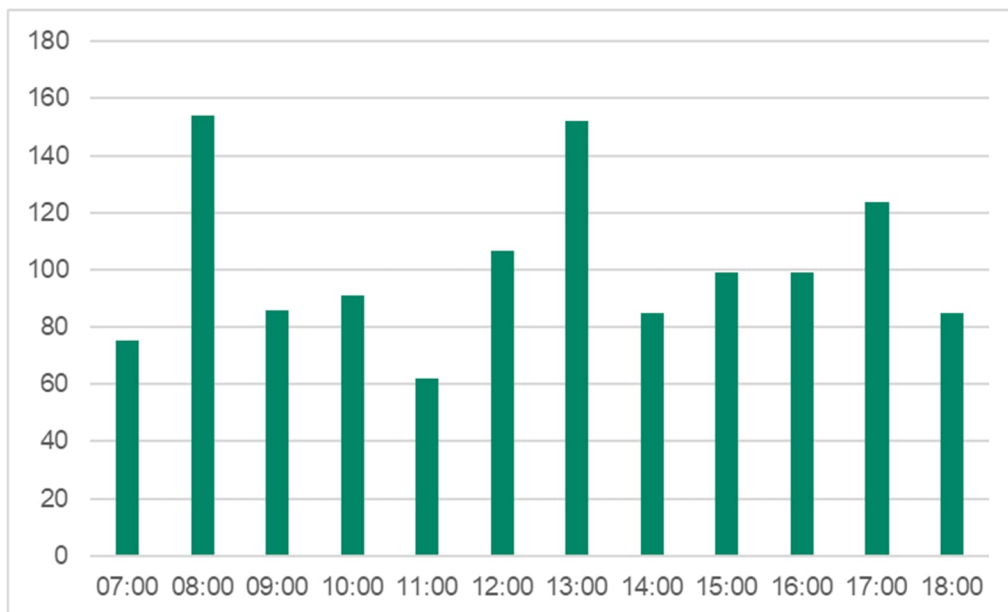


Figure 2.46: Pedestrian Count at Junction 4

### 2.4.3 Junction 4 Pedal Cycle Counts

There were 802 cyclists observed at Junction 4 in the 12-hour study period. The busiest movement for cyclists at this junction was the straight through movement from Abbey Road to Rochestown Avenue (see Figure 2.47). The busiest time for cyclists at this junction was between 08:00 and 09:00, when 141 cyclists travelled through the junction.

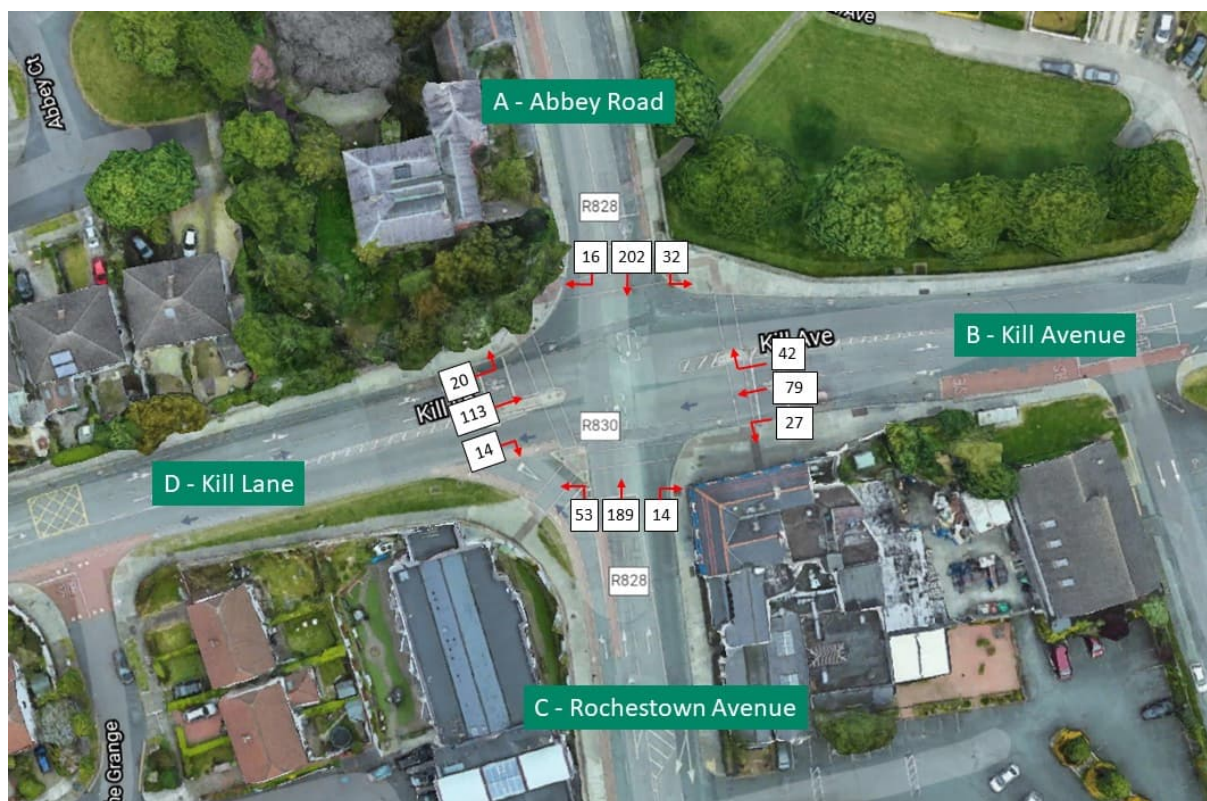


Figure 2.47: Cyclists at Junction 4

### 2.4.4 Junction 4 Bus Count

There was a total of 320 buses counted during the survey, which contributed to 1.4% of overall traffic. Most buses at Junction 4 travel along Kill Lane / Kill Avenue. The Dublin Bus no. 46A, 75 and 75A currently operate on this route. A smaller number of buses also travel along Rochestown Avenue/Abbey Road. Dublin Bus no. 7B, 7D and 63 currently run on this route.

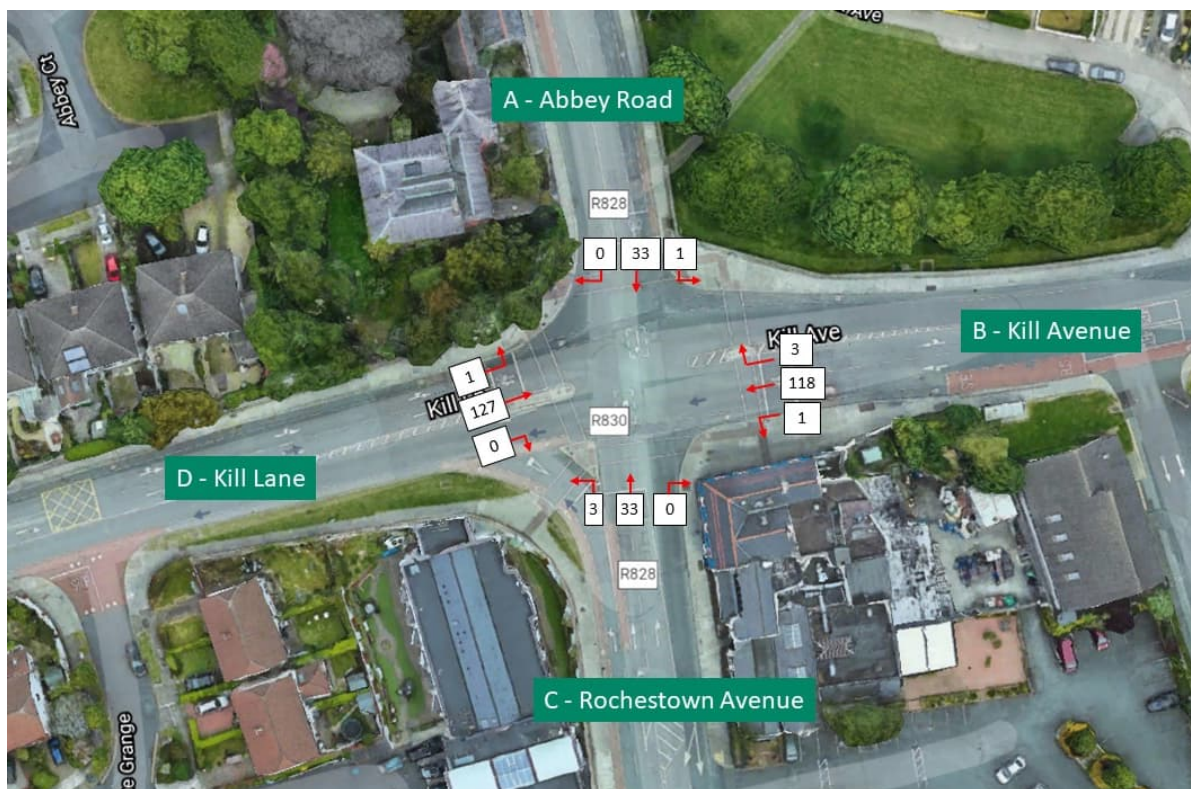


Figure 2.48: Bus Count at Junction 4

### 2.4.5 Junction 4 Traffic Queues

During the AM site visit, queuing was observed on all arms of the junction. Queues exceeding 100m, were recorded on the Abbey Road, Kill Avenue and Kill Lane arms, and queues of over 75m were recorded on the Rochestown Avenue Arm. The majority of the queuing traffic cleared in one cycle. This was captured by the cameras mounted in close proximity to the junction and the queue report attached in **Appendix A**. The queuing on Kill Avenue is shown in Figure 2.49.



