THORNTON O'CONNOR
TOWN PLANNING

Volume I – Non Technical Summary

Environmental Impact Assessment Report

In respect of a Build-to-Rent Residential Development

at

The former Aldi Site, Carmenhall Road, Sandyford Industrial Estate, Dublin 18

Submitted on Behalf of Sandyford GP Limited (acting in its capacity as general partner for the Sandyford Central Partnership

November 2019

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1.0 INTRODUCTION

1.1 Preamble

This Non-Techncial Summary (NTS) of the subject Environmental Impact Assessment Report (EIAR) is prepared in relation to the subject Strategic Housing Development planning application for lands located between Blackthorn Drive and Carmanhall Road at site at the former Aldi Site, Carmanhall Road, Sandyford Business District, Dublin 18. This application principally relates to the demolition of all structures at the subject lands and the provision of a Build-to-Rent residential scheme with residential support facilities, a creche and a café.

The development description is provided as follows in the Statutory Notices:

> *Sandyford GP Limited (acting in its capacity as general partner for the Sandyford Central Partnership) intend to apply to An Bord Pleanála for permission for a strategic housing development at a 1.54 ha site at the former Aldi Site, Carmanhall Road, Sandyford Business District, Dublin 18.*
>
> *The development, which will have a Gross Floor Area of 49,342 sq m will principally consist of: the demolition of the existing structures on site and the provision of a Build-to-Rent residential development comprising 564 No. apartments (46 No. studio apartments, 205 No. one bed apartments, 295 No. two bed apartments and 18 No. three bed apartments) in 6 No. blocks as follows: Block A (144 No. apartments) is part 10 to part 11 No. storeys over basement; Block B (68 No. apartments) is 8 No. storeys over basement; Block C (33 No. apartments) is 5 No. storeys over lower ground; Block D (103 No. apartments) is part 16 to part 17 No. storeys over lower ground; Block E (48 No. apartments) is 10 No. storeys over semi-basement; and Block F (168 No. apartments) is 14 No. storeys over semi basement.*
>
> *The development provides resident amenity spaces (1,095 sq m) in Blocks A, C and D including concierge, gymnasium, lounges, games room and a panoramic function room at Roof Level of Block D; a creche (354 sq m); café (141 sq m); a pedestrian thoroughfare from Carmanhall Road to Blackthorn Drive also connecting into the boulevard at Rockbrook to the west; principal vehicular access off Carmanhall Road with servicing and bicycle access also provided off Blackthorn Drive; 285 No. car parking spaces (254 No. at basement level and 31 No. at ground level); 21 No. motorcycle spaces; set-down areas; bicycle parking; bin storage; boundary treatments; hard and soft landscaping; lighting; plant; ESB substations and switchrooms; sedum roofs; and all other associated site works above and below ground.*

1.2 Requirement for this Environmental Impact Assessment Report

The Environmental Impact Assessment (EIA) requirements for certain developments derive from EU Directives. The Council Directive 2014/52/EU amended Directive 2011/92/EU and these requirements are designed to ensure that any project likely to have significant effects on the environment are duly and comprehensively assessed.

The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 have now transposed the 2014 Directive into Irish law.

The preparation of an EIAR is required for the subject proposed development as the scheme falls within the remit of those listed in Schedule 5 (Part 2) of the *Planning and Development Regulations, 2001* (as amended), which sets out the relevant thresholds which require the carrying out of an EIAR. The subject development falls within the threshold of Category 10 (b)(i) as it comprises the '*construction of more than 500 dwelling units'*.

1.3 Purpose of this EIAR

This EIAR has been prepared on behalf of the Applicant, Sandyford GP Limited (acting in its capacity as general partner for the Sandyford Central Partnership), in relation to the subject development of 564 No units and associated commercial facilities. As noted above, the proposed development falls within the remit of Category 10(b)(i) Schedule 5 (Part 2) of the *Planning and Development Regulations, 2001 (as amended*), which states that the carrying out of an EIAR is required when development comprises the '*construction of more than 500 dwelling units*'.

The EIAR has also been prepared having due regard to the Environmental Protection Agency's *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Draft August 2017* which sets out that:

> '*A systematic approach, standard descriptive methods and the use of replicable assessment techniques and standardised impact descriptions must be adopted to ensure that all likely significant effects are adequately considered and clearly communicated.'*

The EIAR assess the effects, if any, which the proposed development, if carried out, would have on the environment and also includes the information specified in annex (IV) of the Directive.

1.4 The Developer

We confirm that our Client, Sandyford Central Partnership (acting in its capacity as general partner for the Sandyford Central Partnership) is the owner of the subject lands.

1.5 EIAR Study Team

This EIAR has been compiled by Thornton O'Connor Town Planning and comprises input from an experienced team of consultants. The various consultants have been provided in the table below and their expertise will be included at the beginning of each relevant chapter. Each consultant is appropriately qualified and experienced in their respective fields in accordance with Directive 2014/52/EU.

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2.0 SITE LOCATION AND URBAN CONTEXT

2.1 Site Location

The subject site is located between Blackthorn Drive and Carmanhall Road and has an area of 15,426 sq m (1.54 Hectares). The wider surrounding area is referred to as the Sandyford Business District which comprises Stillorgan Business Estate, Sandyford Business Estate, South County Business Park, Central Park, Legionaries and Leopardstown Park Hospital.

