

13 Traffic and Transport

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13.1 Introduction

This chapter of the EIAR has been prepared by DBFL Consulting Engineers and OCSC Consulting Engineers.

This section of the report assesses and evaluates the likely impact of the proposed development on the existing transportation system in the vicinity of the site, as well as identifying proposed mitigation measures to minimise any identified impacts arising from the development at the Old Bray Road, Cornelscourt, Dublin 18.

The material assets considered in the traffic section include pedestrian, bicycle, public transport (bus, light and heavy Rail) infrastructure and associated services in addition to the local road network and associated junction nodes.

13.2 Study Methodology

The purpose of this assessment is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the proposed residential development. The scope of the assessment covers transport and sustainability issues including vehicular access and pedestrian, cyclist and public transport connectivity. Recommendations contained within this report are based on existing and proposed road layout plans, site visits, traffic observations and junction vehicle turning count data. Our methodology incorporated a number of key inter-related stages, including;

- **Site Audit:** A site audit was undertaken to quantify existing road network characteristics and identify local infrastructure management arrangements, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport. An inventory of the local road network was also developed at this stage of the assessment.
- **Preplanning Meeting:** A preplanning meeting was undertaken with officers of Dún Laoghaire – Rathdown County Council including representatives of the Transport Planning Department.
- **Traffic Counts:** Junction turning counts were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed residential development.
- **Trip Generation:** A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed residential development.
- **Trip Distribution:** Based upon existing traffic characteristics and anticipated travel patterns of the proposed residential development, a trip distribution exercise has been undertaken to assign site generated trips across the local network.
- **Network Analysis:** Further to quantifying the predicted impact of vehicle movements across the local road network for the adopted optimum site access strategy, more detailed computer simulations have been undertaken to assess the operational performance of key junctions in the post development 2021 and 2036 development scenarios.

The assessment of effects of the proposed development on material assets are assessed in terms of quality (positive, neutral or negative effects), significance (imperceptible, not significant, slight, moderate, significant, very significant or profound effects), extent, context, probability (likely, unlikely effects) and duration (temporary, short term, long term or permanent effects) in line with the criteria set out in Table 3.3 Description of Effects of the Environmental Protection Agency Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (August 2017).

13.3 The Existing Receiving Environment (Baseline)

Site Location

The subject development site is located in Cornelscourt, a suburb located in South Dublin. Cornelscourt is conveniently located approximately 4.4km east of Sandyford and offers connectivity

towards various areas of Dublin via the N11 Stillorgan Road, with the site being located approximately 180m away from the N11 corridor. The M50 is approximately 2.7km south of the subject site and offers many forward connections. The development site is currently a vacant greenfield site and benefits from access off the R842 Old Bray Road.

The general site location is shown in **Figure 13.1**. The indicative site boundary is presented in **Figure 13.2**