Figure 2.49: Kill Avenue during the AM Peak

During the PM site visit, queuing was observed on all arms of the junction. Queues exceeding 100m, were recorded on the Abbey Road, Kill Avenue and Kill Lane arms, and queues of over 75m were recorded on the Rochestown

Avenue Arm. The majority of the queuing traffic cleared in one cycle. This was captured by the cameras mounted in close proximity to the junction and the queue report attached in **Appendix A**. The queuing on Abbey Road is shown in Figure 2.50.



**Figure 2.50: Abbey Road during the PM Peak**

## 2.5 Junction 5 – Mounttown Road Upper / York Road / Tivoli Road / Mounttown Road Lower

Junction 5 is at the crossroads between Mounttown Road Lower and York Road / Tivoli Road / Mounttown Road Upper (Figure 2.51).



Figure 2.51: Junction 5

### Junction 5 Traffic Counts

As a first step in the analysis of the JTC data, the 15-minute flows were aggregated together to reveal the traffic hourly demand profile, Figure 2.52 below refers.

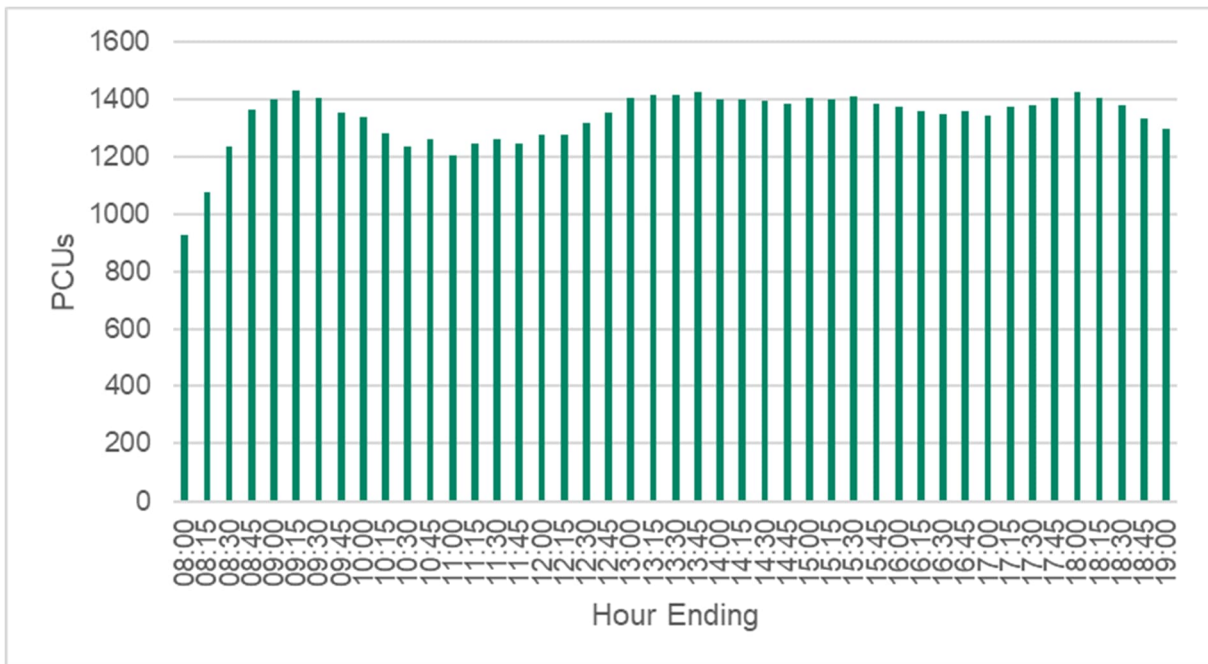
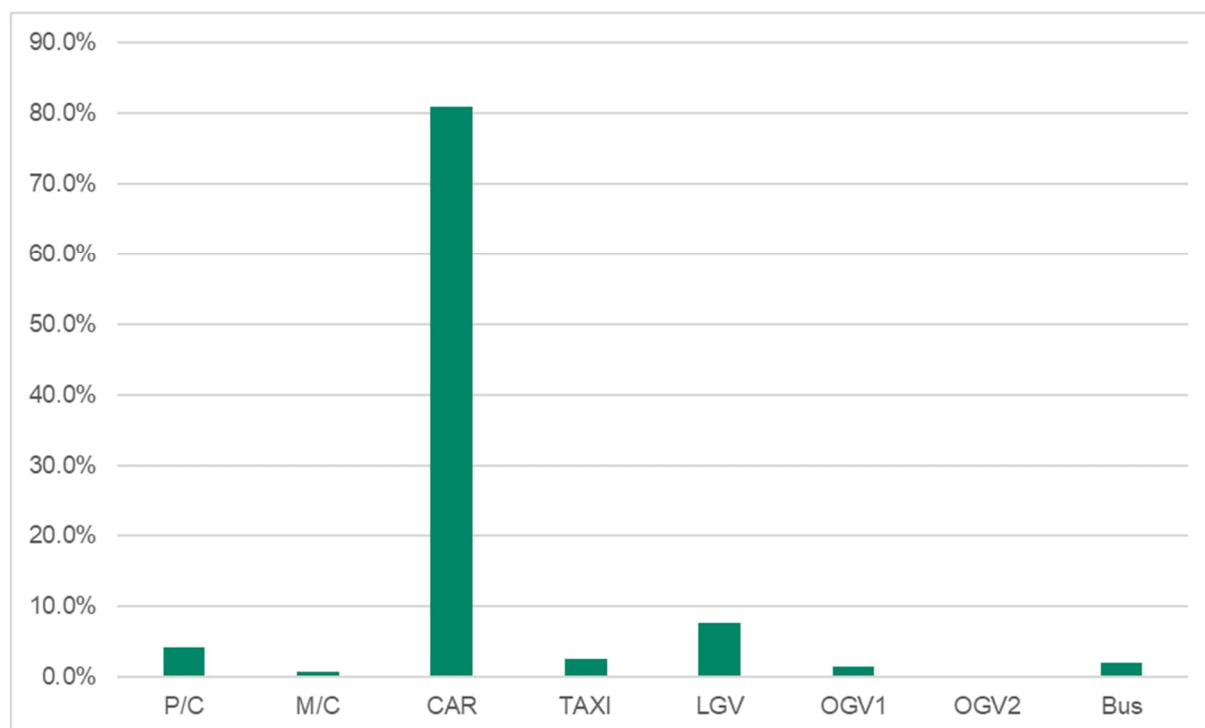


Figure 2.52: Traffic Volumes at Junction 5

The demand profile was then examined to reveal the system AM and PM peak hours. As can be seen from Figure 2.52 above, the AM and PM peak hours at Mounttown Road Lower / York Road / Tivoli Road / Mounttown Road Upper Junction occurs during the following hours:

- AM Peak Hour (08:15 – 09:15)
- PM Peak Hour (17:00 – 18:00)

There was a total of 15,941 vehicles counted over the 12-hour period at Junction 5. Figure 2.53 below shows a breakdown of the vehicles in their various classes. There is a high percentage of cars (81.0%) and LGVs (7.7%) traversing through the junction. In comparison, there is a low level of Heavy Goods Vehicles, with OGV1 at 1.4% and OGV2 at 0.2%. Cyclists made up 4.3% of users traversing the junction. It should however be noted that cyclists crossing the junction via the footpaths and central islands have not been counted; only cyclist using the carriageway have been accounted for.



**Figure 2.53: Breakdown of vehicle classification at Junction 5**

Figure 2.54 below shows the total vehicles on all arms of the junction for the AM peak period (08:15-09:15). The total number of vehicles travelling through the junction during the AM peak is 1,398 PCU. The volume of traffic travelling northbound on Mounttown Road Lower is the largest movement in the AM peak, with 574 PCU.