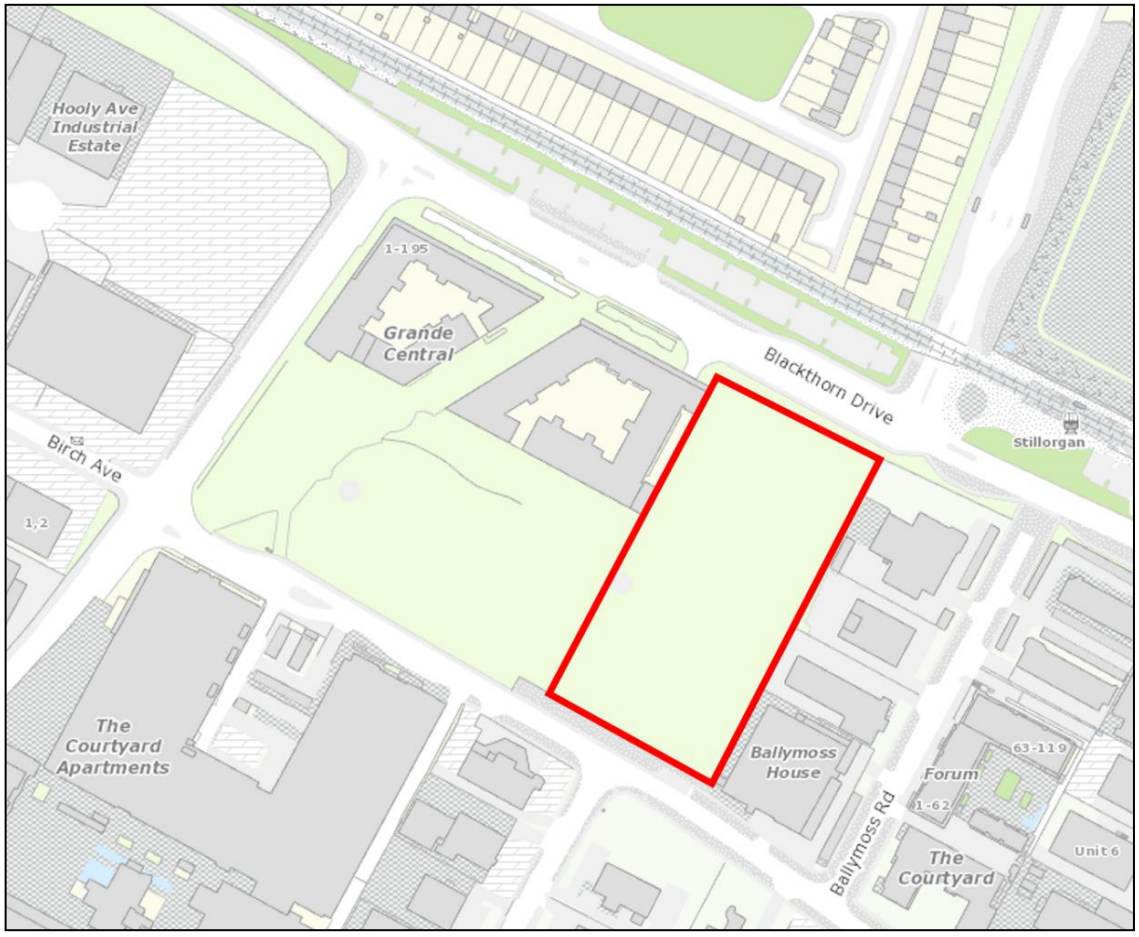

Figure 2.1: **Location of the Subject Site.**

Source: **Myplan.ie, OSI Map, Indicative Location Annotated by Thornton O'Connor Town Planning, 2019.**

2.2 Site Context

The subject site is bound by a constructed mixed use residential scheme (Rockbrook Phase I) and a brownfield site (Rockbrook Phase II) which has recently been granted permission for a mixed use development to the west (Reg. Ref. ABP-304405-19) as indicated at Figure 2.2 below.

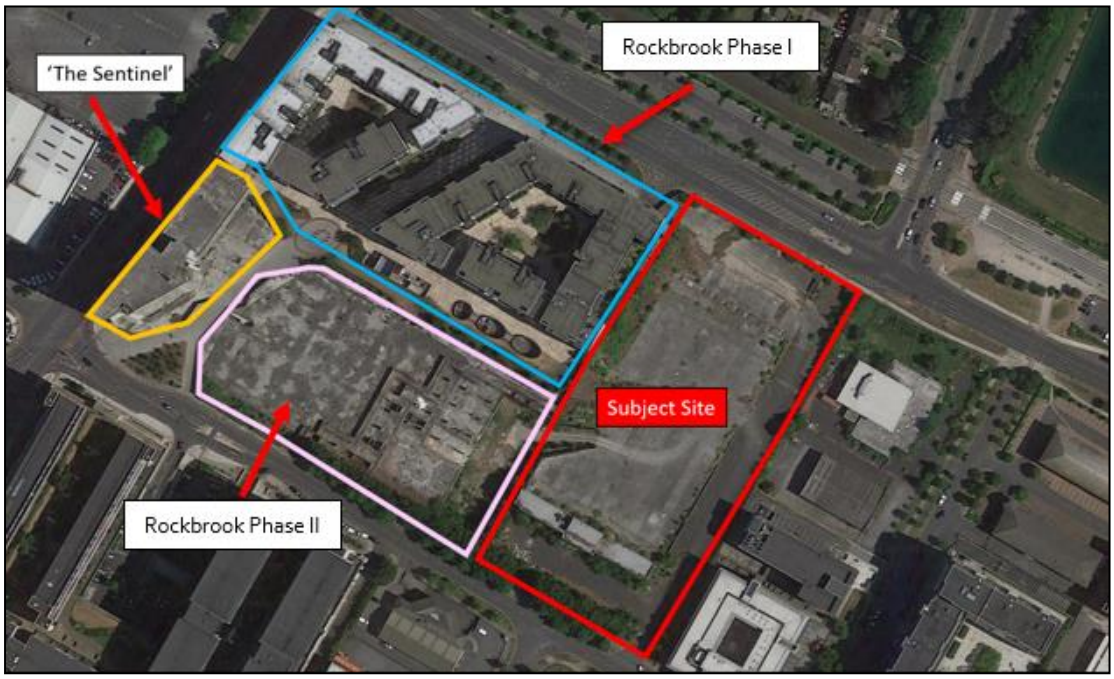

Figure 2.2: **Immediate Area of the Subject Site with Recent and Proposed Developments.**

Source: **Google Earth, Annotated by Thornton O'Connor Town Planning, 2019.**

The site is bound to the north by Blackthorn Drive, a large distributor road and the Green Luas line, which is located less than c.100 m to the north-east. Further north is characterised by suburban low density housing. The Stillorgan-Kilmacud and Stillorgan-Merville Electoral Districts located directly to the north of the subject site comprise 91 per cent and 77 per cent of House/Bungalows respectfully. The Stillorgan reservoir is located to the north-east. South of the subject site is primarily commercial in nature with the provision of the Beacon South Quarter Shopping Centre which includes Dunnes Stores as an anchor unit.

