O'Flynn Construction Co. Unlimited Company

Old Fort Road, Ballincollig - Strategic Housing Development

Traffic and Transport Assessment

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Job number 273486-00

Ove Arup & Partners Ireland Ltd

Arup
One Albert Quay
Cork
T12 X8N6
Ireland
www.arup.com

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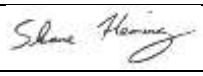
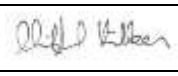
		Signature			
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1 Introduction

Arup has been appointed by O'Flynn Construction to prepare an Outline Mobility Management Plan (MMP) for a proposed residential development on Old Fort Road, Ballincollig, Co. Cork. It is intended to apply for permission for the proposed development through the Strategic Housing Development process via An Bord Pleanála. The development site is located within Ballincollig Town Centre, within the Cork City Western Environs sub-area of the Ballincollig-Carrigaline Municipal District. It lies in the jurisdiction of Cork City Council.

The proposed development will comprise a residential development of 123 apartment units, developed over three distinct blocks. There will also be an accompanying crèche on site. The development will be constructed on a greenfield site on the northern side of the Old Fort Road, which is to the north of the main street of Ballincollig.

This report describes the existing environment and current site accessibility, presents the proposed development, estimates the future traffic generated by the proposed development and assesses the impact of the traffic on the surrounding network. For the purpose of this assessment it has been assumed that the new development will be fully constructed and occupied in 2021.

2 Planning Context

2.1 Cork County Development Plan 2014

The site of the proposed development is bounded to the north by a Water Treatment Plant & Playing Fields, and to the south by the Old Fort Road and the Crescent Apartments. It is located approximately 9km from Cork City Centre (see **Figure 1**). The site is located within the administrative boundary of Cork City Council and was incorporated into the Cork City South West Local Electoral Area from June 2019. The site lies within the Ballincollig-Carrigaline Municipal District, and specifically within the 'Cork City Southern Environs' portion of this Municipal District.

Figure 1: Site Location – proximity to Cork City Centre.

2.2 Ballincollig-Carrigaline Municipal District Local Area Plan

As a Cork City Council Local Area Plan for this area is unavailable, the prevailing Ballincollig-Carrigaline Municipal District LAP will be referenced. Local Area Plans (LAPs) were developed for the various Metropolitan Districts (MDs) within the Cork County Council jurisdiction following on from the preparation of the Cork County Development Plan (2014). The LAP for the Ballincollig-Carrigaline MD was finalised in August 2017.

As outlined above, the site lies within the 'Cork City South West Environs' sub-district of the Ballincollig-Carrigaline MD.

There are currently no specific zoning objectives for the site set out in the LAP (the site is zoned as 'Town Centre'). The LAP includes objectives for town centres, including the following:

"1.7.43: …Cork County Council recognises the key strategic and important cultural/economic/societal role town centres play in sustainable communities. Furthermore, the successful delivery of well-conceived town centre development will deliver public realm and physical improvements which can in-turn improve quality of life factors and help increase economic activity.

1.7.44: To help address town centre vibrancy issues and to assist communities, property owners and prospective applicants develop the most appropriately designed investment at the optimum town centre locations, targeted supports will be required. The LAP formulation process provides an opportunity to initiate a Town Centre Improvement Scheme that will provide suggested approaches to help inform decisions that can contribute to improved town centre functionality and public realm improvements.

1.7.45: It is intended in the first instance, that the Town Centre Improvement Scheme will consider locations within the towns of Carrigtwohill, Ballincollig, Passage West and Carrigaline and will seek to do the following:

- *Provide guidance on the future land use and public realm improvement priorities within the town centre;*
- *Identify key buildings to be protected within the town centre;*
- *Provide guidance for developers/public on the key aspects of the town's urban character which need to be respected/reinterpreted in future applications (building height, roofscape, materials, building lines, plot depth, signage);*
- *Provide a people-focussed movement and public realm strategy which defines the gateways/ sense of arrival within the town; enhances connectivity and permeability between the town centre and housing/employment growth areas…; rationalises on-street parking on the main streets; widens and improves the quality of the pavement within the defined retail core; introduces traffic calming measures and additional safe pedestrian crossing points at key locations (near schools etc);*
- *Identify opportunity sites for single or multi-use developments within the existing streetscape; and*
- *Devise an urban structure for the future expansion of the town, including identifying the location of new streets, positioning of building lines, height parameters, plot divisions etc in line with the Best Practice Urban Design Manual as read with the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas.*