Figure 2.55 below shows the total vehicles on all arms of the junction for the PM peak period (17:00-18:00). The total number of vehicles travelling through the junction during the AM peak is 1,428 PCU. The volume of traffic travelling eastbound on Mounttown Road Upper is the largest movement in the PM peak, with 410 PCU.

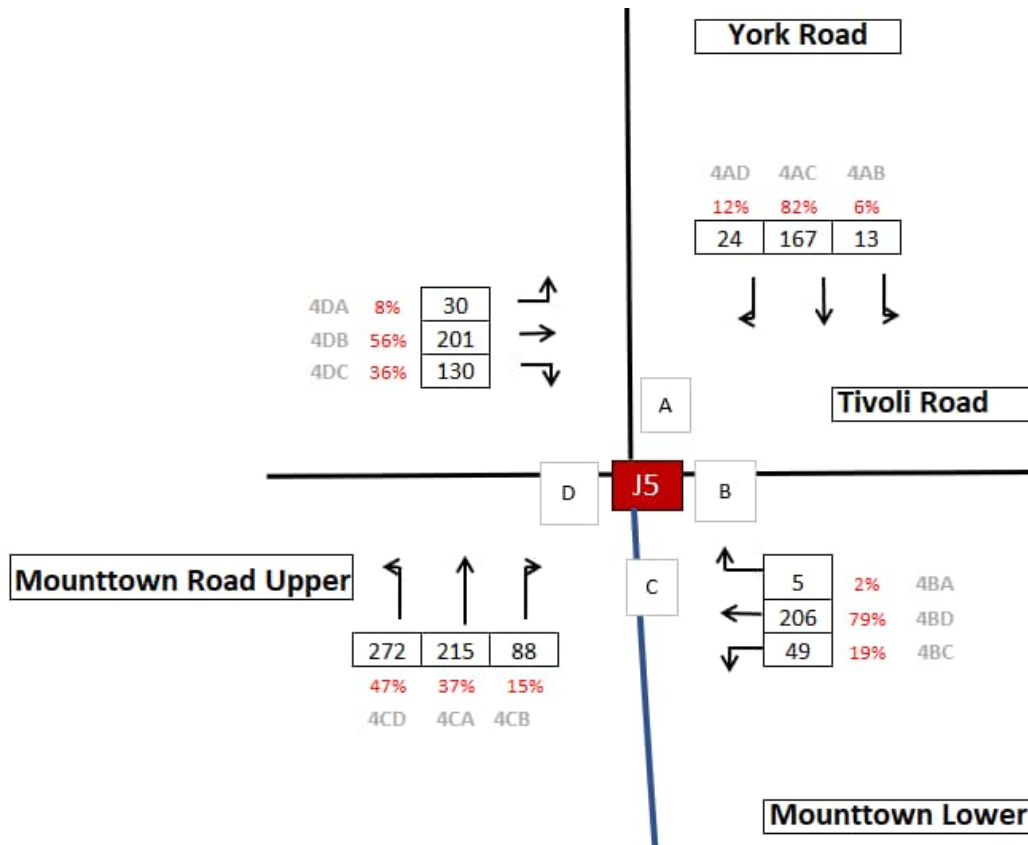


Figure 2.54: Traffic data for the AM Peak period (08:15-09:15) at Junction 5

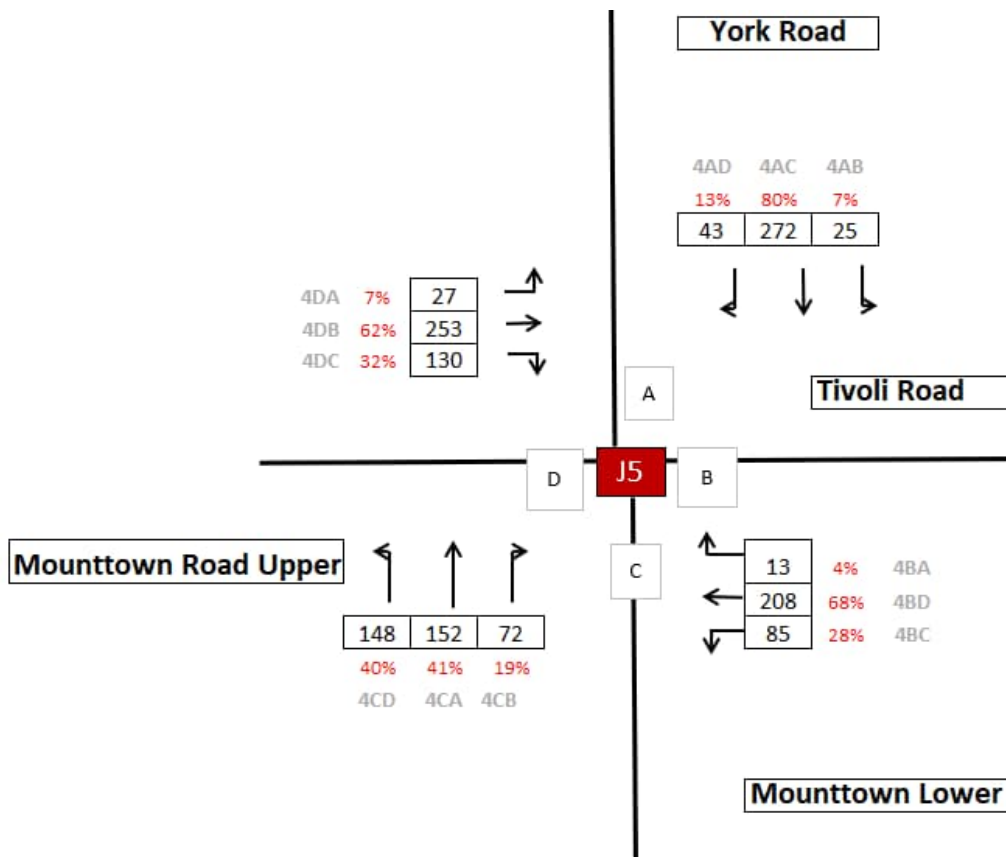


Figure 2.55: Traffic data for the PM Peak period (17:00-18:00) at Junction 5



### 2.5.1 Junction 5 Pedestrian Counts

Pedestrian Counts were undertaken at the junction over a twelve-hour period from 07:00 to 19:00 on Wednesday 29<sup>th</sup> September 2021. Eight pedestrian movements were recorded, the two movements across each of the main four arms of the junction. Pedestrians who did not cross the road carriageway were not recorded in the survey.

There were 1,130 pedestrian crossing movements recorded during the 12-hour survey period. The arm with the greatest number of pedestrian crossings is York Road (A), with a total of 431 pedestrians crossing.

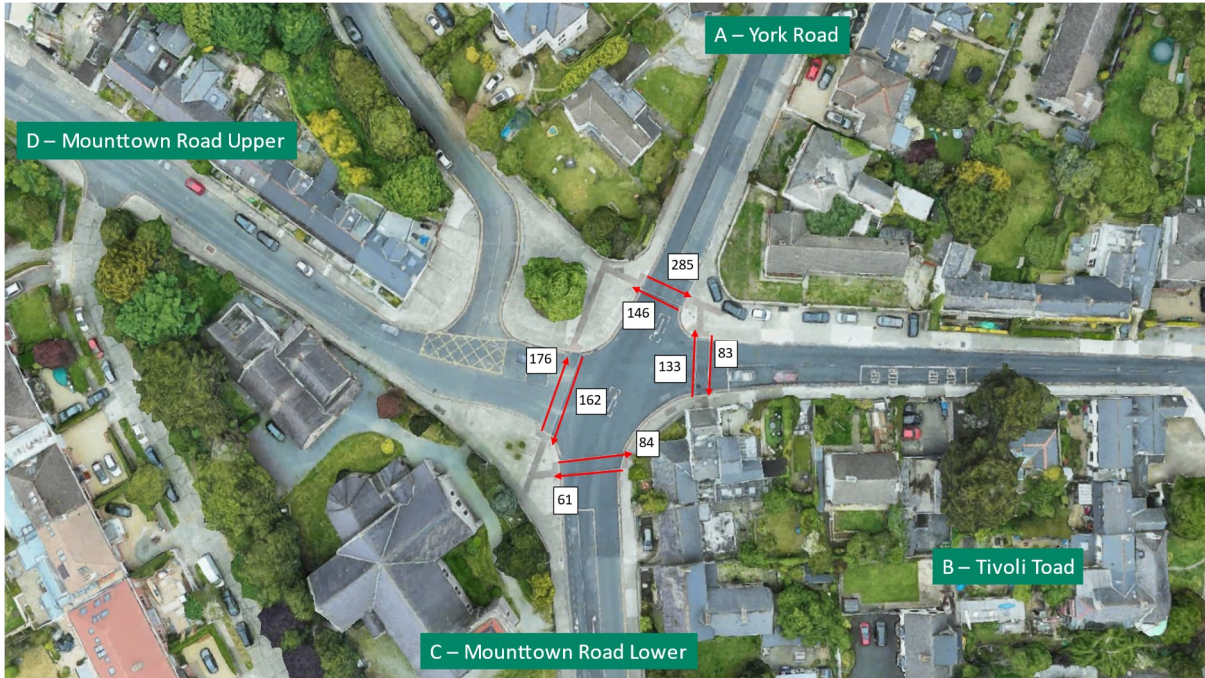


Figure 2.56: Pedestrian Movements at Junction 5

The hourly count is shown below in Figure 2.57. The busiest time of day at the junction is the lunchtime peak from 13:00-14:00 when 176 pedestrians traverse the junction. This is followed by the morning peak of 08:00-09:00 with 133 pedestrians traversing the junction (Figure 2.57).