Figure 2.3: **Wider Surrounding Context of the Subject Site.**

Source: **Google Earth, Annotated by Thornton O'Connor Town Planning, 2019.**

Rockbrook Phase I comprises the construction of Blocks A and B of the parent permission (DLR Reg. Ref: D05/1159 and ABP Ref.Pl 06D.215205) and the partially constructed 14 No. storey Sentinel Building located to the south west of the subject site. The Sentinel Building has been granted subsequent planning permission for the development of 294 No. office suites and 28 No. meeting rooms (DLR Reg. Ref.: D16A/0991). When completed the Sentinel development will create additional employment opportunities in the area.

Rockbrook Phase II has recently been granted permission by An Bord Pleanála (Reg. Ref.: ABP-304405-19) for the construction of 428 No. apartments, creche (486 sq m) and 4 No. retail units (862 sq m). The scheme subject to this EIAR has been designed to provide key pedestrian linkages with Rockbrook Phase I and II. Furthermore, the Applicant and Design Team have been cognisant of the architectural composition of the entirety of the Block and its role in addressing a key node of public transport in Sandyford through the examination of alternative design approaches (refer to Chapter 4) which were informed by reviewing the extant planning history of the subject site, the surrounding urban context and relevant planning policies

The *Dún Laoghaire-Rathdown County Development Plan 2016-2022* and Appendix 15 of the *Dún Laoghaire-Rathdown County Development Plan 2016-2022* - Sandyford Urban Framework Plan (SUFP) have identified an area directly to the south of the subject site for Open Space. The Open Space site is zoned Objective F which aims to *'preserve and protect for open space with ancillary active recreational amenities'* as shown at Figure 2.5 below. The provision of public open space in such close proximity to the subject site will further enhance the high quality and quantum of public, communal and private open space being provided for future residents of the Build-to-Rent scheme.

2.3 Zoning

The subject site is zoned 'MIC' (*Mixed Use Inner Core*) in the *Dún Laoghaire Rathdown County Development Plan 2016-2022*, where the stated objective is *'to consolidate and complete the development of the mixed-use inner core to enhance and reinforce sustainable development'.* The lands zoned MIC form Zone 2 within the SUFP.

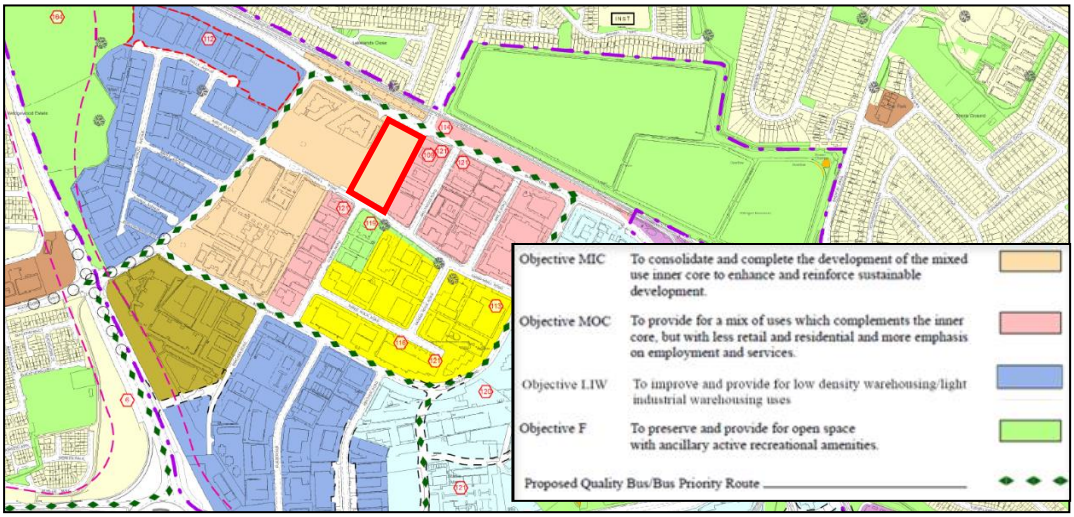

Figure 2.4: **Zoning Map with Subject Site Outlined Indicatively in Red.**

Source: **Zoning Map Extract (Map No. 6) from *Dún Laoghaire - Rathdown County Development Plan 2016-2022.***