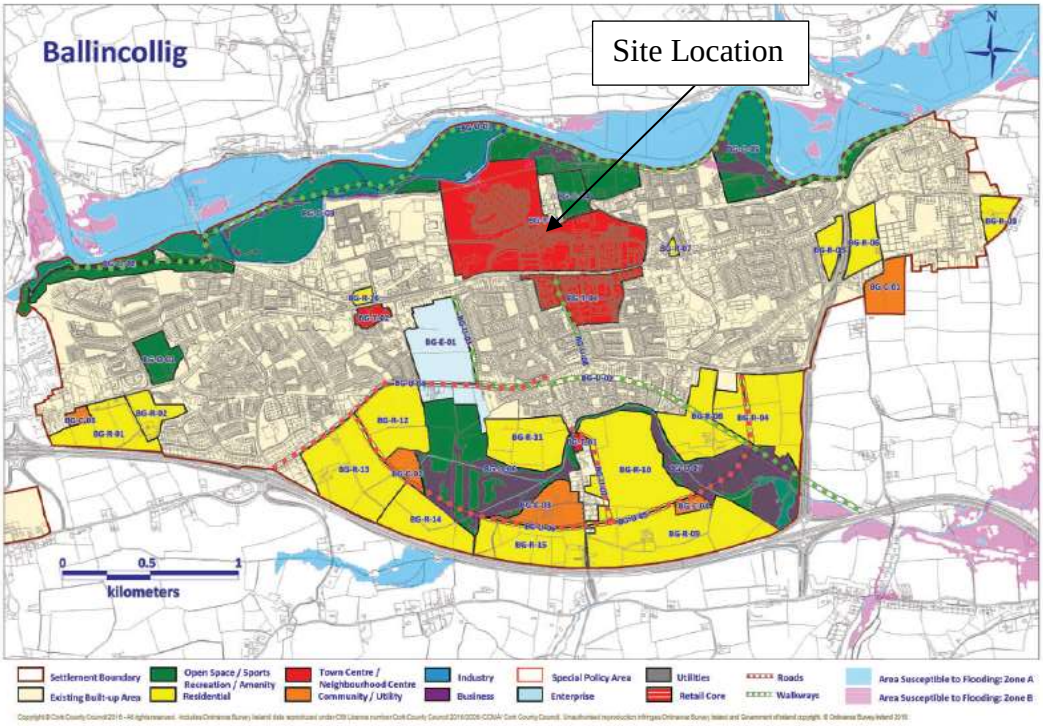

Figure 2: Ballincollig-Carrigaline MD LAP – Current Zoning ('Town/Neighbourhood Zoning')

3 Existing Receiving Environment

3.1 Site Location

The proposed development is located in the suburban town of Ballincollig, which is approximately 9km west of Cork City. The site is located to the north of an existing shopping centre. It is currently a greenfield site which is accessed from the Old Fort Road. The site location and access point are presented in **Figure 3** and **Figure 4** below.

Figure 3: Site Location – Local Context

3.2 Vehicular Accessibility

3.2.1 Existing Road Network

A brief description of the local road network in the vicinity of the proposed development is provided below. The layout of the local road network is also presented in **Figure 4** below.

Figure 4: Local Road Network

Main Street Ballincollig (R608): The R608 is a regional single-carriageway two-way route, which acts as the primary east-west route in Ballincollig. It connects Cork City with the western regions on its own or via the N22. Footpaths are provided on both sides of the main street, with on-street parking also provided on both sides.

As part of the Green Route improvements in recent years, comprising urban realm improvements in Ballincollig town, upgrading junctions and provision of bus lanes, cycle lanes and new footpaths, a signalised junction replaced the old Muskerry Roundabout on the R608. The Muskerry Estate signalised junction provides accessibility to the proposed site via Old Fort Road. The R608 widens locally at this junction, with an eastbound bus lane through the junction, a westbound cycle lane on the western side of the junction, and additional lanes on the immediate approaches to facilitate vehicular turning movements.

Old Fort Road: This single-carriageway two-way route provides access to the proposed development site from the Muskerry signalised junction and acts as one of the main routes for the area coming to/from the N22 and N40. It also acts as a distributor road for the north side of the town. This road has one vehicular lane in each direction with a two-way cycle facility provided on the northern side and a footpath on the southern side.

Innishmore Lawn: This road has one vehicular lane in each direction with a segregated cycle facility provided on the northern side and footpaths on both sides.

3.2.2 Proposed Access/Egress to the Site

Vehicle access to the proposed development will be via The Old Fort Road, as indicated in **Figure 4** above.

3.3 Cyclists and Pedestrians

3.3.1 Existing Cyclist and Pedestrian Provision

Since the implementation of the Green Route proposals, the pedestrian and cycling environment in the area has improved significantly, allowing greater access for pedestrian and cyclists into and through Ballincollig town centre. Footpaths are provided on both sides of the majority of streets in the vicinity of the proposed development. Cyclist-priority infrastructure is also provided on many of the surrounding streets, which are incorporated into bus lanes in some areas along the R608.

Figure 5 below shows the proposed cycling network for Ballincollig which was developed as part of the Cork Cycle Network Plan (2017). A primary cycling route is proposed (BC-U1) along the R608, running in an east-west direction with a number of inter-linking routes including a secondary route on the Old Fort Road (BC-U2A) and a primary route on the Innishmore Lawn Road (BC-U2).