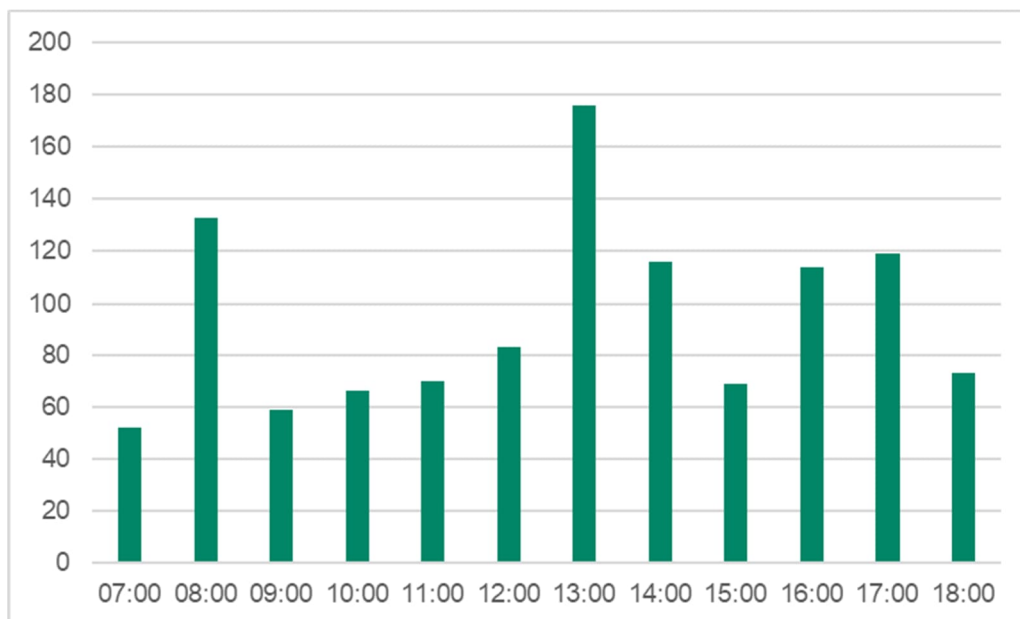


Figure 2.57: Pedestrian Count at Junction 5

### 2.5.2 Junction 3 Pedal Cycle Counts

There were 686 cyclists observed at Junction 5 in the 12-hour study period. The busiest movement for cyclists at this junction was the straight through movement from Mounttown Road Upper to Tivoli Road (see Figure 2.58). The busiest time for cyclists at this junction was between 08:00 and 09:00, with 150 cyclists travelling through the junction at this time.

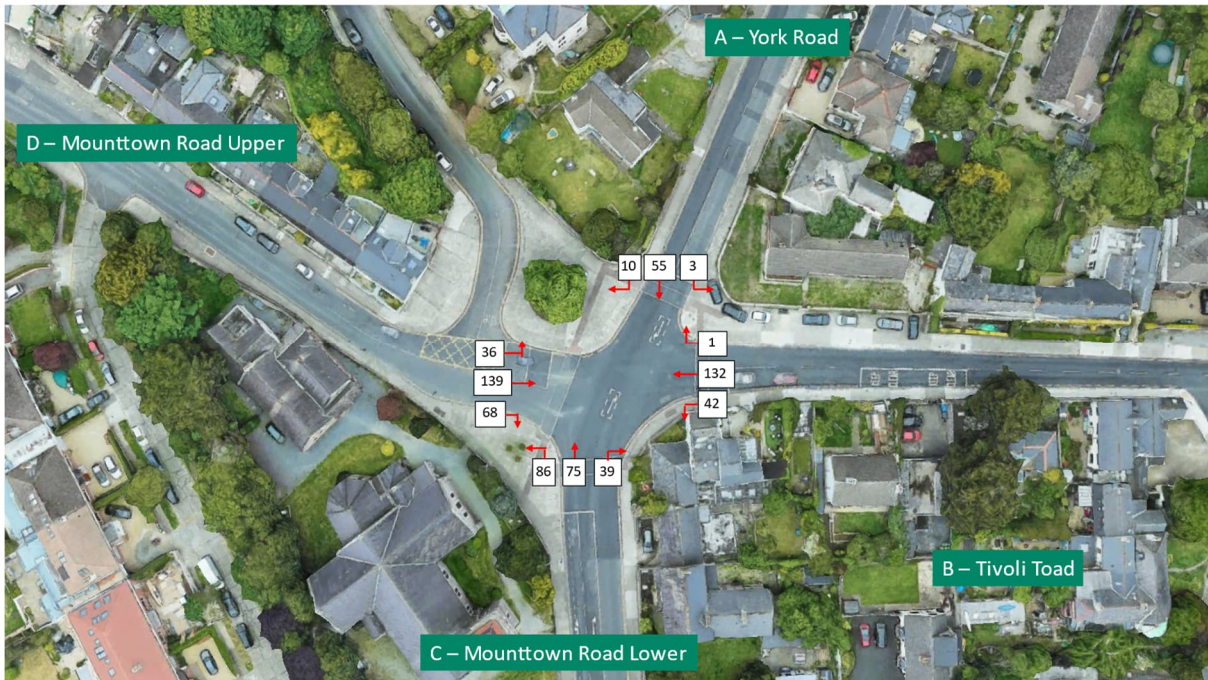


Figure 2.58: Cyclists at Junction 5

### 2.5.3 Junction 5 Bus Count

The Mounttown Road Lower / York Road / Tivoli Road / Mounttown Road Upper Junction had a total of 345 buses counted during the survey, which contributed to 2.1% of overall traffic. Dublin Buses no. 46A, 63, 63A, 75, and 75A travel straight through the junction from Mounttown Road Lower to York Road, and vice versa.

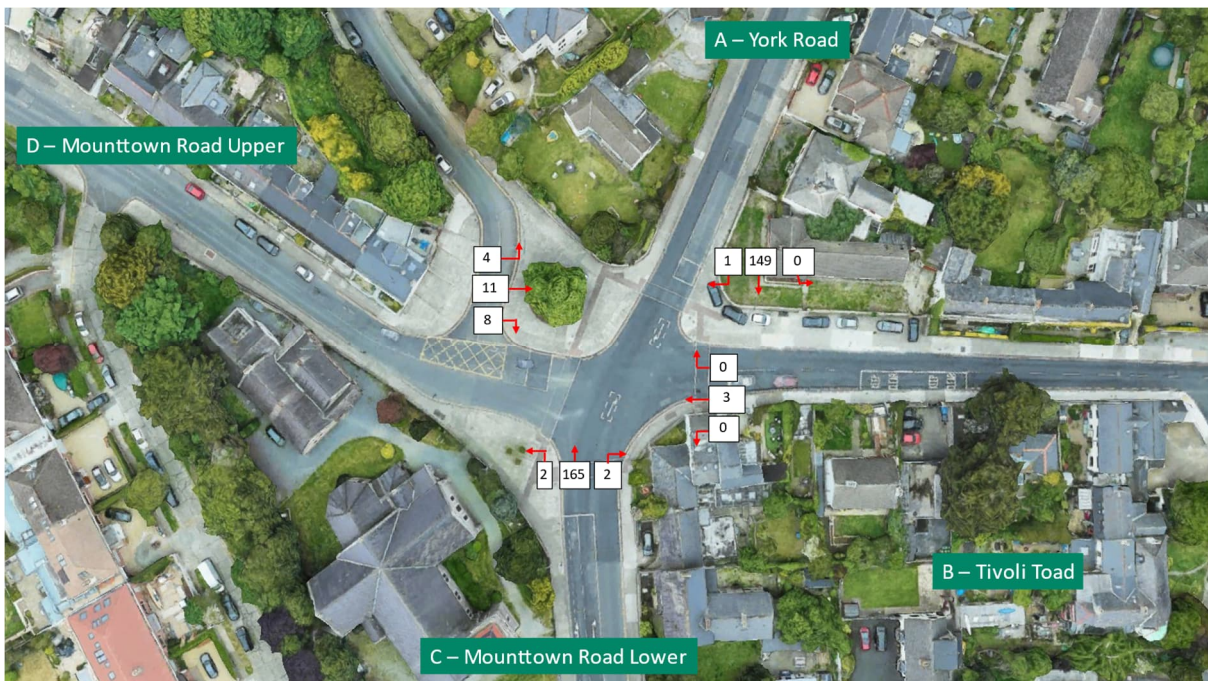


Figure 2.59: Bus Count at Junction 5

### 2.5.4 Junction 5 Traffic Queues

During the AM site visit, queuing was observed on all arms of the junction. Queues exceeding 100m, were recorded on the York Road, Tivoli Road and Mounttown Road Upper arms of the junction, and queues of over 75m were recorded on the Mounttown Road Lower arm. The majority of the queuing traffic cleared in one cycle. This was captured by the cameras mounted in close proximity to the junction. The queuing on the Mounttown Road Lower arm is shown in Figure 2.60. The queue report is attached in **Appendix A**.