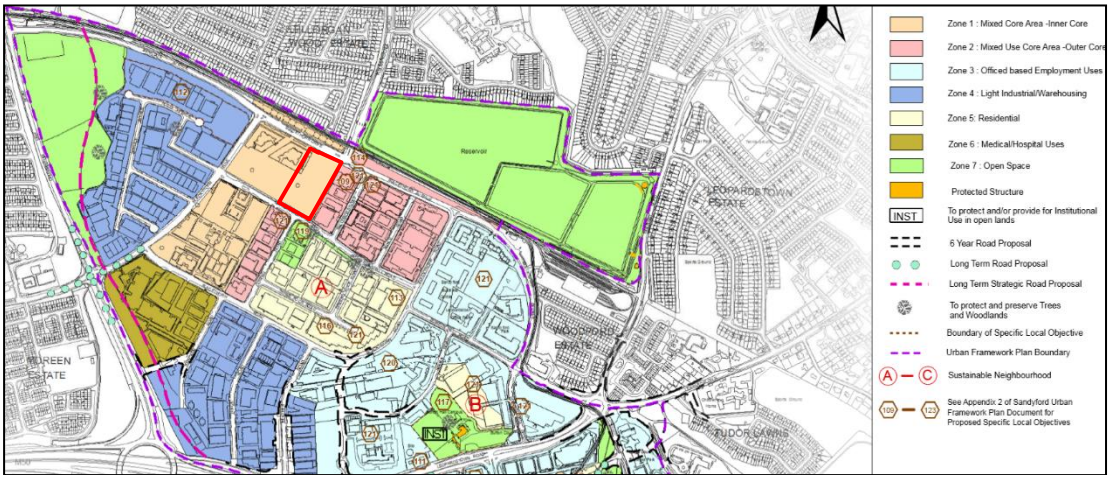

Figure 2.5: **SUFP Zoning Map with Subject Site Outlined Indicatively in Red.**

Source: **Zoning Map Extract from Appendix 15 of the *Dún Laoghaire - Rathdown County Development Plan 2016-2022* - Sandyford Urban Framework.**

The site does not contain any Protected Structures or any conservation designations. Blackthorn Avenue located to the north of the subject site is designated as a proposed quality bus/bus priority route. The proposed development which comprises residential units with ancillary resident amenities, creche and café are permitted in principle on the subject lands.

3.0 PROJECT DESCRIPTION

The chapter will set out a detailed description of the proposed development in accordance with Article 5 (1)(a) of the EU Directive 2014/52/EU which notes that the following should be included:

> *'a description of the project comprising information on the site, design, size and other relevant features of the project'*

The scheme includes the following residential unit typologies:

- 46 No. studio apartments;
- 205 No. 1 bed units;
- 295 No. 2 bed units; and
- 18 No. 3 bed units.

The development also proposes to provide communal amenity spaces including concierge, gymnasium, lounges, games room and a panoramic function room at the roof level of Block D; a creche ; café; a pedestrian thoroughfare from Carmanhall Road to Blackthorn Drive also connecting into the boulevard at Rockbrook to the west; vehicular access off Carmanhall Road with servicing and bicycle access also provided off Blackthorn Drive; 285 No. car parking spaces; 21 No. motorcycle spaces; set-down areas; bicycle parking; bin storage; boundary treatments; hard and soft landscaping; lighting; plant; ESB Substations and switchrooms; sedum roofs; and all other associated site works above and below ground.

3.1 Location

The location of the subject site has been provided at Chapter 2 of this document. In summary, the subject site is positioned on a strategic site in Sandyford between Carmanhall Road and Blackthorn Drive. The Luas stop is located less than 100 m to the north east of the subject site. The proposed scheme provides a pedestrian thoroughfare from Carmanhall Road to Blackthorn Drive and will also provide pedestrian connection to Rockbrook Phase I (constructed) and Phase II (permitted in accordance with Reg. Ref.: ABP-304405-19) which are located to the west of the subject site. The Beacon South Quarter is located to the south-west of the development site and provide a range of shops and services including a Dunnes Stores convenience and comparison store as the anchor unit. A proposed park is also located directly to the South of the subject site.

3.2 Physical Characteristics

The vacant brownfield site previously contained an industrial warehouse and office structure. In its current form the site is extensively paved with a remaining structure to the southern side. The principle of demolishing the remaining structure on site has been established through the extant permission on the site.

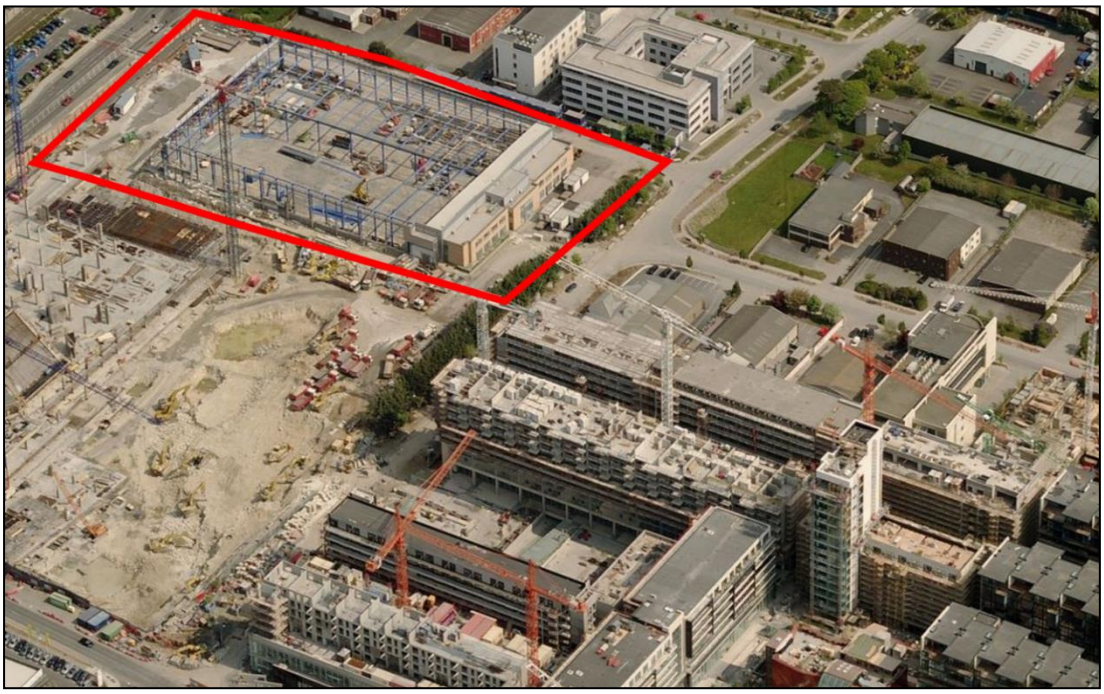

Figure 3.1: Aerial View of the Subject Site (Outlined in Red) c. 2004/2005 Prior to the Construction of Rockbrook Phase I.