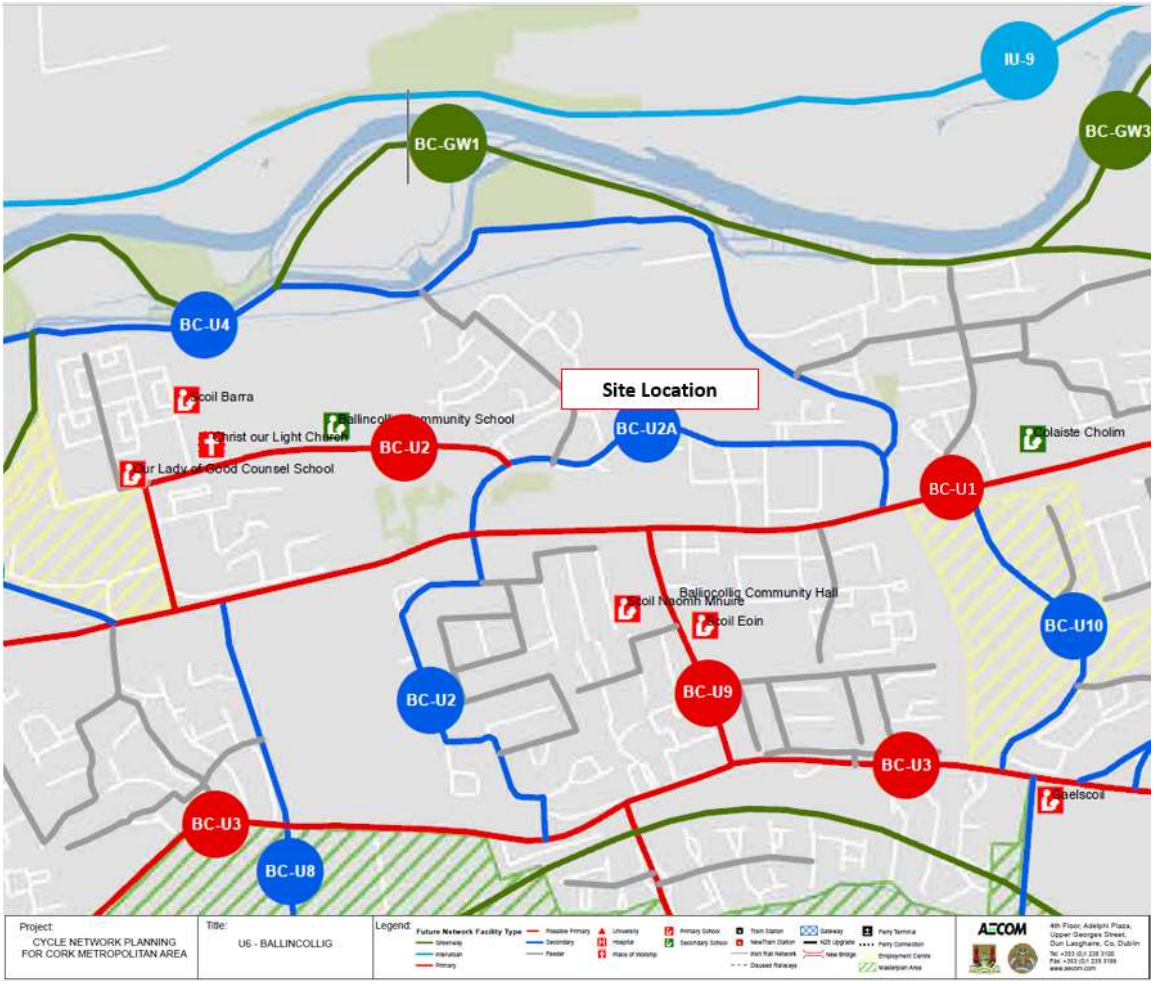

Figure 5: Cycle Network Planning Map for Ballincollig

3.4 Public Transport

3.4.1 Existing Public Transport Provision

The site is very well served by public transport. The closest bus stop is located on the R608 Main Street, approximately 300m to the south of the site as shown in **Figure 4**. A bus shelter is provided for both eastbound routes.

The bus stops are served by the number 220 & 220X Carrigaline-Cork-Ballincollig and the number 233 Cork-Ballincollig-Ballingeary regional bus services. The approximate frequency of these services is presented in **Table 1**.

The 220 service operates on a 24-hour basis with increased frequency during the day (every 15-minutes for the majority of the typical day). Bus Éireann has confirmed that a 60% increase in customer journeys has been observed since these changes were implemented. This is the first 24-hour service in Cork City and indeed in Ireland, and it provides excellent connectivity for the proposed development to Cork City and its surrounding suburban areas and is considered a resounding success since implementation.

Table 1: Public Transport Service Frequencies

Bus Service	Approximate Frequency
Bus No. 220/220X Carrigaline – Cork – Ballincollig	24-hour service operating every 15 mins from 06.15-23.30; every 30 mins outside of these times
Bus No. 233 Cork – Ballincollig – Ballingeary	Westbound: 07.42, 07.45, 09.12, 09.05, 13.00,13.32, 15.58, 22.48. Eastbound: 06.48, 07.53, 08.22, 11.03, 13.38, 15.18, 16.50, 16.53, 18.38, 19.13.

3.4.2 Cork Metropolitan Area Transport Strategy

The Cork Area Metropolitan Transport Study proposes a Mass Transit System (envisaged as a Bus Rapid Transport system in the medium-term, and potentially being converted to a Light Rail System in the longer-term), which is proposed to run from Ballincollig to Mahon, via Cork City Centre. The route identified in the strategy is 17km in length, and is proposed to serve the future proposed expansion areas within the city and suburbs, with proposed stops in Ballincollig, Curraheen, Cork Institute of Technology, Cork University Hospital, County Hall, University College Cork, St. Patrick's Street, Kent Station, Cork South Docklands and Mahon Point. The system is expected to have 5-minute frequencies and will result in an estimated 27-minute journey time from Ballincollig to St. Patrick's Street, and 47 minutes from Ballincollig to Mahon Point.

This will complement the 24-hour No. 220 Ballincollig to Carrigaline bus service and make Ballincollig extremely well-connected with major centres of employment in Cork City. Route option studies are expected to commence in mid-2020, and in the short-term it is an objective to implement interim bus services along the preferred route corridor.

The CMATS report indicates that construction of the LRT system may commence between 2026-2031, with the full system in place by 2040.

3.5 Existing Traffic Patterns

In order to assess the impact of the proposed development on the local road network, an examination of the existing traffic flows in the area was deemed necessary, and traffic surveys were carried out on Wednesday 13th of February 2019 between the hours of 07:00 – 10:00 and 16:00 – 19:00, at the junctions shown below in Figure 6. These traffic flows were then growthed up to 2020 values based on the Transport Infrastructure Ireland (formerly National Roads Authority) Project Appraisal Guidelines for Link-Based Traffic Growth Forecasting.

Figure 6: Locations of traffic surveys

3.5.1 Traffic Volumes

Examination of the traffic count data concluded that the peak morning traffic flows occurred between 08:15 and 09:15, while the evening peak period was observed to occur between 17:00 and 18:00. The two-way traffic flows recorded during these time periods are presented in **Table 2**.