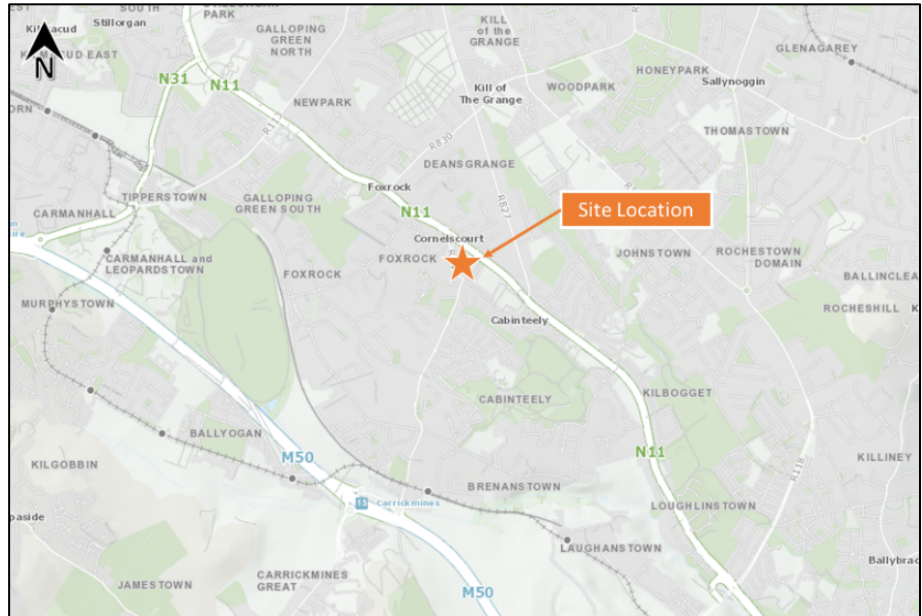


Figure 13.1 - Site Location

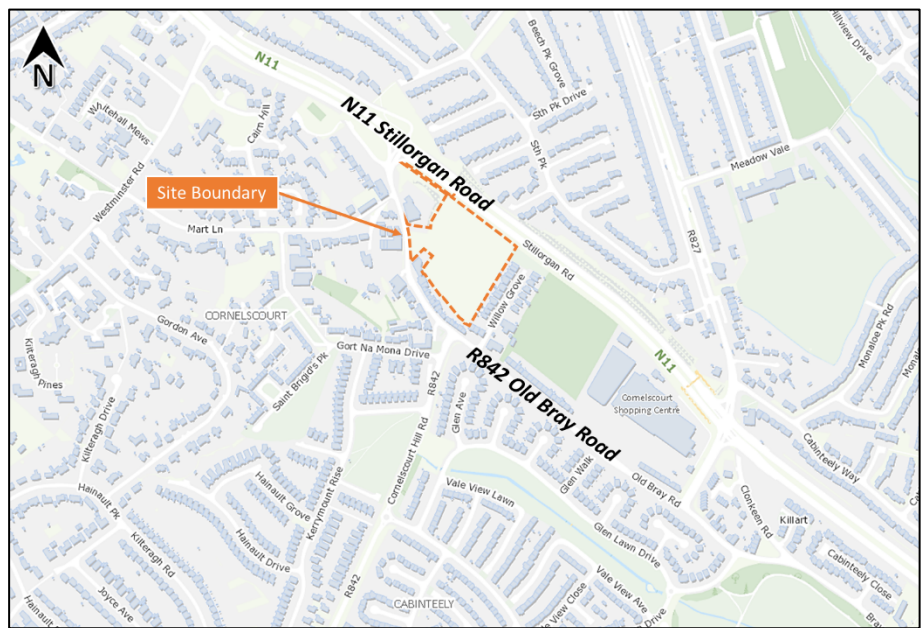


Figure 13.2 - Indicative Site Boundary

Existing Transportation Infrastructure

The main arterial road within the study area is the N11 Stillorgan Road situated directly north of the proposed development site. The proposed development site gains vehicular access to the R842 Old Bray Road, a two-way single lane carriageway with a 50kph speed limit.

In the immediate vicinity of the site, pedestrians can benefit from the provision of footways on both sides of the carriageway on the Old Bray Road. The N11 Stillorgan Road has a limited provision of pedestrian footpaths, nearby to bus stop locations.

There are no cycling facilities on the R842 Old Bray Road, where the site access is located. However, the proposed development site benefits from a cycle track, immediately adjacent to the road on the N11 Stillorgan Road (180m from subject site). This cycle track extends as far southwards as the intersection of the N11 Stillorgan Road with the R118 Wyattville Road. Travelling northwards, cyclists can avail of this cycle track in both directions as far as Donnybrook, where a cycle lane provides links into Dublin City Centre.

The site is highly accessible by Dublin Bus which operates the 46a, 84 and 145 bus routes along the N11 corridor with bus stops located less than 200m from the development site. These routes provide frequent services connecting the site to the city centre, as well as a wide range of destinations including Dún Laoghaire, Bray, Greystones and Newcastle. Additional local Dublin bus and Go Ahead services (84a, 84x, 63, 75) can be accessed from bus stops on the R842 Old Bray Road and the N11.

Connections to Dublin Airport are facilitated by Bus Éireann route 133 and Aircoach route 702, both served by bus stops approximately 900m from the site, on the N11 Stillorgan Road.

The proposed development site also has excellent links to the Luas Green Line, with the closest stop (Carrickmines) being located approximately 1.8km south of the site. Dún Laoghaire Station, located approximately 4.5km north of the development site, provides excellent linkages to Pearse and Connolly Train Stations, from which many forward connections are available.

Proposed Transportation Infrastructure

Several upgrades to the cycling network in the vicinity of the development site are proposed as part of the Greater Dublin Area (GDA) Cycle Network Plan, including the formation and improvements of the following key routes:

- Primary Routes 12 and 12A, providing links from St. Stephen's Green, through Leeson Street and Donnybrook;
- Secondary Route SO6, providing links from Dún Laoghaire to Tallaght via Ballycullen and Old Bawn; and
- The Carrickmines Greenway, from Sandyford to Shanganagh.