3.3 Planning History

According to a search of Dún Laoghaire Rathdown County Council's online planning database, there have been 4 No. planning applications on the subject site. It is considered that the recent Strategic Housing Application granted by An Bord Pleanála at the subject site (Ref. PL06D.301428) on 17th July 2018 is of most relevance to the subject application.

ABP Ref. PL06D.301428 - Extant Permission for 459 No. Residential Unit Scheme

Applicant:	Pearse Farrell, Statutory Receiver to Certain Assets of Tivway Ltd (in receivership) and Picerno Ltd (in receivership)
Description:	The demolition of all buildings and structures on the site and construction of 460 No. apartments in 6 No. five to fourteen storey blocks. The development proposed consisted of: a) A total of 139 No. apartments (22 No. one bedroom, 98 No. two bedroom (including 10 No. duplex units) and 19 No. three bedroom units (including 2 No. duplex units) in the eleven storey Block A; b) A total of 58 No. apartments (22 No. one bedroom, 23 No. two bedroom, including 12 No. duplex units and 13 No. three bedroom) in the eight storey Block B; c) A total of 35 No. apartments (12 No. one bedroom and 19 No. two bedroom (including 14 No. duplex units) and 4 No. three bedroom (including 2 No. duplex units) in 5 storey Block C;

d) A total of 64 No. apartments (1 No. studio unit, 47 No. two bedroom and 16 No. three bedroom) in the fourteen storey Block D;

e) A total of 74 No. apartments (16 No. one bedroom, 52 No. two bedroom (including 7 No. duplex units) and 6 No. three bedroom (including 1 No. duplex unit)) in the ten storey Block E;

f) A total of 90 No. apartments (20 No. one bedroom, 64 No. two bedroom (including 7 No. duplex units) and 6 No. three bedroom (including 1 No. duplex unit)) in the twelve storey Block F;

g) The provision of ancillary on-site facilities including: a gymnasium (149.6 sq m) and yoga/ spin studio (85.3 sq m) (with associated changing rooms and toilets 69 sq m); a movie room (64.1 sq m) on the Blackthorn Drive level of Block C; a crèche (231.9 sq m) on the boulevard level of Block C; an administration office (36.9 sq m); a meeting/events room (33.4 sq m) and a reception area/entrance lounge (75.8 sq m) on the Blackthorn Drive level of Block D; a lounge / café (153.1 sq m), a bar/kitchen (18 sq m) and a games room (40.8 sq m) on the boulevard level of Block D; and a communal meeting room (59.4 sq m) on the second floor of Block A

h) The construction of a two-level basement providing 454 No. car parking spaces, 516 No. bicycle parking spaces, service and plant areas. waste management areas and storage areas;

i) The construction of 2 No. new vehicular accesses -to the two-level basement car park and to the 45 No. space car park under the podium of Block A from Carmanhall Road, and 2 No. pedestrian accesses, one from Blackthorn Drive and one from Carmanhall Road;

j) The provision of landscaped courtyards and an internal pedestrian boulevard connecting to the existing boulevard in the Rockbrook development to the west; and

k) All other associated works required to facilitate the proposed development including the paving of and tree planting on the footpaths and provision of vehicle drop off areas on the Blackthorn Drive and Carmanhall Road frontages.

Decision: Grant subject to Conditions

Decision Date: 17th July 2018

Whilst the subject development, which relates to a Build to Rent building typology provides a new design approach to the site, which is dictated by the residential typology, the scheme now presented has sought to respect the principal planning parameters of the extant permission. In this regard, the positioning of the 6 No. blocks previously permitted has been subject to just minor adjustments. Adjustments to height of the blocks have been provided for architectural and wayfinding reasons and having regard to the amended national policy context relating to the provision of height and density at strategically located sites that is embedded in the *Urban Development and Building Heights Guidelines for Planning Authorities, December 2018*.

A comparison of the key statistics of the components of the extant and proposed schemes are provided below:

	Extant	Proposed
	Build to Sell	Build to Rent
No. of Units	459 No.	564 No.
No. of Blocks	6 No.	6 No.
No. of Storeys	5 -14 No.	5 – part 17 No.
Car Parking Spaces	499 No.	285 No.
Cycle Parking Spaces	662 No.	1,178 No.
Creche	231.9 sq m	354 sq m
Cafe	153.1 sq m	141 sq m
Plot Ratio	2.93	3.19

3.4 Design and Layout

3.4.1 Demolition

The development will include demolition of the existing structures on site. The principle of demolishing the remaining structures on site was established under the previous permissions at the subject site - DLR. Reg. Ref.: D07A/0619 and more recently the SHD permission under ABP Ref.PL06.301428 (extant). The demolition of existing structures on site will be discussed throughout the EIAR.

3.4.2 Height

The scheme comprises 6 No. Blocks ranging in height from 5 No. storeys to part 17 No. storeys, an increase from the extant permission which provided maximum heights of 14 No. storeys. The increased height to Block D is proposed having regard to the architectural desire to provide more undulation in building height with a statement slender building of height to announce the entrance to the pedestrian boulevard and direct pedestrian from the Luas to the commercial core at the Beacon South Quarter. The following maximum heights are proposed across the scheme:

Block	Storeys
A	Part 10 to Part 11 No. Storeys Over Basement
B	8 No. Storeys Over Basement
C	5 No. Storeys Over Lower Ground
D	Part 16 To Part 17 No. Storeys Over Lower Ground
E	10 No. Storeys Over Semi Basement
F	14 No. Storeys Over Semi Basement

Table 3.1: Proposed Heights

Source: Henry J Lyons Architects, compiled by Thornton O'Connor Town Planning, 2019.

3.4.3 Access Arrangements and Parking

The proposed scheme provides for 1,178 No. cycle parking spaces, 285 No. car parking spaces and 21 No. motorcycle spaces. The subject site is located within a dense mixed-use district in Dún Laoghaire - Rathdown and is accessible by multiple modes of transport. The area has experienced successive periods of inward investment in recent years and several changes to movement and access have occurred throughout this time.