Figure 2.60 Mounttown Road Lower at AM Peak

During the PM peak, on the Mounttown Road Upper and Tivoli Road arms, similar queue of exceeding 100m were recorded, but the majority of the queuing traffic cleared in one staging cycle. The queuing on the Mounttown Road Upper is shown in Figure 2.61.



Figure 2.61 Mounttown Road Upper at AM Peak

### 3. Emerging Preferred Designs

The emerging preferred designs for junctions on the DLR Central scheme can be summarised as follows:

#### 3.1 Junction 1 – Proposed Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park

The proposal for Junction 1 is to maintain the 5-arm signal-controlled junction, but with the removal of existing left slip lanes on Glenageary Road Upper, Oliver Plunkett Road, and Mounttown Lower. The removal of these left slip lanes facilitates the provision of a 2-way cycle facility. The proposed cycle facilities are designed as a protected junction, in particular, Junction Type 4 Cyclops junction, as set out in the Bus Connects Preliminary Design Guide. The emerging preferred option is shown in Figure 3.1.

Instead of left turn slip, Oliver Plunkett Road will have one lane for straight ahead and left turning traffic and a short lane for right turning traffic. Glenageary Road Upper westbound will have no left turn slip, instead will have a left and straight-ahead lane, and a lane for right turning traffic. Mounttown Road Upper will have one lane for straight ahead and left turning traffic and a short lane for right turning traffic. Kill Avenue will remain the same as existing.



Figure 3.1: Emerging Preferred Option Junction 1

### 3.2 Junction 2 - Kill Avenue and Claremont Avenue

Junction 2 will remain a 3-arm signal-controlled junction. The proposed cycle facilities are designed as a protected junction, in particular, Junction Type 4 Cyclops junction, as set out in the Bus Connects Preliminary Design Guide. The emerging preferred option is shown in Figure 3.2.

Kill Avenue eastbound will be reduced from two straight ahead lanes to one, with the right turning lane maintained. The current on-road one-way cycle tracks on Kill Avenue will be upgraded to a two-way raised adjacent cycle track on the southern side of the road. The staggered pedestrian crossing on Kill Avenue will be upgraded to a straight crossing, and the crossing on Claremont Avenue will be changed to a toucan crossing to facilitate the new cycle facility as shown in Figure 3.2.

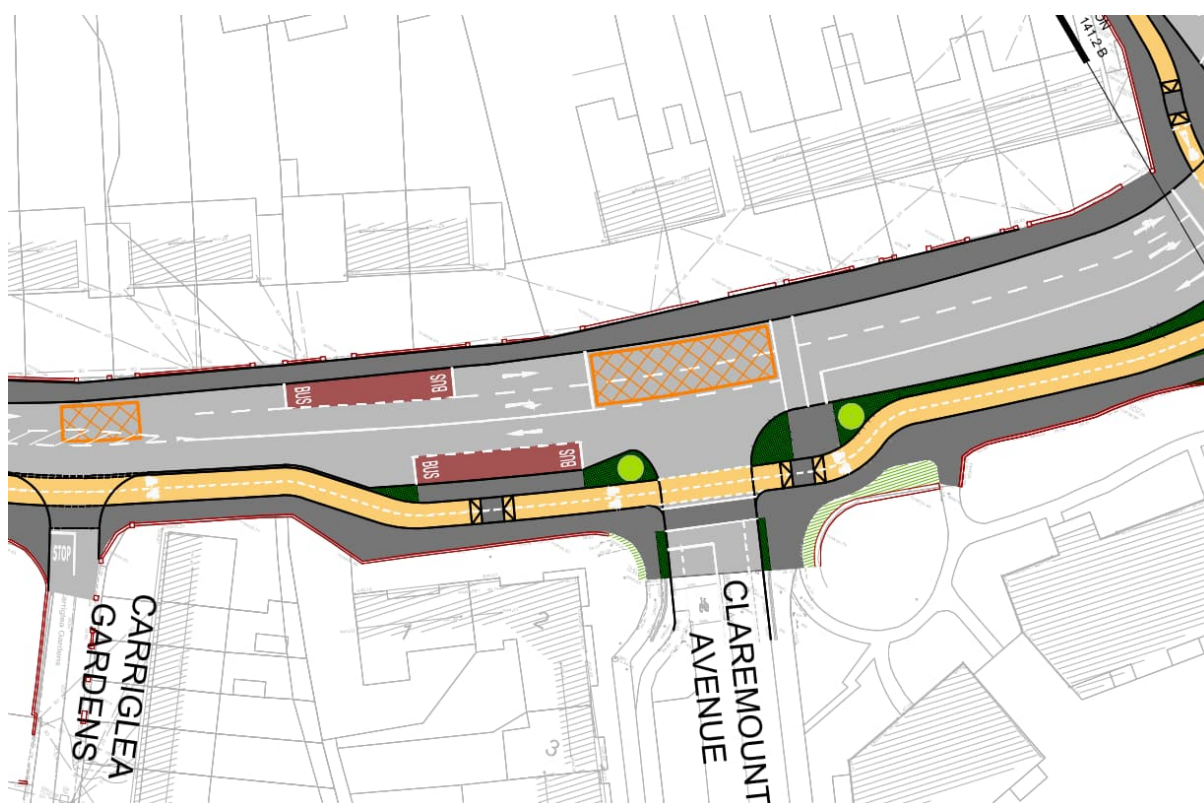


Figure 3.2: Emerging Preferred Option Junction 2

### 3.3 Junction 3 - Glenageary Road Upper / Maypark Avenue / Cualanor Avenue Junction

Junction 3 will remain a 4-arm signal-controlled junction. The proposed cycle facilities are designed as a protected junction, in particular, Junction Type 4 Cyclops junction, as set out in the Bus Connects Preliminary Design Guide. The emerging preferred option is shown in Figure 3.3.

It is proposed to remove the Bus Lanes / Left Turn Lanes on Glenageary Road. It is proposed to provide a straight ahead / left turning lanes, and a dedicated lane for right turning traffic on both Glenageary Road East and West.

The left turning slip on Maypark Avenue will be removed, instead with a left / straight lane and a right turning lane will be provided, as will Cualanor Avenue.