The subject development site is also located adjacent to the proposed Bray to City Centre Core Bus Corridor (CBC 13) which will run along the N11 Stillorgan Road. This CBC route will be delivered as part of the National Transport Authority's (NTA) Bus Connects initiative, which will transform the current bus system by redesigning routes to offer fast, predictable and reliable journeys. The subject site will therefore benefit greatly from enhanced accessibility and mobility levels delivered by Bus Connects.

It is also noted that within the Transport Strategy for the Greater Dublin Area 2016 – 2035, it is intended to develop the light rail network in the GDA with the implementation of the Luas Lucan Line, to provide a high capacity link into the centre of Lucan's large residential area to the south of the N4 national road and connecting to the City Centre.

13.4 Characteristics of the Proposed Development

The current proposal provides for a Build to Rent development consisting:

- 468 residential units (452 apartments and 16 houses) as follow:
 - 41 no. studio apartment units,
 - 257 no. 1 bed apartment units,
 - 136 no. 2 bed apartment units;
 - 18 no. 3 bed apartment units;

- 10 no. 3 bed semi-detached house units; and
- 6 no. 1 bed bungalow units.
- A café / restaurant of c. 140 sq m; office space of 149 sq m; concierge of c. 149 sq m; and a residential tenant amenity space of c. 458 sq m is also proposed.
- 274 Car Parking Spaces (273 at basement level and 1 at surface level)
- 12 Motor Cycle Spaces
- 616 Bicycle Parking Spaces
- Public Open Space
- Vehicular Access
- Basement Areas
- Sub Stations and 3 Switch Rooms
- All Associated Site Development Works

Further details of the development proposals including the site layout and site access arrangements are illustrated in the architect's scheme drawings as submitted with this report.

13.5 Potential Impact of the Proposed Development

Construction Stage

Management of Construction Activities

All construction activities on-site will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed in full with Dún Laoghaire – Rathdown County Council prior to the commencement of construction activities on site.

The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programmed respecting key stakeholders thereby ensuring that both the public's and construction workers safety is maintained at all time, disruptions minimised and undertaken within a controlled hazard free / minimised environment. The impact of the construction period will be temporary in nature.

Construction Traffic

Construction traffic will only be generated between 07:00 to 19:00 Monday to Friday and between 09:00 to 13:00 on Saturdays (subject to Planning conditions) and will consist of the following two principal categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff.
- Excavation plant, dumper trucks and delivery vehicles involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 16:00. It should be noted that a large proportion of construction workers are anticipated to arrive in shared transport. Considering the sensitivity of the site, opportunities for remote off-site compound parking will be explored. Deliveries will be actively controlled and subsequently arrive at a dispersed rate during the course of the working day.

An appropriate control and routing strategy for HGVs can also be implemented for the duration of site works as part of the CTMP. It is not proposed to utilise any roads with weight/height restrictions as part of the routing of HGVs during the construction phase.

A significant benefit of the subject development site’s characteristics is that all construction traffic vehicle parking demands can be accommodated on-site thereby minimising the impact upon the operational performance and safety levels of the adjacent public road network.

Considering the site’s proximity to the strategic road network and following the implementation of an appropriately detailed CTMP, it is concluded that construction traffic will not give rise to any significant traffic concerns or impede the operational performance of the local road network and its surrounding junctions. The level of significance of the above findings are categorised in Section 13.10.

Operational Stage

Development Schedule’s Trip Generation

Whilst the vast majority of person trips to/from the proposed development will be undertaken by sustainable modes of travel, the specific impact of the subject scheme will be predominantly influenced by the number of additional vehicle movements that the scheme could potentially generate. To assist in determining this, a review of trip generation factors contained within the TRICS database was carried out. TRICS data is primarily UK based, although a number of Irish sites have recently been included and the number of Irish sites continues to expand. Nevertheless, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

Notwithstanding the above, internal research undertaken by TRICS has shown that there is no direct evidence of trip rate variation by country or region. The use of English, Scottish or Welsh data can be equally applicable to Ireland if users take into account important site selection filtering factors such as levels of population, location type, local public transport provision, and development size and car ownership level, amongst others.

Data supplied for inclusion in TRICS undergoes a procedure of validation testing, and there is no evidence from this procedure suggesting that data from Ireland bears any significant fundamental differences to that from the other countries included. Consequently, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

Table 13.1 below presents the trip rates (using data from TRICS) used for the proposed development during the morning and evening peak hour periods. Utilising these TRICS generated trip rates, the potential vehicle trips generated from the proposed development during the AM and PM peak hour has been calculated as presented in **Table 13.1** below.