Table 2: 2020 Two-Way Link Flows (PCUs), AM peak (08:15 – 09:15) and PM peak (17:00 – 18:00)

Junction	2020	
	AM Peak	PM Peak
1. Muskerry Estate Signalised Junction	1443	1428
2. Innishmore Lawn Access	951	697
3. Surface Car Park Entrance	865	1018
4. Station Road Signalised T-Junction	1023	1027
5. Harrington Street Signalised T-Junction	846	955

Junction	2020	
	AM Peak	PM Peak
6. Old Fort Rd Signalised T-Junction	1637	1739
7. Old Fort Road Outside Development	885	606

3.6 Committed Developments

An additional development, the Westfield Office Development, has recently received planning permission in the Ballincollig Area. It is expected that the scheme (which is currently under construction) will be operational ahead of the implementation of the proposed residential development that is the subject of this assessment.

Therefore, it is considered that the traffic generated by this development should be included and considered as committed development in the assessment of the traffic flows of the area.

The anticipated traffic expected to be generated by the development was obtained from the traffic assessment reports submitted for these schemes and has been included in this assessment as committed development traffic for analysis purposes.

4 Proposed Development

4.1 Nature of the Proposed Development

The proposed development will be a residential development which will front the Old Fort Road. The residential element of the scheme will comprise a total of 123 apartment units and there will also be an accompanying crèche on site as part of the development.

Figure 7: Proposed Development Site Plan

4.2 Projected Trip Generation

The potential traffic generated by the proposed development has been calculated by examining the TRICS 7.4.4 online database. The TRICS database contains trip generation rates for various land uses across the UK and Ireland.

The proposed location and number of units of the proposed development was used to establish a 'best fit' in terms of trip generation rates for the proposed development. Trip generation rates are calculated throughout the day as rates vary depending on time of day for different land uses.

Total traffic expected to be generated by the development was then calculated based on the number of units and their associated floor area in the development, and the floor area of the proposed crèche.

In determining a suitable trip rate for the residential element of the scheme, a comparison was undertaken between the trip rate for the scheme based on the number of units, and the trip rate based on total floor area.

It was noted that using the trip rates based on floor area resulted in a slightly higher number of trips to and from the scheme when compared to the number of units, and therefore in order to ensure a conservative estimate this higher trip rate was used to calculate the trip generation.

The expected volume of traffic, expressed in 'person trips' was found and the modal split for the Ballincollig area (as recorded during Census 2016) was then used to find the number of trips, measured in passenger car units (PCUs), generated by the proposed development, which can be seen in **Table 3**.

PCUs are used as the unit of measurement rather than vehicles in order to examine and measure the relative effect on traffic networks by a variety of vehicles. Essentially, a passenger car is assumed to be the standard vehicle for the network and is therefore given a PCU value of 1. A factor is then applied to vehicles other than a standard car in order to convert their relative effects in terms of volume, speed, delay etc. to that of a car. A Heavy Goods Vehicle, for example, would have an equivalent PCU value of 2.3.

Table 3: Trip Generation (PCUs)

	AM (08.15-09.15)		PM (17:00-18:00)	
	Arrival	**Departure**	**Arrival**	**Departure**
Total	15	34	30	20

Note: figures in the above table have been rounded up/down for clarity

The existing AM and PM peak traffic hours were determined based on the traffic counts undertaken at the three junctions outlined above and were used as the 'base' scenario for the assessment of additional traffic arising from the proposed development.

The proposed vehicle trip generation shows that there will be 49 new two-way movements in the AM peak traffic hour (08.15-09.15) and 50 new two-way movements in the PM peak traffic hour (17.00-18.00) to and from the proposed development. It has been assumed that the new development will be fully constructed and operational in 2021.

4.3 Traffic Distribution

As derived from the traffic surveys undertaken for this assessment, the majority of arriving and departing traffic at the proposed site will be via the R608 approaches from the east or west of Ballincollig town centre. The existing trip distribution for the AM and PM peak hours is shown in **Table 4** below.

Table 4: Existing Trip Distribution Profile

Access Route	**AM**		**PM**	
	Arrivals	**Departures**	**Arrivals**	**Departures**
Innishmore Lawn	3%	3%	3%	3%

Access Route	AM		PM	
	Arrivals	Departures	Arrivals	Departures
Station Road	14%	14%	14%	14%
R608 East of Ballincollig	58%	58%	58%	58%
R608 West of Ballincollig	25%	25%	25%	25%

Using the traffic distribution profile outlined in **Table 4**, traffic from the proposed development was assigned to the surrounding road network. **Table 5** presents the traffic assignment to and from the proposed development via the three proposed access points.

Table 5: Proposed Trip Distribution (PCUs)

Access Route	AM		PM	
	Arrivals	Departures	Arrivals	Departures
Innishmore Lawn	1	1	1	1
Station Road	2	4	4	2
R608 East of Ballincollig	9	20	17	11
R608 West of Ballincollig	4	9	8	5

Note: figures in the above table have been rounded up/down for clarity

It can be seen from the figures above that most of the generated traffic flows in the peak periods will approach the site from the R608 East of Ballincollig. A smaller portion of traffic will approach the site via the R608 West of Ballincollig.

4.4 Parking Provision

4.4.1 Car Parking

The Cork County Development Plan 2014 specifies the maximum permissible parking spaces for a range of development types in the environs of Cork City and in the rest of Cork County. This standard is presented in **Table 6** below, along with the proposed parking provision associated with the proposed development.

Table 6: Car Parking Standards

Development Type	Maximum Standard	Units	Maximum Parking Spaces	Proposed Parking Spaces
Residential	1.25 spaces per unit	121	151	98

This illustrates that a maximum of 151 parking spaces is allowable at the proposed development site in accordance with the County Development Plan. However, recognising the need for modal shift to sustainable transport modes, and taking into account the proximity of the development to a high-frequency bus service and the upgraded pedestrian and cyclist network in the vicinity of the development, 98 car parking spaces are proposed as part of this development. This is markedly less than the maximum allowable quantum and demonstrates a commitment to encouraging sustainable transport for residents in the proposed development.

4.4.2 Electric Car Parking Provision

The Cork County Development Plan stipulates that all parking spaces including residential should be constructed to be capable of accommodating future charging points as required.