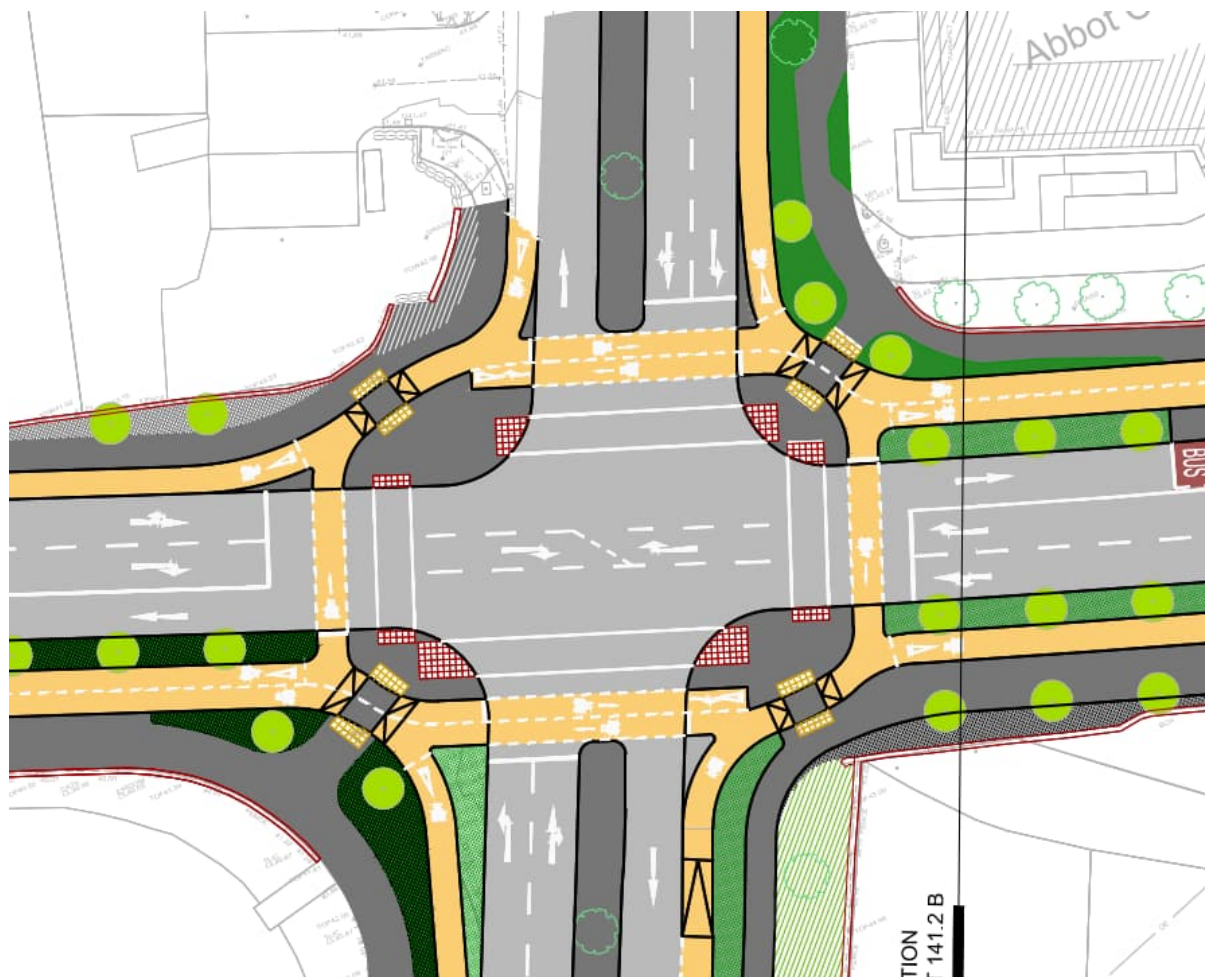


Figure 3.3: Emerging Preferred Option Junction 3

### 3.4 Junction 4 - Kill Avenue / Rochestown Avenue / Kill Lane/ Abbey Road Junction

Junction 4 will remain a 4-arm signal-controlled junction. The proposed cycle facilities are designed as a protected junction, in particular, Junction Type 4 Cyclops junction, as set out in the Bus Connects Preliminary Design Guide. The emerging preferred option is shown in Figure 3.4.

It is proposed to remove the Left Turn Lane on Rochestown Avenue, instead with a left / straight lane and a right turning lane.

It is proposed to provide a straight ahead / left turning lanes, and a dedicated lane for right turning traffic on Rochestown Avenue, Kill Lane, and Abbey Road.

It is proposed to reinstate the straight through / left and the straight through / right on Kill Avenue, that were realigned for the existing temporary cycle scheme.

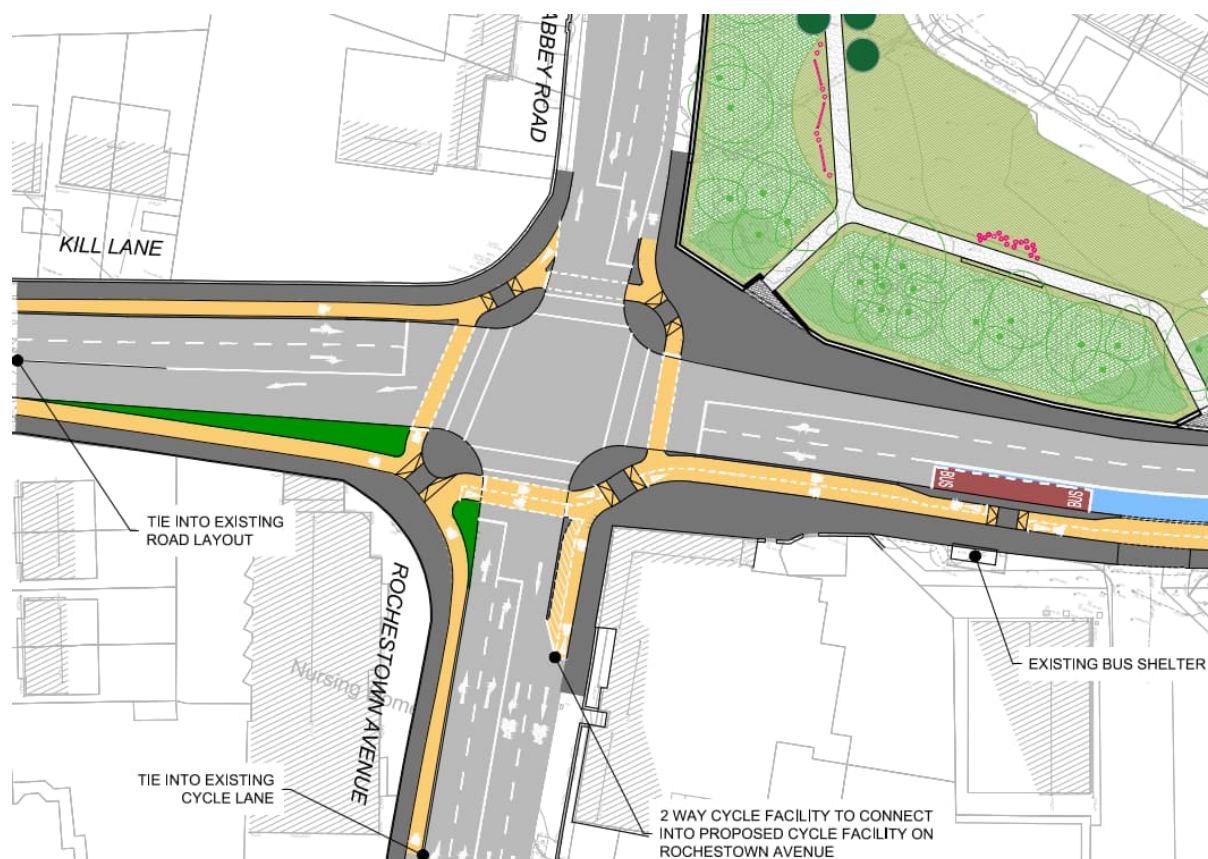


Figure 3.4: Emerging Preferred Option Junction 4

### 3.5 Junction 5 - Mounttown Road Upper / York Road / Tivoli Road / Mounttown Road Lower

Junction 5 will remain similar to its existing layout. However the footpath will be built out on the eastern side of Mounttown Road Lower, creating a shared path where the 2-way cycle lane will end. Cyclists will have to access the shared path and cross at a new Toucan crossing. A Toucan crossing will also be provided on Mounttown Road Upper to facilitate cyclists crossing this road and accessing the 2-way cycle facility. The emerging preferred option is shown in Figure 3.5.

The current traffic lanes are to remain as existing.