Cornelscourt Vehicle Trips	AM Peak Hour			PM Peak Hour		
	Arr	Dep	Total	Arr	Dep	Total
Apartments	27	86	113	72	48	119
Houses	2	6	8	5	3	8
Restaurant	0	0	0	2	1	4
Offices	1	0	1	0	1	1
Total	30	92	122	79	53	132

Table 13.1 - Proposed Development Vehicle Trips

Traffic Growth

With the objective of quantifying the existing traffic movements across the local road network a number of local traffic surveys were commissioned. Vehicle turning count surveys (classified junction turning count) were conducted from 0700 to 1000 and 1600 to 1900 on Tuesday 08 January 2019 at the following junctions:

- **Junction 1:** R842 Old Bray Road / Old Bray Road (Cul-de-sac)
- **Junction 2:** R842 Old Bray Road / Mart Lane
- **Junction 4:** R842 Old Bray Road / Cornelscourt Hill Road

The traffic surveys established that the local AM and PM peak hours occur between 0815 - 0915 and 1615 - 1715 respectively. Additional traffic count surveys were undertaken by DBFL during the established AM and PM peak hours on Wednesday 30 January 2019 at the following junction:

- **Junction 3:** R842 Old Bray Road / Site Access



Figure 13.3 - Surveyed Junctions

In order to analyse and assess the impact of the proposed development on the surrounding road network, a traffic generation and distribution model (excel based) of the above key junctions was created and the following traffic scenarios were assessed:

- 2021 Opening Year without/with development;
- 2036 Future Design Year without/with development.

To ensure a robust analysis of traffic upon the local road network, growth rates using the National Roads Authority (NRA) Project Appraisal Guideline projections were adopted. Table 5.5.1 within the TII Project Appraisal Guidelines provides Annual National Traffic Growth Factors for the different regions within Ireland. The subject site lies within 'Region 1 – Dublin City'.

Applying the annual factors (medium growth) for the adopted Opening Year of 2021 and Future Design Year of 2036, the following growth rates have been adopted to establish corresponding 2021 and 2036 baseline network flows:

- 2019 to 2021 – 1.0270 (or 2.70%); and
- 2030 to 2036 – 1.1843 (or 18.43%).

Assessment Scenarios & Network Impact

It is anticipated that the earliest the scheme could be built and fully occupied would be some time in 2021. Accordingly, 2021 and 2036 (e.g. Opening Year plus 15 years) have been adopted as the Opening Year and Future Design Years respectively. Two different traffic scenarios have been assessed, namely (a) the 'Base' (Do-Nothing) traffic characteristics and (b) the 'Post Development' (Do-Something) traffic characteristics.

The ‘Base’ traffic scenario takes into account the existing flows travelling across the local road network. The proposed development traffic is then added to the network’s ‘Base’ traffic flows to establish the ‘Post Development’ traffic flows. In summary, the following scenarios have been investigated:

Base	2019 – Base Traffic Flows
Do-Nothing	2021 – ‘Do Nothing’ Scenario
	2036 – ‘Do Nothing’ Scenario
Do-Something	2021 – ‘Do Something’ Scenario
	2036 – ‘Do Nothing’ Scenario

Table 13.2 - Proposed Traffic Scenarios

The TII document ‘Guidelines for Traffic Impact Assessments’ states that the impact of any specific development upon the local road network is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the networks operational performance. An assessment was therefore undertaken for the relevant links surrounding the site, to determine the percentage level of impact generated by the proposed development as presented in **Table 13.3**.

	Link	Peak Hour	2021 Do Something	2036 Do Something
1	R842 Old Bray Road / Old Bray Road (Cul-de-sac)	AM	12.18%	10.56%
		PM	12.38%	10.73%
2	R842 Old Bray Road / Mart Lane	AM	8.97%	7.78%
		PM	4.95%	4.29%
3	R842 Old Bray Road / Site Access	AM	18.93%	16.42%
		PM	17.40%	15.09%
4	R842 Old Bray Road / Cornelscourt Hill Road	AM	4.22%	3.66%
		PM	3.88%	3.36%

Table 13.3 - Proposed Development Traffic Percentage Impact (Link)

Junction – Nature of Impact		AM Peak Hour		PM Peak Hour	
		Impact Scale	Impact Significance	Impact Scale	Impact Significance
1	R842 Old Bray Road / Old Bray Road (Cul-de-sac)	10.56%	Moderate	10.73%	Moderate
2	R842 Old Bray Road / Mart Lane	7.78%	Moderate	4.29%	Slight
3	R842 Old Bray Road / Site Access	16.42%	Moderate	15.09%	Moderate
4	R842 Old Bray Road / Cornelscourt Hill Road	3.66%	Slight	3.36%	Slight

Table 13.4 - 2036 Horizon Year Network Impact Categorisation

It was determined that the percentage level of impact generated by the development traffic on the adjoining roads did exceed 10% in the 2021 and 2036 scenarios for Junction 1 and Junction 3 and exceeded 5% for the Junction 2 AM scenarios. Consequently, further network analysis of Junction 1, Junction 2 and Junction 3 was required.