3 parking spaces will therefore be provided with charging facilities, with the remaining spaces constructed with sufficient ducting, capable of accommodating further charging points.

4.4.3 Disabled Parking Provision

The Cork County Development Plan stipulates that 5% of car parking spaces provided should be set aside for disabled car parking.

6 disabled parking spaces will therefore form part of the total 98 spaces.

4.4.4 Cycle Parking

The design standards for apartments for local authorities stipulates that cycle parking shall be provided at a ratio of 1 space per bedroom, with additional allowance for visitor parking.

The proposed development will comprise a total of 207 bedrooms; therefore 207 cycle parking spaces are proposed for this purpose, with an additional 2 spaces proposed for the proposed creche. In addition to this, visitor parking spaces are required at a rate of one space per 2 units. This would equate to a further 62.5 spaces, with a total cycle parking requirement therefore of 271.5 spaces.

A total of 272 bicycle parking spaces will be provided as part of the development, which is in line with the required provision.

4.4.5 Motorcycle Parking Provision

The Cork County Development Plan stipulates that an allocation of 1 motorcycle parking space be provided per 10 car parking spaces.

12 motorcycle parking spaces will therefore be provided as part of the development; these are provided within the general parking area beneath the podium.

5 Impact on Local Road Network

5.1 General

The impact on the local road network has been assessed by examining the projected traffic flows on links in the vicinity of the proposed development, and at the following five junctions both without and with the proposed development:

1. Old Fort Road Proposed Development Access;
2. Old Fort Road/Innishmore Lawn Priority T-Junction;
3. Muskerry Estate Signalised Junction;
4. Station Road Signalised T-Junction; and
5. Old Fort Road Signalised T-Junction.

The morning peak period (08.15 – 09.15) and evening peak period (17.00 – 18.00) have been examined to assess the busiest case in terms of local traffic on the road network and traffic generated by the proposed development.

For this assessment, it has been assumed that the proposed development will be constructed and fully occupied during the year 2021. The impact on the local road network has been assessed for this opening year (2021), an interim year of five years after opening (2026) and a design year 15 years after opening (2036). Traffic volumes surveyed in 2019 on the local road network have been increased to account for the growth in background traffic to the years 2020, 2021, 2026 and 2036. These growth rates are in accordance with the Transport Infrastructure Ireland (formerly National Roads Authority) Project Appraisal Guidelines for Link-Based Traffic Growth Forecasting.

5.2 Link Flow Assessment

The projected link traffic flows for both the 'With' and 'Without' development scenarios are presented for each of the assessment years in the following tables. The figures in brackets relate to the percentage increase in link traffic volumes as a result of the development. **Figure 8** below shows the analysed links.

Figure 8: Road links in the vicinity of the proposed development

5.2.1 Opening Year 2021

The existing two-way traffic volumes on links in the vicinity of the proposed development in 2021, for scenarios with and without the proposed development in place, are shown in **Table 7** below.

Table 7: Future Two-Way Traffic Flows – Opening Year 2021 (PCUs)

Link	2021 AM Peak (08.15-09.15) Without Development	2021 AM Peak (08.15-09.15) With Development	2021 PM Peak (17.00-18.00) Without Development	2021 PM Peak (17.00-18.00) With Development
1. R608 West	1137	1150 (+1.1%)	1336	1349 (+1.0%)
2. R608 East	838	841 (+0.3%)	888	892 (+0.4%)
3. Old Fort Road South	706	722 (+2.2%)	581	598 (+2.8%)
4. Old Fort Road North	997	1014 (+1.7%)	858	876 (+2.1%)
5. Old Fort Road (Outside Dev)	1126	1143 (+1.5%)	841	859 (+2.1%)
6. Old Fort Road East	1073	1105 (+3.0%)	878	910 (+3.6%)
7. R608 East	1825	1854 (+1.6%)	1700	1729 (+1.7%)

For the 2021 opening year, the proposed development shows varying increases of between 0.3% and 3.6% in traffic flows on the surrounding road network.

5.2.2 Interim Year 2026

The two-way traffic volumes on links in the vicinity of the proposed development in the 2026 interim year, for scenarios both with and without the proposed development in place, are shown in **Table 8** below**.**

Table 8: Future Two-Way Traffic Flows - Interim Year 2026 (PCUs)

Link	2026 AM Peak (08.15-09.15) Without Development	2026 AM Peak (08.15-09.15) With Development	2026 PM Peak (17.00-18.00) Without Development	2026 PM Peak (17.00-18.00) With Development
1. R608 West	1194	1207 (+1.1%)	1397	1409 (+0.9%)
2. R608 East	880	883 (+0.3%)	932	935 (+0.3%)
3. Old Fort Road South	738	754 (+2.1%)	606	622 (+2.6%)
4. Old Fort Road North	1037	1053 (+1.5%)	891	909 (+2.0%)
5. Old Fort Road (Outside Dev)	1172	1189 (+1.4%)	873	891 (+2.0%)
6. Old Fort Road East	1117	1149 (+2.9%)	923	955 (+3.5%)
7. R608 East	1909	1937 (+1.4%)	1786	1814 (+1.6%)

For the 2026 interim year, the proposed development shows varying increases of between 0.3% and 3.5% in traffic flows on the surrounding road network.

5.2.3 Design Year 2036

The two-way traffic volumes on links in the vicinity of the proposed development in the 2036 design year, for scenarios both with and without the proposed development in place, are shown in **Table 9** below.