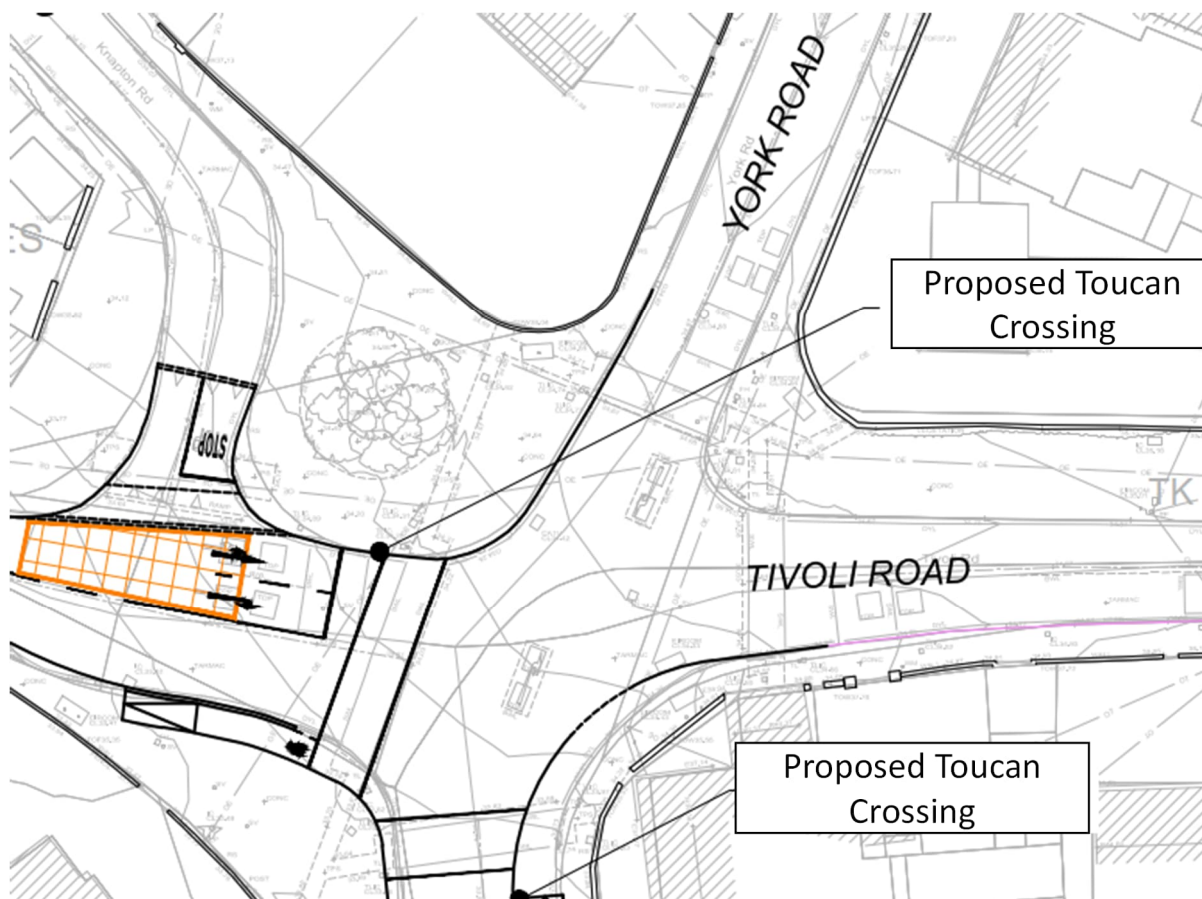


Figure 3.5: Emerging Preferred Option Junction 5



## 4. Junction Modelling

### 4.1 Introduction

This section presents the junction modelling analysis of the key junctions in the study area including:

- Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park
- Kill Avenue and Claremont Avenue
- Glenageary Road Upper / Maypark Avenue / Cualanor Avenue Junction, and
- Kill Avenue / Rochestown Avenue / Kill Lane/ Abbey Road Junction.

Given that the Mounttown Road Upper / York Road / Tivoli Road / Mounttown Road Lower junction is not being upgraded, it is assumed that the junction capacity will not be altered.

All the four remaining junctions are compared with the base scenario.

The signalised junctions were modelled using the LinSig software tool. The outputs from the LinSig software present Degree of Saturation (DoS) and queue lengths as indicators of the operational efficiency of the junction. A Degree of Saturation of 100% indicates that the junction is operating at its theoretical maximum capacity, however a value of approximately 90% is the optimum DoS for a traffic signal-controlled junction.

### 4.2 Junction 1 - Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park

The results of the junction analysis for the Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park are illustrated in Table 4.1 below.

Peak Period	Junction Arm and Link	Base		Emerging Preferred	
		Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)
Weekday AM	Practical Reserve Capacity		-14%		-21.5%
	Kill Avenue NB Ahead+Left	11.1	78.9%	5.8	66.9%
	Kill Avenue NB Right	8.7	94.2%	10.3	104.9%
	Oliver Plunkett Rd EB Ahead+Left+Right			8.4	55.8%
	Oliver Plunkett Rd EB Left	0.1	1.2%		
	Oliver Plunkett Rd EB Ahead + Left	13.6	97.5%		
	Oliver Plunkett Rd EB Right	1.3	19.3%		
	Glenageary Rd Upper WB Ahead + Right	26.9	102.6%		
	Glenageary Rd Upper WB Left	1.1	24.5%		
	Glenageary Rd Upper WB Right			8.3	48.8%
	Glenageary Rd Upper WB Ahead+Left			45.7	109.4%
	Mounttown Lower SB Ahead+Left+Right			18.7	94.6%
	Mounttown Lower SB Ahead+Left+U-Turn Left	24.1	101.7%		
	Mounttown Lower SB U-Turn Left			0.2	5%
	Mounttown Lower SB Right	1.1	22.6%	-	-
Highthorn Park SB-All	0.8	20%	0.8	20%	
Weekday PM	Practical Reserve Capacity		-18.8%		-25.4%
	Kill Avenue NB Ahead+Left	4.2	47.9%	3.2	36.5%
	Kill Avenue NB Right	14.3	104.3%	14.8	109.6%
	Oliver Plunkett Rd EB Ahead+Left+Right			11.6	84.4%
	Oliver Plunkett Rd EB Left	0	0.6%		

Oliver Plunkett Rd EB Ahead + Left	21	106.1%		
Oliver Plunkett Rd EB Right	1.2	17.3%		
Glenageary Rd Upper WB Ahead + Right	20.6	106.9%		
Glenageary Rd Upper WB Left	0.7	17.6%		
Glenageary Rd Upper WB Right			6.3	45%
Glenageary Rd Upper WB Ahead+Left			38.5	113%
Mounttown Lower SB Ahead+Left+Right			19.5	88.3%
Mounttown Lower SB Ahead+Left+U-Turn Left	34	104.3%		
Mounttown Lower SB U-Turn Left			0.1	3%
Mounttown Lower SB Right	1	18.6%		
Highthorn Park SB-All	0.7	15.8%	0.7	16%

**Table 4.1: Junction 1 – LinSig Result**

The Junction 1 results indicate for the :

- In the **Base** scenario, the junction is currently operating over capacity during the AM and PM peaks, with a PRC of -14% and -18.8% respectively.
- In the **Emerging Preferred** scenario, the junction operates marginally poorer, with a PRC of -21.5% and -25.4% during the AM and PM peaks respectively.
- During the AM peak, on Glenageary Road Upper, the queue increases from a combined queue of 28 vehicles in the Base scenario to a combined queue of 54 vehicles in the **Emerging Preferred** scenario.
- During the PM peak, on Glenageary Road Upper, the queue increases from a combined queue of 21.3 vehicles in the Base scenario to a combined queue of 44.8 vehicles in the **Emerging Preferred** scenario.

Both the existing and the Emerging Preferred are operating over capacity in both peaks. The Base scenario is performing slightly better compared to the Emerging Preferred options though all scenarios are operating over capacity.

It must be noted, that in the **Emerging Preferred** option, an additional dedicated stage is provided for pedestrians and cyclists, while the existing has pedestrians “walking with traffic” during traffic stages.

The design principle of creating more compact junctions, which minimise pedestrian and cyclists waiting times is set out in DMURS which notes that “in areas where pedestrian activity is high, junctions may have to operate at saturation levels for short periods (i.e. above 93% during peak periods)”. The junction also provides shorter pedestrian crossing distances, dedicated cyclist signals and a dedicated segregated cycle track through the junction.

### 4.3 Junction 2 - Kill Avenue / Claremont Avenue

The results of the junction analysis for the Kill Avenue / Claremont Avenue junction are illustrated in Table 4.2 below. The junction was modelled with the Glenageary Road Upper / Kill Avenue / Oliver Plunkett Road / Mounttown Lower / Highthorn Park Junction, given their close proximity.

Peak Period	Junction Arm and Link	Base		Emerging Preferred	
		Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)
Weekday AM (08:00-09:00)	Kill Avenue EB Ahead	4.3	24.3%		
	Kill Avenue EB Ahead + Right	1.5	18.2%	7.1	41.1%
	Claremont Avenue NB Left + Right	4	56.7%	3.5	42.6%
	Kill Avenue WB Ahead+Left	5.5	44.4%	0.6	37.7%
Weekday PM (17:00-18:00)	Kill Avenue EB Ahead	2.8	16.4%		
	Kill Avenue EB Ahead + Right	2.5	25.6%	5.9	38.4%
	Claremont Avenue NB Left + Right	2.9	46.4%	2.8	42.3%
	Kill Avenue WB Ahead+Left	4.8	39.7%	0.4	33.1%

**Table 4.2: Junction 2 – LinSig Result**

The Junction 2 results indicate:

- In the **Base** scenario, all arms of the junction are currently operating under capacity during the AM and PM peaks.
- In the **Emerging Preferred** scenario, all arms of the junction are currently operating under capacity during the AM and PM peaks.
- During the AM peak, on Kill Avenue Eastbound, the queue increases from a combined queue of 5.8 vehicles in the Base scenario to a combined queue of 7.1 vehicles in the **Emerging Preferred** scenario.
- During the PM peak, on Kill Avenue Eastbound, the queue increases from a combined queue of 5.3 vehicles in the Base scenario to a combined queue of 5.9 vehicles in the **Emerging Preferred** scenario.