Network Analysis

To determine the level of capacity available with the development in place, a PICADY model was developed for the following three arm priority-controlled junctions for both the ‘Do Nothing’ and ‘Do Something’ scenarios:

- **Junction 1:** R842 Old Bray Road / Old Bray Road (Cul-de-sac)
- **Junction 2:** R842 Old Bray Road / Mart Lane
- **Junction 3:** R842 Old Bray Road / Site Access

Junction 1: R842 Old Bray Road / Old Bray Road (Cul-de-sac)

The principal results of the operational assessment of this three-arm priority-controlled junction during the weekday morning and evening peaks are summarised in **Table 13.5** and **Table 13.6** below. The three arms were labelled as follows within the PICADY model:

- Arm A: R842 Old Bray Road South
- Arm B: Old Bray Road (Cul-de-sac)
- Arm C: R842 Old Bray Road North

The PICADY results (**Table 13.5**) indicate that the Old Bray Road three-arm priority-controlled junction will operate within capacity for the 2021 “Do Something” AM peak hour with a maximum RFC value of 0.06 and a corresponding queue of 0.1 pcus being recorded on the northern arm of the Old Bray Road. For the corresponding PM peak hour, a maximum RFC value of 0.01 will occur for both the major and minor arms with corresponding queues of 0.0 pcus for each arm.

Year Scenario	Period	Arm	Description	Queue (pcu)	Delay (s)	RFC
2021 DS	AM Peak	A	R842 Old Bray Road South	-	-	-
		B	Old Bray Road (Cul-de-sac)	0.0	9.96	0.03
		C	R842 Old Bray Road North	0.1	5.81	0.06
	PM Peak	A	R842 Old Bray Road South	-	-	-
		B	Old Bray Road (Cul-de-sac)	0.0	9.28	0.01
		C	R842 Old Bray Road North	0.0	5.34	0.01

Table 13.5 - 2021 Do Something Analysis for Junction 1

For the 2036 Future Horizon Year “Do Something” scenario the PICADY results (**Table 13.6**) also indicate that the Old Bray Road priority-controlled junction will operate within capacity for the 2036 “Do Something” AM peak hour with a maximum RFC value of 0.07 and a corresponding queue of 0.1 pcus being recorded on the northern arm of Old Bray Road. For the 2036 “Do Something” PM peak hour a maximum RFC value of 0.02 occurs both along the R842 Old Bray Road North arm of the junction and on the Old Bray Road (Cul-de-sac) minor arm, with corresponding queues of 0.0 pcus each.

Year Scenario	Period	Arm	Description	Queue (pcu)	Delay (s)	RFC
2036 DS	AM Peak	A	R842 Old Bray Road South	-	-	-
		B	Old Bray Road (Cul-de-sac)	0.0	10.48	0.04
		C	R842 Old Bray Road North	0.1	5.74	0.07
	PM Peak	A	R842 Old Bray Road South	-	-	-
		B	Old Bray Road (Cul-de-sac)	0.0	9.42	0.02
		C	R842 Old Bray Road North	0.0	5.25	0.02

Table 13.6 - 2036 Do Something Analysis for Junction 1

Junction 2: R842 Old Bray Road / Mart Lane

The principal results of the operational assessment of this three-arm priority-controlled junction during the weekday morning and evening peaks are summarised in **Table 13.7** and **Table 13.8** below. The three arms were labelled as follows within the PICADY model:

- Arm A: R842 Old Bray Road South
- Arm B: Mart Lane
- Arm C: R842 Old Bray Road North

The PICADY results (**Table 13.7**) indicate that the Mart Lane three-arm priority-controlled junction will operate within capacity for the 2021 “Do Something” AM peak hour with a maximum RFC value of 0.38 and a corresponding queue of 0.7 pcus being recorded on the Mart Lane arm. For the corresponding PM peak hour, a maximum RFC value of 0.18 will occur on the Mart Lane arm with a corresponding queue of 0.2 pcus.