3.4.4 Residential (Unit Mix)

The scheme proposes 564 No. high quality apartments comprising 46 No. studios (8.2%), 205 No. one bed units (36.3%), 295 No. two bed units (52.3%) and 18 No. three bed units (3.2%).

3.4.5 Communal Resident Amenities

The proposed scheme provides 1,095 sq m of resident amenities between Blocks A and D. The residential amenities in Block D front Blackthorn Drive providing animation to the streetscape. Resident facilities are also provided in Block A fronting Carmanhall Road including lounges, games room, office space and a kitchenettte/dining area. The provision of resident amenities at both entrances to the site creates an active frontage along Carmanhall Road and Blackthorn Drive whilst also providing choice to the future residents of the scheme. A multi-function communal room is provided at the 17th level of Block D and opens onto a roof garden. The communal function room at this level will be a feature statement of the development providing long range landscape views.

3.4.6 Creche

A creche measuring 354 sq m is provided at podium level of Block C. The creche can be accessed directly from this podium level or via the lift provided at lower ground floor fronting Carmanhall Road.

3.4.7 Café

A café (141 sq m) has been provided at podium level of Block D. Its strategic corner position with full length glazing allows for an active frontage with the proposed landscaped external areas.

3.5 The Cumulation with Other Proposed Projects

The following development projects have been granted permission in proximity to the subject site and are considered throughout the EIAR.

Reg. Ref.:	**SHD Ref: ABP PL06D.304405**
Address:	The junction of Blackthorn Drive and Carmanhall Road, Sandyford Business District, Sandyford, Dublin 18.

Distance from Subject Site:	Adjoins Western Boundary
Description:	The development principally comprises the construction of **428 No. apartments**. The development will also include a crèche (486 sq m) with ancillary outdoor play areas; 4 No. ground floor local/neighbourhood retail units (862 sq m); communal community residents' facilities (934 sq m in total) including a multi-purpose space (184 sq m), laundry and community co- working area (97 sq m), a variety of ancillary resident amenity areas, communal and public open spaces.
Grant Date:	19th August 2019

Reg. Ref.:	**D18A/1210**
Address:	Grafton House, Ballymoss Road, Sandyford Industrial Estate, Dublin.
Distance from Subject Site:	Adjoins Eastern Boundary.
Description:	The development will consist of the **temporary change of use** of the existing building to a temporary two storey **primary school** (c.822.10 sqm) with required internal and elevation modifications necessary to accommodate the proposed education use for a 5 No. year period. The development will involve minor revisions to property boundaries to include the erection of 2m high welded mesh fencing and required access gates.
Grant Date:	23rd May 2019

3.6 Secondary Projects

The proposed development subject to this EIAR is not reliant on any secondary projects for the completion the scheme, thus it can be independently constructed and operated.

3.7 Phasing

Henry J Lyons Architects have prepared a detailed phasing plan (Dwg. No. SFC-HJL-00-XX-Dr-A-9100) for the proposed development which outlines 5 No. key stages that are to be completed in 2 No. phases over 36 No. months. The construction phase of the development is based on the typical construction timeframes for similar projects.

4.0 EXAMINATION OF ALTERNATIVES

4.1 Introduction

Chapter 4 of the EIAR sets out why the proposed design and layout was chosen and provides details of alternative schemes considered throughout the design process. In addition, this chapter discusses alternative locations, alternative processes and alternative mitigation measures associated with the proposed development.

Annex IV (2) of the amended EIA Directive (2014/52/EU) notes that the following is required in relation to the consideration of alternatives in the preparation of an EIAR:

> *'A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.'*

Therefore, the details provided in Chapter 4 are fully in accordance with Annex IV (2) of Directive 2014/52/EU.

4.2 Alternative Design, Height and Layouts

The main alternatives considered in Chapter 4 relates to options considered by the Applicant and Design Team throughout the design process relating to height considerations, façade treatments and layouts.

In summary, many of the reasons that early iterations of the design schematics were not selected are as follows:

- Failing to avail of the opportunity to 'announce' the entry to the Boulevard from the Luas Station;
- Monotonous height profiles within the block;
- Negating the opportunity to counterbalance the height of 'The Sentinel' Building, which is at the other end of the pedestrian thoroughfare;
- Insufficient articulation provided to elevations to emphasise verticality;
- Need to provide brick colours that promote a sense of brightness and light;
- Daylight/Sunlight and Wind Impacts.

The final layout of the proposed scheme will appropriately assimilate into the surrounding context to provide a sustainable residential and commercial development in close proximity to public transport, services, facilities and employment locations.

The proposed layout locates the highest building form at the least sensitive position within the site fronting Blackthorn Drive and the Green Luas Line. Block D will with its volume and height impart character and identity to the scheme and will assist with orientation and place making by marking a major entry point into and through the neighborhood.

The scheme also provides a substantial quantum of open space providing a high quality living environment for residents in addition to the provision of a café and creche. The facilitation of a north – south pedestrian link from Carmanhall Road to Blackthorn Drive will also encourage permeability through the site. It is the opinion of the design team that the new scheme will bring a superior quality new urban edge to the inner core in Sandyford.

4.3 Alternative Locations

The overarching vision of the Applicant and Design Team since the outset of the project was to develop a high quality residential scheme on appropriately zoned lands. Having regard to the zoning objectives of the subject site, alternative locations were not considered.

4.4 Alternative Processes

The proposed development comprises the development of 564 No. Build-to Rent residential units, café, creche and ancillary resident facilities. Therefore, as the development proposes in excess of 100 No. residential units, it is mandatory that the planning application is lodged as a Strategic Housing Development Planning Application to An Bord Pleanála, under the *Planning and Development (Housing) and Residential Tenancies Act 2016.*

4.5 'Do Nothing Alternative'

In the event of a 'do nothing scenario' the site would continue to remain in a vacant state and would represent an inefficient use of scarce urban zoned land within an existing urban area proximate to high capacity public transport infrastructure.