Table 9: Future Two-Way Traffic Flows - Design Year 2036 (PCUs)

Link	2036 AM Peak (08.15-09.15) Without Development	2036 AM Peak (08.15-09.15) With Development	2036 PM Peak (17.00-18.00) Without Development	2036 PM Peak (17.00-18.00) With Development
1. R608 West	1252	1265 (+1.0%)	1458	1470 (+0.8%)
2. R608 East	922	926 (+0.4%)	975	979 (+0.4%)
3. Old Fort Road South	771	786 (+1.9%)	631	647 (+2.5%)
4. Old Fort Road North	1074	1093 (+1.7%)	924	942 (+1.9%)
5. Old Fort Road (Outside Dev)	1229	1236 (+0.6%)	904	922 (+2.0%)
6. Old Fort Road East	1162	1193 (+2.7%)	967	999 (+3.3%)
7. R608 East	1994	2022 (+1.4%)	1871	1899 (+1.5%)

For the 2034 interim year, the proposed development shows an increase of between 0.4% and 3.3% in traffic flows on the local road network.

5.2.4 Summary

The above tables show that the increase in traffic flow on the local and regional road network in the vicinity of the proposed Westfield development as a result of the development will vary, with the largest percentage increase observed was less than 4%. According to the TII Transport Assessment Guidelines, a Transport Assessment is required when traffic to and from the proposed development exceeds 10% of the traffic flow on the adjoining road. None of the links surveyed are above 10%. However, it was agreed with Cork City Council to assess the four main junctions in the vicinity of the proposed development.

5.3 Junction Assessment

The background traffic flows recorded in February 2019 were applied to the four junctions outlined above, as follows:

1. Old Fort Road/Innishmore Lawn Priority T-Junction;
2. Muskerry Estate Signalised Junction;
3. Station Road Signalised T-Junction; and
4. Old Fort Road Signalised T-Junction.

The signalised junctions were analysed using LinSig V3, a dedicated software package for the analysis of signal-controlled junctions. The priority junctions, including proposed accesses, were analysed using Junctions 9 software, which is a dedicated software package for the analysis of priority junctions (containing the PICADY and ARCADY analysis packages).

The junction assessments presented below encompass the following scenarios:

- 2020 Base Year – traffic surveys from 2019 growthed up to 2020 for the current (2020) year assessment;
- 2021 Opening Year – without Development (but inclusive of committed developments currently under construction in the site vicinity);
- 2021 Opening Year – with Development;
- 2026 Interim Year – without and with Development; and
- 2036 Design Year – without and with Development.

5.3.1 Old Fort Road/Innishmore Lawn Priority T-Junction

5.3.1.1 Base Year 2020

The 2020 Base Year AM and PM results for the 'Without' scenario are shown below in **Table 10** indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 10: Junctions 9 Assessment: 2020 Base Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)			PM Peak (17.00-18.00)		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
Innishmore Lawn	0.8	14.47	44	0.2	10.49	16
Old Fort Road	0.6	9.2	32	0.7	7.7	33

It can be seen from the results above that the Old Fort Road/Innishmore Lawn Priority T-Junction is currently operating within capacity during the AM and PM Peak periods in the 2020 Base Year.

5.3.1.2 Opening Year 2021

The 2021 Opening Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 11** and **Table 12** respectively, indicating 'Queue', 'Delay' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 11: Junctions 9 Assessment: 2021 Opening Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)			PM Peak (17.00-18.00)		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
Innishmore Lawn	0.9	19.26	46	0.7	10.57	38
Old Fort Road	2.7	17.83	68	0.9	8.38	37

Table 12: Junctions 9 Assessment: 2021 Opening Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)			PM Peak (17.00-18.00)		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
Innishmore Lawn	0.9	19.42	47	0.7	11.35	39
Old Fort Road	2.9	17.83	69	0.9	8.48	37

It can be seen from the results above that the Old Fort Road/Innishmore Lawn Priority T-Junction will operate within capacity during the AM and the PM Peak periods in the 2021 'Without' scenario, and that it will continue to operate within capacity in the 2021 'With' scenario.

5.3.1.3 Interim Year 2026

The 2026 Interim Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 13** and **Table 14** respectively, indicating 'Queue', 'Delay' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 13: Junctions 9 Assessment: 2026 Interim Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)			PM Peak (17.00-18.00)		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
Innishmore Lawn	1	20.81	50	0.7	11.72	39
Old Fort Road	3.1	19.00	70	1.0	8.60	39

Table 14: Junctions 9 Assessment: 2026 Interim Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)			PM Peak (17.00-18.00)		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
Innishmore Lawn	1.0	21.01	50	0.7	11.62	40
Old Fort Road	3.3	19.60	71	1	8.71	40

It can be seen from the results above that the Old Fort Road/Innishmore Lawn Priority T-Junction will operate within capacity during the AM and the PM Peak periods in the 2026 'Without' scenario, and that it will continue to operate within capacity in the 2026 'With' scenario.

5.3.1.4 Design Year 2036

The 2036 Design Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in and

Table 15 and **Table 16** respectively indicating 'Queue', 'Delay' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 15: Junctions 9 Assessment: 2036 Design Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)			PM Peak (17.00-18.00)		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
Innishmore Lawn	1.1	22.61	53	0.7	12.05	40
Old Fort Road	3.5	21.14	73	1.1	8.86	42

Table 16: Junctions 9 Assessment: 2036 Design Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)			PM Peak (17.00-18.00)		
	Queue (PCU)	Delay (s)	RFC (%)	Queue (PCU)	Delay (s)	RFC (%)
Innishmore Lawn	1.2	22.87	53	0.7	11.95	41
Old Fort Road	3.8	21.84	74	1.1	8.98	42

It can be seen from the results above that the Old Fort Road/Innishmore Lawn Priority T-Junction will operate within capacity during the AM and the PM Peak periods in the 2036 'Without' scenario, and that it will continue to operate within capacity in the 2036 'With' scenario.