Year Scenario	Period	Arm	Description	Queue (pcu)	Delay (s)	RFC
2021 DS	AM Peak	A	R842 Old Bray Road South	-	-	-
		B	Mart Lane	0.7	14.73	0.38
		C	R842 Old Bray Road North	0.2	6.09	0.10
	PM Peak	A	R842 Old Bray Road South	-	-	-
		B	Mart Lane	0.2	12.71	0.18
		C	R842 Old Bray Road North	0.0	5.64	0.03

Table 13.7 - 2021 Do Something Analysis for Junction 2

For the 2036 Future horizon Year “Do Something” scenario the PICADY results (**Table 13.8**) also indicate that the Mart Lane priority-controlled junction will operate within capacity for the 2036 “Do Something” AM peak hour with a maximum RFC value of 0.46 and a corresponding queue of 0.9 pcus being recorded on the Mart Lane minor arm of the junction. For the 2036 “Do Something” PM peak hour a maximum RFC value of 0.22 occurs along the Mart Lane arm of the junction, with a corresponding queue of 0.3 pcus.

Year Scenario	Period	Arm	Description	Queue (pcu)	Delay (s)	RFC
2036 DS	AM Peak	A	R842 Old Bray Road South	-	-	-
		B	Mart Lane	0.9	17.27	0.46
		C	R842 Old Bray Road North	0.2	6.06	0.12
	PM Peak	A	R842 Old Bray Road South	-	-	-
		B	Mart Lane	0.3	14.05	0.22
		C	R842 Old Bray Road North	0.1	5.55	0.04

Table 13.8 - 2036 Do Something Analysis for Junction 2

Junction 3: R842 Old Bray Road / Site Access

The principal results of the operational assessment of this three-arm priority-controlled junction during the weekday morning and evening peaks are summarised in **Table 13.9** and **Table 13.10** below. The three arms were labelled as follows within the PICADY model:

- Arm A: R842 Old Bray Road South
- Arm B: Proposed Site Access / Current AIB Bank Access
- Arm C: R842 Old Bray Road North

The PICADY results (**Table 13.9**) indicate that the Site Access three-arm priority-controlled junction will operate within capacity for the 2021 “Do Something” AM peak hour with a maximum RFC value of 0.26 and a corresponding queue of 0.4 pcus being recorded on the minor arm. For the corresponding PM peak hour, a maximum RFC value of 0.20 will occur on the minor arm, with a corresponding queue of 0.3 pcus.

Year Scenario	Period	Arm	Description	Queue (pcu)	Delay (s)	RFC
2021 DS	AM Peak	A	R842 Old Bray Road North	-	-	-
		B	Proposed Site Access / Current AIB Access	0.4	12.21	0.26
		C	R842 Old Bray Road South	0.1	5.64	0.07
	PM Peak	A	R842 Old Bray Road North	-	-	-
		B	Proposed Site Access / Current AIB Access	0.3	12.15	0.20
		C	R842 Old Bray Road South	0.2	5.63	0.09

Table 13.9 - 2021 Do Something Analysis for Junction 3

For the 2036 Future Horizon Year “Do Something” scenario the PICADY results (**Table 13.10**) also indicate that the Site Access priority-controlled junction will operate within capacity for the 2036 “Do Something” AM peak hour with a maximum RFC value of 0.28 and a corresponding queue of 0.4 pcus being recorded on the minor arm of the junction. For the 2036 “Do Something” PM peak hour a maximum RFC value of 0.22 occurs along the minor arm of the junction, with a corresponding queue of 0.3 pcus.

Year Scenario	Period	Arm	Description	Queue (pcu)	Delay (s)	RFC
2036 DS	AM Peak	A	R842 Old Bray Road North	-	-	-
		B	Proposed Site Access / Current AIB Access	0.4	12.99	0.28
		C	R842 Old Bray Road South	0.2	5.55	0.08
	PM Peak	A	R842 Old Bray Road North	-	-	-
		B	Proposed Site Access / Current AIB Access	0.3	13.24	0.22
		C	R842 Old Bray Road South	0.3	5.52	0.11

Table 13.10 - 2036 Do Something Analysis for Junction 3

Results of the analysis undertaken outline that all junctions will operate well within capacity for the morning and evening peak hours for all scenario years assessed with little queueing and delay evident.

13.6 Potential Cumulative Impacts

The analysis detailed above represents an appraisal in terms of potential cumulative impacts for a typical weekday as it is focussed upon the key two busiest periods of the day (e.g. AM and PM peak hours). During the other 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods.