In addition, the proposed pedestrian connections from the existing Rockbrook boulevard and its connection/entrance from the Luas Stop at Stillorgan would remain incomplete. As such, the direct pedestrian boulevard connecting Blackthorn Drive and Carmanhall Road would not be facilitated and the permeability of the area would not be improved if the development does not proceed, which is considered a slight negative impact. In addition, health and safety issues at the site would be likely due to potential for anti-social behaviour if the site in unmonitored.

If the development does not proceed 564 No. households would not be provided.

4.6 Conclusion

Having examined various alternative designs, the proposed scheme is the preferred option to increase the density of the site to 564 Build to Rent units in addition to amenity space, a crèche and café, while maintaining a good balance between height and density, maintaining a human scale and providing strong and intimate community with focus on consolidating social interaction and integration among the residents.

5.0 POPULATION AND HUMAN HEALTH

Chapter 5 of this EIAR considers any likely impacts that the proposed development may have on population and human health. An analysis of the Census 2016 data was the principal data source in the preparation of this chapter. The site is located within the Dundrum – Balally Electoral Division and data relating to population profile and trends, housing, household completions, employment and commuting patterns, local services and amenities for example, were studied.

According to the 2016 Census, the subject site is located within the Electoral Division (ED) of Dundrum – Balally (ED No.05037). The population for this area (SAPMAP) was recorded to be 8,035 No. persons. However, we note that the number of persons accommodated in the 3,119 No. households in this Electoral Area is 7,895 No. persons (i.e. 139 No. additional persons were present on the night of the census who are not normally resident in the electoral area). The extent of the ED is illustrated at Figure 5.1 below.

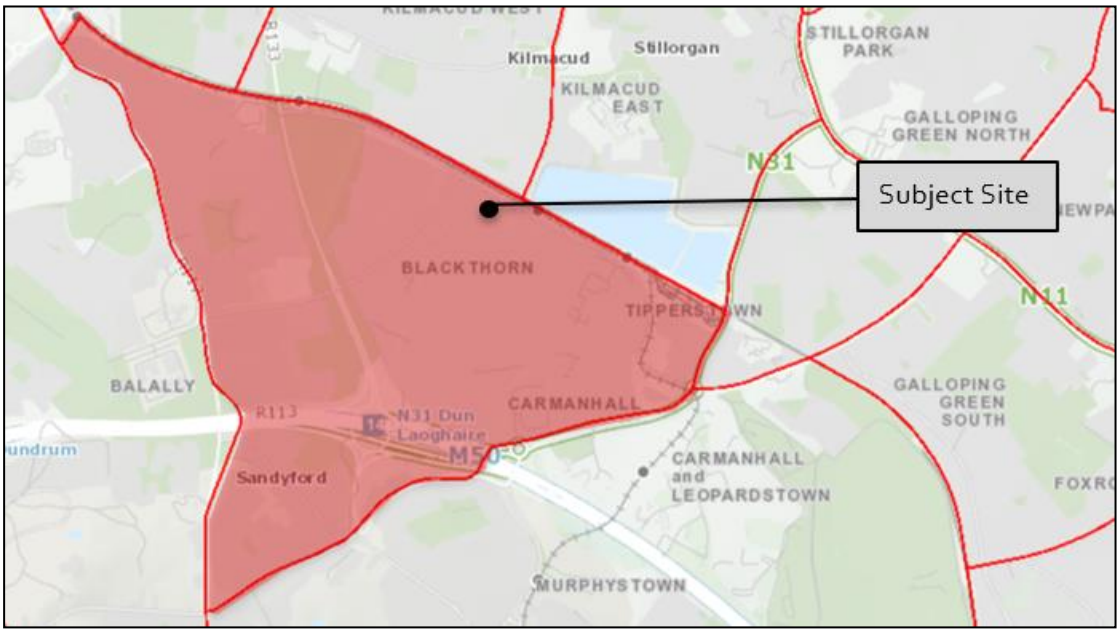

Figure 5.1: Map Demonstrating the Electoral Division of Dundrum – Balally (Shaded Red).

Source: Census 2016, Annotated by Thornton O'Connor Town Planning, 2019.

The 2011 Census recorded a population of 7,049 No. persons with a resident population of 6,907 No. persons which represents a 14.3% increase in the number of persons usually resident within the Dundrum – Balally Electoral Division.

The table below provides a breakdown of population trends:

Population Trends in Dundrum – Balally ED[1]			
	Census 2011	Census 2016	Change
Population	7,049	8,035	+13.98%
Resident Population	6,907	7,895	+14.3%
No. of Households	2,716	3,119	+14.83%

Table 5.1: Population Trends in the Dundrum – Balally ED.

Source: Census 2016, Central Statistics Office.

In projecting population growth (2016-2031), CSO data indicates that the Greater Dublin Area will see its population increase by just over 400,000 by 2031 if internal migration patterns return to the traditional pattern observed in the mid-1990s.

There are a range of age groups living in the Dundrum-Balally ED according to the 2016 Census as demonstrated in Table 5.2 below, the highest concentration of persons are of working age between 19 and 64 No. years old (5,456 No. persons or 67.9% of the ED population), which is higher than the figures for the State (2,872,502 No. persons representing 60.3% of the population) and for County Dún Laoghaire – Rathdown (132,586 No. persons or 60.8 % of the population).

Due to the high number of persons living in the area who are aged between 19 and 64 No. years old, the Dependency Ratio for the Dundrum – Balally ED is ultimately lower than recorded for the County and the State (Dependency Ratio relates to those not of working age i.e. 0 – 18 years old and 65+).

Population by Sex and Age[2]			
Age Group (Years)	Male (No.)	Female (No.)	Total (No.)
0-4	273	287	560
5-12	320	322	642
13-18	221	178	399
19-24	354	325	679
25-29	470	452	922
30-34	546	496	1,042

[1] http://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=ED3409&Geog_Code=2AE196291D5A13A3E055000000000001#SAPMAP_T5_500

[2] http://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=ED3409&Geog_Code=2AE196291D5A13A3E055000000000001#SAPMAP_T5_500

35-39	477	409	886
40-44	265	274	539
45-49	207	168	375
50-54	167	185	352
55-59	159	160	319
60-64	173	169	342
65-69	131	177	308
70-74	147	181	328
75-79	99	97	196
80-84	42	54	96
85+	22	28	50
Total	4,073	3,962	8,035

Table 5.2: Population by Sex and Age.