5.3.1 Muskerry Estate Signalised Junction

5.3.1.1 Base Year 2020

The 2020 Base Year AM and PM results for the 'Without' scenario are shown below in **Table 17**, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 17: LinSig Assessment: 2020 Base Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)

R608 West	6.3	62	4.3	47
R608 East	4.1	36	10.2	71
Old Fort Road North	4.6	63	8.4	71
Old Fort Road South	5.8	62	4.0	71

It can be seen from the results above that Muskerry Estate Signalised Junction is currently operating within capacity during the AM and PM Peak periods in the 2020 Base Year.

5.3.1.2 Opening Year 2021

The 2021 Opening Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 18** and **Table 19** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 18: LinSig Assessment: 2021 Opening Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	6.4	63	5.0	63
R608 East	4.2	38	12.3	85
Old Fort Road North	4.8	66	14.1	88
Old Fort Road South	5.9	62	4.2	72

Table 19: LinSig Assessment: 2021 Opening Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	6.4	63	4.9	62
R608 East	4.2	38	12.4	85
Old Fort Road North	4.9	64	14.6	89
Old Fort Road South	6.1	66	4.2	72

It can be seen from the results above that the Muskerry Estate Signalised Junction will operate within capacity during the AM and the PM Peak periods in the 2021 'Without' and the 2021 'With' scenarios.

5.3.1.3 Interim Year 2026

The 2026 Interim Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 20** and **Table 21** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 20: LinSig Assessment: 2026 Interim Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	6.8	66	5.2	65
R608 East	4.6	39	14.0	89
Old Fort Road North	5.0	68	15.7	91
Old Fort Road South	6.3	66	4.5	76

Table 21: LinSig Assessment: 2026 Interim Year, AM and PM Peaks – With Development (PCUs)

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	7.1	70	5.3	66
R608 East	4.5	41	14	89
Old Fort Road North	5.2	67	16.3	92
Old Fort Road South	6.3	66	4.5	76

It can be seen from the results above that the Muskerry Estate Signalised Junction will operate within capacity during the AM Peak periods in the 2026 'Without' and 2026 'With' scenario. It begins to approach capacity during the PM Peak period 2026 'With' and 2026 'Without' scenarios; however, the introduction of the development is seen to have minimal impact on the junction.

5.3.1.4 Design Year 2036

The 2036 Design Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 22** and **Table 23** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 22: LinSig Assessment: 2036 Design Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	7.5	73	5.6	69
R608 East	4.8	43	16.5	94
Old Fort Road North	5.3	67	17.6	94
Old Fort Road South	6.7	69	5.0	80

Table 23: LinSig Assessment: 2036 Design Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	7.2	69	5.6	69
R608 East	4.7	42	16.5	94
Old Fort Road North	5.6	71	18.5	95
Old Fort Road South	7.0	73	5.0	80

It can be seen from the results above that the Muskerry Estate Signalised Junction will operate within capacity during the AM Peak periods in the 2036 'Without' and 2036 'With' scenario. It is approaching capacity on specific arms during the PM Peak period 2036 'With' and 2036 'Without' scenarios; however, the introduction of the development is seen to have minimal impact on the junction.

5.3.2 Station Road Signalised T-Junction

5.3.2.1 Base Year 2020

The 2020 Base Year AM and PM results for the 'Without' scenario are shown below in **Table 24**, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 24: LinSig Assessment: 2020 Base Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	7.3	57	4.7	42
R608 East	5.1	39	8.6	57

Station Road	5.9	55	5.7	59

It can be seen from the results above that the Station Road Junction is currently operating within capacity during the AM and PM Peak periods in the 2020 Base Year.

5.3.2.2 Opening Year 2021

The 2021 Opening Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 25** and **Table 26** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 25: LinSig Assessment: 2021 Opening Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	7.6	59	5.3	46
R608 East	5.2	41	8.9	59
Station Road	6.6	59	5.7	57

Table 26: LinSig Assessment: 2021 Opening Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	7.6	59	5.3	46
R608 East	5.2	41	8.9	59
Station Road	6.7	59	5.8	57

It can be seen from the results above that the Station Road Junction will operate within capacity during the AM and the PM Peak periods in the 2021 'Without' scenario, and that it will continue to operate within capacity during the AM and PM Peak periods in the 2021 'With' scenario.

5.3.2.3 Interim Year 2026

The 2026 Interim Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 27** and **Table 28** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 27: LinSig Assessment: 2026 Interim Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)

R608 West	8.5	62	5.8	48
R608 East	5.5	43	9.5	62
Station Road	7.1	62	6.1	60

Table 28: LinSig Assessment: 2026 Interim Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	8.5	62	5.8	48
R608 East	5.5	43	9.5	62
Station Road	7.1	62	6.1	60

It can be seen from the results above that the Station Road Junction will operate within capacity during the AM and the PM Peak periods in the 2026 'Without' scenario, and that it will continue to operate within capacity during the AM and PM Peak periods in the 2026 'With' scenario.

5.3.2.4 Design Year 2036

The 2036 Design Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 29** and **Table 30** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 29: LinSig Assessment: 2036 Design Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	9.3	65	6.3	50
R608 East	5.8	45	10.3	66
Station Road	7.5	64	6.5	63

Table 30: LinSig Assessment: 2036 Design Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	9.3	65	6.3	50
R608 East	5.8	45	10.3	66
Station Road	7.6	65	6.6	64

It can be seen from the results above that the Station Road Junction is currently operating within capacity during the AM and the PM Peak periods in the 2036

'Without' scenario, and that it will continue to operate within capacity during the AM and PM Peak periods in the 2036 'With' scenario.

5.3.3 Old Fort Road Signalised T-Junction

5.3.3.1 Base Year 2020

The 2020 Base Year AM and PM results for the 'Without' scenario are shown below in **Table 31**, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 31: LinSig Assessment: 2020 Base Year, AM and PM Peaks – Without Development (PCUs)

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	11.4	73	11.7	75
R608 East	9.4	73	12.6	73
Old Fort Road	10.8	71	11.4	74

It can be seen from the results above that the Old Fort Road Junction is currently operating within capacity during the AM and PM Peak periods in the 2020 Base Year.