Potential cumulative impacts have been assessed in relation to the existing and permitted transportation schemes. A desktop study was conducted of planning applications in the vicinity of the subject development on the DLRCC planning database to assess any cumulative impacts from granted or committed applications close to the subject scheme. No committed developments were found to

be in the vicinity of the site, such that if the area were to be developed, this would have an effect on the local road network.

Any future development in the vicinity of the subject site would have to undergo Traffic and Transport assessments to assess the potential cumulative impacts to the transport network.

13.7 Do Nothing Scenario

In the absence of the proposed development, the overall operational performance of the existing junctions on the surrounding road network will be affected by the impact caused by the forecast background network traffic growth (should that growth arise).

13.8 Risks to Human Health

During the construction stage of the proposed development, health and safety procedures as per the Construction Management Plan (CMP) will be adhered to. The Construction Management Plan will be prepared in accordance with the Dún Laoghaire – Rathdown County Development Plan regulations.

13.9 Mitigation Measures

Construction Stage

The Construction Management Plan will be prepared as part of the planning application with an associated Construction Traffic Management Plan (CTMP) which will incorporate a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the development. The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated construction period impacts:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads;
- Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network;
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential;
- Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low;
- Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Dún Laoghaire – Rathdown County Council will be adhered to;
- Potential localised traffic disruptions during the construction phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's Traffic Signs Manual "*Chapter 8 Temporary Traffic Measures and Signs for Roadworks*" and "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010); and
- Site entrance point/s from the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public highway.
- Material storage zone will be established in the compound area and will include material recycling areas and facilities;
- 'Way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas;

- Dedicated construction haul routes will be identified and agreed with Dún Laoghaire – Rathdown County Council prior to commencement of activities on-site; and
- On completion of the works, all construction materials, debris, temporary hardstands etc. from the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

Operational Stage

A package of integrated mitigation measures has been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures and associated timescale for their implementation are summarised below.

- **Management** – A Mobility Management (MMP) will be compiled with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor to be implemented upon occupation of the site. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed development. The active management of this BTR development will ensure an increased provision of sustainable transport alternatives for the development’s residents. This is aided by the low car parking provision and the generous cycle parking provision at the proposed development.
- **Car Parking Management Strategy** - A management regime will be implemented by the development’s management company to control access to the 274 no. on-site car parking spaces thereby actively managing the availability of on-site car parking for residents. This provision equates to a car parking ratio of approximately 0.6 car parking spaces per residential unit. The signing of a rental agreement for one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents (prior to signing rental agreement) will be notified that the proposed scheme is a ‘low car allocation’ development with no access (or guarantee thereof) to either (i) the limited on-site residents car parking provision or (ii) apply to Dún Laoghaire County Council for a residents parking permit (to park on-street in one of the neighbouring streets). Nevertheless, all residents of the proposed residential scheme will have the opportunity to apply to the on-site management company for both a (i) residents car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated (assigned) on-site basement car parking space or (ii) a visitor’s car parking permit for a short period of time. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space.
- **Infrastructure** – Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on site and ensuring a design which promotes permeability for pedestrians and cyclists to, through and from the development. The level of parking provision for the development will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle.
- **Car Sharing** – The provision of 11 no. dedicated car share (GoCar) spaces in the basement parking facility for the sole use of the scheme’s residents. The availability of these on-site provides a viable alternative to residents owning private vehicles whilst still having access to a car when required.

‘Worst-Case’ Scenario

As stated previously, the analysis carried out represents a worst-case appraisal of a typical weekday as it is focused upon the two busiest periods of the day (i.e. AM and PM peak hours). During the remaining 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods.

Similarly, over the weekend periods both the site generated traffic and the external road network traffic flows are generally lower compared to the weekday peak hour periods that have been assessed.

13.10 Predicted Impacts of the Proposed Development

Construction Stage

Provided the above mitigation measures and management procedures are incorporated during the construction phase, the residual impact on the local receiving environment will be temporary in nature and neutral in terms of quality and effect.

The significance of each of the projected impacts are detailed in **Table 13.11** for the following key junctions:

- **Junction 1:** R842 Old Bray Road / Old Bray Road (Cul-de-sac)
- **Junction 2:** R842 Old Bray Road / Mart Lane
- **Junction 3:** R842 Old Bray Road / Site Access
- **Junction 4:** R842 Old Bray Road / Cornelscourt Hill Road

The significance of the impacts have been determined in accordance with the classifications stipulated within the Environmental Protection Agency *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft (August 2017)*.