Both the Base and the Emerging Preferred scenarios are arms of the junction are operating under operational capacity in both peaks. The Base scenario is performing slightly better compared to the Emerging Preferred options though all scenarios are operating under capacity. The junction also provides shorter pedestrian crossing distances, dedicated cyclist signals and a dedicated segregated cycle track through the junction.

#### 4.4 Junction 3 - Glenageary Road Upper / Maypark Avenue / Cualanor Avenue Junction

The results of the junction analysis for the Glenageary Road Upper / Maypark Avenue junction are illustrated in Table 4.3 below.

Peak Period	Junction Arm and Link	Base		Proposed	
		Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)
Weekday AM (08:00-09:00)	<b>Practical Reserve Capacity</b>		<b>+0.1%</b>		<b>-3.4%</b>
	Maypark Avenue NB Left+Ahead+Right	9.7	86.4%	6.4	77.0%
	Glenageary Road Upper EB Ahead+Left	1.8	25.2%		
	Glenageary Road Upper EB Ahead+Right	14.4	70%		
	Glenageary Road Upper EB Left+Ahead+Right			14.8	65.8%
	Cualanor Avenue SB Ahead+Right	7	89.7%		
	Cualanor Avenue SB Left	0.3	3.9%		
	Cualanor Avenue SB Ahead+Left			0.8	9.2%
	Cualanor Avenue SB Right			6.7	92.1%
	Glenageary Road Upper WB Ahead+Left	3.8	51.3%		
	Glenageary Road Upper WB Ahead+Right	24.4	89.9%		
	Glenageary Road Upper WB Left+Ahead+Right			30.6	93.0%
Weekday PM (17:00-18:00)	<b>Practical Reserve Capacity</b>		<b>+6.3%</b>		<b>+2.9%</b>
	Maypark Avenue NB Left+Ahead+Right	9.1	84.7%	7.9	87.5%
	Glenageary Road Upper EB Ahead+Left	2.1	28.1%		
	Glenageary Road Upper EB Ahead+Right	19.8	83.5%		
	Glenageary Road Upper EB Left+Ahead+Right			21.0	86.4%
	Cualanor Avenue SB Ahead+Right	2.9	57.3%		
	Cualanor Avenue SB Left	0.3	5.2%		
	Cualanor Avenue SB Ahead+Left			0.7	9.8%
	Cualanor Avenue SB Right			2.1	50.7%
	Glenageary Road Upper WB Ahead+Left	5.6	66.1%		
	Glenageary Road Upper WB Ahead	12	59.1%		
	Glenageary Road Upper WB Left+Ahead+Right			17.3	77.1%

**Table 4.3: Junction 3 – LinSig Result**

The Junction 3 results indicate:

- In the **Base** scenario, the junction is currently operating within capacity during the AM and PM peaks, with a PRC of 0.1% and 6.3% respectively.
- In the **Emerging Preferred** scenario, the junction operates marginally poorer, with a PRC of -3.4% and +2.9% during the AM and PM peaks respectively.
- During the AM peak, on Glenageary Road Upper WB, the queue increases from a combined queue of 28.2 vehicles in the Base scenario to a combined queue of 30.6 vehicles in the **Emerging Preferred** scenario.
- During the PM peak, the Base scenario and the in the **Emerging Preferred** scenario have similar queuing.

Both the existing and the Emerging Preferred are operating under operational capacity in all peaks, except for the Emerging Preferred AM peak, with operates just under capacity with a PRC of -3.4%. The Base scenario is performing slightly better compared to the Emerging Preferred options.

It must be noted, that in the **Emerging Preferred** option, an additional dedicated stage is provided for pedestrians and cyclists, while the existing has pedestrians “walking with traffic” during traffic stages.

The design principle of creating more compact junctions, which minimise pedestrian and cyclists waiting times is set out in DMURS which notes that “in areas where pedestrian activity is high, junctions may have to operate at saturation levels for short periods (i.e. above 93% during peak periods)”. The junction also provides shorter pedestrian crossing distances, dedicated cyclist signals and a dedicated segregated cycle track through the junction.

#### 4.5 Junction 4 - Kill Avenue / Rochestown Avenue / Kill Lane/ Abbey Road Junction

The results of the junction analysis for the Kill Avenue / Rochestown Avenue / Kill Lane/ Abbey Road Junction are illustrated in Table 4.4 below.

Peak Period	Junction Arm and Link	Base		Proposed	
		Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)
Weekday AM (08:00-09:00)	<b>Practical Reserve Capacity</b>		<b>7.4%</b>		<b>-0.70%</b>
	Kill Avenue W/B Left Ahead Right	15.2	82.20%		
	Kill Avenue W/B Left Ahead			11.1	90.00%
	Kill Avenue W/B Right			12.4	90.00%
	Rochestown Av N/B Right Ahead	15.8	83.80%		
	Rochestown Av N/B Slip Left	1.5	13.20%		
	Rochestown Av N/B Left Ahead			20.6	90.60%
	Rochestown Av N/B Right			5.7	83.60%
	Kill Lane E/B Ahead Left	11.3	58.60%	12.3	67.10%
	Kill Lane E/B Right	6.1	80.80%	6.5	83.70%
	Abbey Road S/B Left Ahead	11.8	66.40%	11.6	65.40%
Abbey Road Av S/B Right	2.3	50.40%	2.2	43.00%	
Weekday PM (16:00-17:00)	<b>Practical Reserve Capacity</b>		<b>18.0%</b>		<b>8.60%</b>
	Kill Avenue W/B Left Ahead Right	12.7	76.20%		
	Kill Avenue W/B Left Ahead			9.8	82.80%
	Kill Avenue W/B Right			11.1	82.90%
	Rochestown Av N/B Right Ahead	12.4	76.10%		
	Rochestown Av N/B Slip Left	1.7	15.80%		
	Rochestown Av N/B Left Ahead			17.7	81.80%
	Rochestown Av N/B Right			5.9	79.60%
	Kill Lane E/B Ahead Left	12.6	65.20%	14.2	69.70%
	Kill Lane E/B Right	5.6	74.60%	6.1	76.70%
	Abbey Road S/B Left Ahead	12.0	69.10%	12.1	62.40%
Abbey Road S/B Right	1.2	24.10%	1.3	22.80%	

**Table 4.4: Junction 4 – LinSig Result**

The Junction 4 results indicate:

- In the **Base** scenario, the junction is currently operating within capacity during the AM and PM peaks, with a PRC of 7.4% and 18.0% respectively.
- In the **Emerging Preferred** scenario, the junction operates marginally poorer, with a PRC of -0.70% and +8.60% during the AM and PM peaks respectively.
- During the AM peak, on Rochestown Avenue, the queue increases from a combined queue of 17.3 vehicles in the Base scenario to a combined queue of 26.3 vehicles in the **Emerging Preferred** scenario.
- During the PM peak, on Kill Lane, the queue increases from a combined queue of 18.2 vehicles in the Base scenario to a combined queue of 20.3 vehicles in the **Emerging Preferred** scenario.

Both the existing and the Emerging Preferred are operating under operational capacity in all peaks, except for the Emerging Preferred AM peak, which operates just under capacity with a PRC of -0.70%. The Base scenario is performing slightly better compared to the Emerging Preferred options.

The design principle of creating more compact junctions, which minimise pedestrian and cyclists waiting times is set out in DMURS which notes that “in areas where pedestrian activity is high, junctions may have to operate at saturation levels for short periods (i.e. above 93% during peak periods)”. The junction also provides shorter pedestrian crossing distances, dedicated cyclist signals and a dedicated segregated cycle track through the junction.

## 5. Conclusions

The existing conditions assessment identified high volumes of traffic on all junctions in the study area, but also high volume of pedestrians and cyclists due to proximity of large residential areas, schools, and services in the local area, which indicated a significant demand for active travel.

The scheme proposes a number of mitigation measures to promote pedestrian and cycle infrastructure at the existing signalised junctions. For instance, existing left turn slip lanes are proposed to be omitted at a number of existing junctions, to provide a more compact junction as per DMURS, to reduce crossing distances and to assist in reducing vehicular turning speeds. The proposed designs will assist to introduce new and high-quality cycle and pedestrian infrastructure to meet the scheme objectives in terms of promoting sustainable transport.

The results of the junction modelling indicates that the existing junctions will have reduced vehicular capacity as a result of the proposed scheme. However, the proposed designs will result in an increase in capacity for sustainable active travel modes. The proposed designs will

- will promote walking and cycling;
- reduced pedestrian crossing distances at junctions;
- Provide safer facilities for pedestrians and cyclists;
- enhance permeability for sustainable active travel modes; and
- encourage travel for all ages to walk or cycle.

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