5.3.3.2 Opening Year 2021

The 2021 Opening Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 32** and **Table 33** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 32: LinSig Assessment: 2021 Opening Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	10.5	66	12.6	77
R608 East	64.8	108	13.7	77
Old Fort Road	12.9	83	12.1	77

Table 33: LinSig Assessment: 2021 Opening Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	10.6	66	12.7	77

R608 East	72.6	110	14.2	80
Old Fort Road	14.2	87	12.6	79

It can be seen from the results above that the Old Fort Road Junction will not operate within capacity during the AM and the PM Peak periods in the 2021 'Without' and 'With' scenario, with the R608 eastern approach congested.

5.3.3.3 Interim Year 2026

The 2026 Interim Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 34** and **Table 35** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 34: LinSig Assessment: 2026 Interim Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	12.0	73	13.3	78
R608 East	94.9	115	15.5	83
Old Fort Road	12.9	81	13.8	84

Table 35: LinSig Assessment: 2026 Interim Year, AM and PM Peaks – With Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	12.0	73	13.4	78
R608 East	101.1	117	19.5	86
Old Fort Road	14.2	85	14.7	86

It can be seen from the results above that the Old Fort Road Junction will not operate within capacity during the AM and the PM Peak periods in the 2026 'Without' and 'With' scenario, with the R608 eastern approach congested.

5.3.3.4 Design Year 2036

The 2036 Design Year AM and PM results for both the 'Without' and 'With' scenarios are shown below in **Table 36** and **Table 37** respectively, indicating 'Queue' and Ratio of Flow to Capacity 'RFC' values for the respective arms.

Table 36: LinSig Assessment: 2036 Design Year, AM and PM Peaks – Without Development

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	55.5	117	15.1	84
R608 East	124.0	122	22.3	90
Old Fort Road	10.2	61	14.7	85

Table 37: LinSig Assessment: 2036 Design Year, AM and PM Peaks – With Development (PCUs)

Approach Arm	AM Peak (08.15-09.15)		PM Peak (17.00-18.00)	
	Queue (PCU)	RFC (%)	Queue (PCU)	RFC (%)
R608 West	56.7	118	15.2	85
R608 East	130.2	123	25.2	93
Old Fort Road	10.9	64	15.5	87

It can be seen from the results above that the Old Fort Road Junction will not operate within capacity during the AM and the PM Peak periods in the 2021 'Without' and 'With' scenario, with the R608 eastern and western approaches congested.

5.4 Assessment Summary

Sections 5.2 and 5.3 above indicate that the majority of the network continues to perform within capacity in the Opening Year (2021), Interim Year (2026) and Design Year (2036).

The maximum increases in link flows on the regional road network in the Opening Year is 3.6%. This increase occurs during the PM Peak period on Old Fort Road East, just north of the R608 Junction, which will experience a small increase in traffic due to the proposed development. The percentage increase in this and similar locations is small to relatively large base traffic flows. Increases on the R608 regional road are in the region of 1% during the AM and PM Peak period. The location of the entrance on Old Fort Road limits the increase in flows on the R608 through Ballincollig town centre due to Old Fort Road acting a bypass of the centre of Ballincollig.

Analysis of the junctions indicates that the majority of the network will continue to operate within capacity during the peak hours in the Opening Year, Interim Year and Design Year. The Muskerry Estate signalised junction is approaching capacity during the PM peak in the 2036 'Without Development' scenario and in both the 2026 and 2036 'With Development' scenarios, in particular on the R608 East and Old Fort Road North arms. However, it continues to operate within capacity in the 2036 Design Year.

The Old Fort Road signalised junction to the east of Ballincollig operates over capacity during the 2021, 2026 and 2036 AM Peak in the 'Without Development' and 'With Development' scenario, in particular on the R608 approach from the east. It also operates over capacity in the 2036 'With Development' and 'With Development' scenario.

In regard to these two junctions, it should be noted that in the scenarios where the junctions are experiencing capacity issues that these capacity issues are present without implementation of the development, and the introduction of the development is seen to have minimal impact on the junctions in question.

6 Mitigation Measures

As discussed above, the network will continue to operate within capacity for most of the scenarios outlied, with some localised exceptions. The volume of traffic generated by the development doesn't have any major impact on the local network.

The trip generation developed and does not take account of the likelihood of increased use of public transport in particular due to the proximity of the 220 bus route operating at a high frequency on a 24-hour basis connecting to Cork City. Future significant strategic transport proposals outlined in the Cork Metropolitan Area Transport Strategy have also not been factored into this assessment.

For this reason, the traffic generation shown above and its impact on the network represents a worst-case scenario.

6.1 Outline Mobility Management Plan

An Outline Mobility Management Plan (MMP) has been prepared for the proposed development and accompanies this planning application. This MMP is intended to encourage accessibility to the site by alternative and more sustainable travel modes as opposed to single-person car-based trips, in turn minimising the potential impact of residents' commuter travel movements, and travel movements for other purposes, on the surrounding road network.

Post-completion, the principles and outline recommendations contained in this Outline MMP will be adopted by the future occupants of the development and will form the basis of a Mobility Management Strategy for the development.

7 Conclusion

The proposed development is located to the north of Ballincollig, on land zoned as 'Town Centre'. The development will consist of residential buildings and a crèche with a Gross Floor Area (GFA) of 13,495m^2.

The analysis presented above represents a conservative estimate of traffic generated by the proposed development. Notwithstanding this, the network will experience minor growth and will continue to operate similarly to the 'Without Development' scenarios. Two junctions will experience capacity issues due to future background; however, these junctions are both located on the extremities of the Main Street. The impact on the operation of the town centre is therefore considered to be minor.

Due to the combination of these factors, the traffic impact from the proposed development on the surrounding road network is considered acceptable.

Appendix A

Site Plan

A1