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Neutral Effects	Not Significant	Temporary
2	Low Sensitivity	Neutral Effects	Not Significant	Temporary
3	Low Sensitivity	Negative - Low	Slight	Temporary
4	Low Sensitivity	Neutral Effects	Not Significant	Temporary

Table 13.11 - Impact Significance - Construction Phase

Operational Stage

The implementation of the mitigation measures outlined above, including the MMP, will ensure that the residual effect on the local receiving environment is both managed and minimised. In reference to **Table 13.3**, the analysis predicts the scale of residual impact, during both the 2021 and 2036 design years, as being below 5% on the surrounding links, with the exception of following links as shown in **Table 13.12**:

	Link	Peak Hour	2021 Do Something	2036 Do Something
1	R842 Old Bray Road / Old Bray Road (Cul-de-sac)	AM	12.18%	10.56%
		PM	12.38%	10.73%
2	R842 Old Bray Road / Mart Lane	AM	8.97%	7.78%
3	R842 Old Bray Road / Site Access	AM	18.93%	16.42%
		PM	17.40%	15.09%

Table 13.12 - Links with Impact >5%

With regards to the TII thresholds, both the 2021 and 2036 analysis for Junction 1, Junction 2 and Junction 3 demonstrate that the proposed development will not generate an impact greater than 10% or 5% on normal or congested networks respectively.

The significance of each of the projected impacts at each of the key links is detailed within the following tables for the worst case (e.g. peak hours) 2036 Future Year scenarios.

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Negative - Low	Slight	Long Term
2	Low Sensitivity	Low - Negligible	Slight	Long Term
3	Low Sensitivity	Negative - Low	Slight	Long Term

Table 13.13 - Impact Significance – 2036 Design Year (AM)

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Negative - Low	Slight	Long Term
3	Low Sensitivity	Negative - Low	Slight	Long Term

Table 13.14 - Impact Significance – 2036 Design Year (PM)

13.11 Monitoring

Construction Stage

During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

Operational Stage

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

13.12 Reinstatement

Construction Stage

The constructions works areas will be reinstated following completion of development with landscaped areas provided where proposed. The works will be restricted to the footprint of the site for the proposed development. Excavated topsoil and subsoil will be reused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner i.e. sent for soil recovery as appropriate.

Operational Stage

No reinstatement requirements have been identified in relation to the operational phase of the proposed development.

13.13 Interactions

Land and Soil: The volumes of surplus soils generated by the scheme will influence construction stage traffic generation. Measures to optimise design and minimise material generation are detailed in Chapter 15 whilst measures to mitigate against construction stage traffic impacts have been identified in Section 13.9.

Noise and Vibration: In terms of residual impacts, the projected increase in vehicle traffic during the construction stage may lead to a slight increase in noise and vibration along the adopted construction haul route. However, such effects will be temporary in nature.

The projected increase in vehicle traffic during the operational stage may lead to a slight increase in noise levels during peak trip generation periods, however, implementation of the mitigation measures described in Section 13.11 will prevent and minimize the potential impacts of this interaction.

Air Quality: Post - construction development traffic will contribute to increased traffic volumes on the surrounding road network which in turn will decrease air quality.

As detailed in Chapter 10, none of the road links impacted by the proposed development satisfied the assessment criteria and it was therefore determined that the impact to air quality is imperceptible for the long and short term.

13.14 Difficulties Encountered

There were no material difficulties encountered in compiling and assessing the data for this EIA sufficient to prevent modelling of the likely transport effects of the proposed development. The analysis reported within this chapter is based upon the traffic survey data specifically commissioned for this appraisal and undertaken in 2019.

13.15 References

Bus Connects website (www.busconnects.ie)

Department of Transport's Traffic Signs Manual "Chapter 8 Temporary Traffic Measures and Signs for Roadworks"

Department of Transport's "Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition" (2010)

Dublin Bus website (www.dublinbus.ie)

Dún Laoghaire – Rathdown County Development Plan (2016-2022)

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

Irish Rail website (www.irishrail.ie)

National Transport Authority; Greater Dublin Area Cycle Network Plan (2013)

NRA 'Traffic and Transport Assessment Guidelines' (2014)

Ordnance Survey Ireland (www.osi.ie)

The Institution of Highways and Transportation 'Guidelines for Traffic Impact Assessments' (1994)

Transport for Ireland (www.transportforireland.ie)

Transport Infrastructure Ireland (www.tii.ie)