Source: Census 2016, Central Statistics Office.

As the highest concentration of the Dundrum – Balally ED population are of working age, the proposed scheme will provide a choice in tenure in the area, giving greater flexibility to those who may be seeking to rent an apartment in the area.

We note that the scheme will also significantly benefit the existing population who are not in the workforce e.g. retirement age and cohort. There is a significant cohort of persons aged 65+ (12.1 %) in the Dundrum – Balally Electoral Area who may welcome the opportunity to downsize to a rented apartment in their local area. This will relieve pressure on the market sector by opening up larger family dwellings for sale in the surrounding areas.

We also note that 6.9 % of the ED population were aged 0 – 4 years old at the time of the 2016 Census. The proposed development includes the provision of a creche which will cater for the younger cohort of persons that will be accommodated in the proposed development. The creche will also cater for the younger cohort in the wider ED area.

The proposed development will cater for all age groups as the development will provide a mix of Build-to-Rent unit types comprising studios, 1, 2 and 3 No. bedrooms units facilitating a variety of household formations. In summary the following age groups will be principally catered for:

- Persons within the working age group looking to rent a home;
- Persons older than the working age group seeking to trade down; and
- Families who may wish to rent a home which contains a creche within the development.

From examination of the available statistics and information available, the following conclusions have been made:

- The ED is predominated by smaller households and it is important to provide tenure choice for such household formations;
- The correlation between household sizes and house sizes are disproportionate, despite, the smaller than average household sizes;
- The relatively high number of completions at Stillorgan and Sandyford demonstrate the desire by persons to live in such locations that benefit from high capacity public infrastructure with services, facilities and amenities within walking distance of their homes;
- Over 50% of those travelling to work, school or college commute for less than 30 minutes, which demonstrates the sustainable and accessible location of the Dundrum-Balally ED;
- Over 50% of those travelling to work, school or college commute for less than 30 minutes, which demonstrates the sustainable and accessible location of the Dundrum-Balally E; and
- The *Dún Laoghaire – Rathdown Development Plan 2016-2021* identifies Sandyford as a Neighbourhood Centre. In addition, there are a number of sports clubs operating in the area. As such, it is evident that there are a variety of facilities and services located in close proximity to the subject site that the future residents of the scheme can utilise within walking and cycling distance.

5.3 Potential Impacts of the Proposed Development and Summary of Mitigation Measures Proposed

The development will have a long-term positive impact on population by providing 564 No. high-quality residential units which includes provision for Part V units, catering for a wide cohort of persons. There will be an increase in employment opportunities for the wider population of the area during the construction stage and we also note that the workers on the site will utilise local shops and business therefore benefiting the local economy. During the operational stage of the Build-to-Rent development, employment opportunities in respect of the management, cleaning and maintenance of the scheme will be required, in addition to the running of the creche and café. The proposed scheme will also provide communal resident areas facilitating residents working from home. The uplift in population will positively contribute to the local area with residents spending their income in the local area. The provision of creche, café and high quality landscape public open space within the scheme will significantly enhance the amenity provision in the area providing an attractive environment in an existing built-up area.

If the development does not proceed, there would be an associated negative impact for pedestrians/cyclists in the area as the proposed link through the north-south of the site would not be provided and the permeability/connectivity from Carmanhall Road to the Stillorgan Luas stop on Blackthorn Drive would not be provided.

As associated with all new developments, there will be a slight temporary negative impact on the surrounding area during construction stage arising from construction traffic entering and exiting the site and their associated noise, dust and slight nuisance. However, these issues can

be appropriately mitigated as set out in Chapters 11 (Air Quality and Climate), 12 (Noise and Vibration) and 14 (Traffic and Transportation) of this EIAR.

Chapter 10 sets out mitigation measures which will ensure that no negative impacts will occur on population and human health in terms of water and hydrology during the construction and operational stage.

In relation to air quality and climate, there may be potential for impacts on human health such as dust emissions during construction stage. A Dust Minimisation Plan is proposed to be implemented to minimise such emissions. The predicted impact is long term and neutral with respect to human beings during the operational phase. Unplanned events have been considered throughout the preparation of this chapter.

In relation to noise and vibration, in the short term the local area will be impacted during the construction period due to the influx of construction traffic, noise, vibrations and dust. However, we note that these impacts are temporary and are generally associated with all new developments in residential areas. Please see the Noise and Vibration Chapter (Chapter 12) and the Traffic and Transportation Chapter (Chapter 14) in addition to the Infrastructure Report submitted as a separate document which set out mitigation measures which will minimise any potential impacts on human health. Once the development is completed there will be potential noise arising from the increase of persons on the subject site and additional traffic movements entering and exiting the site (although this will be kept to a minimum having regard to the reduced number of car parking spaces provided to promote sustainable modes of transport).

The impacts on the population and human beings in relation to landscape and visual impact are fully assessed in Chapter 8. The proposed development will undoubtedly change the view of this large site when viewed by the surrounding residents, however the layout of the proposed development has appropriately considered the existing environment as discussed in Chapter 8.

6.0 ARCHAEOLOGY AND CULTURAL HERITAGE

Chapter 6 was prepared by Cathal Crimmins Architects (Grade 1 Conservation Architects) and details that the analysis of the available archaeological resources indicate that there are no known archaeological sites or features within the subject site which are likely to be affected by the proposal.

The Register of Historic Monuments (RHM), the Sites and Monuments Record (SMR), the Record of Monuments and Places (RMP), the topographical files of the National Museum of Ireland and the excavations bulletin were all consulted in order to determine the archaeological significance of the site and likely impacts of the proposed development, if any.

A review of these records reveal that the development site is not within the zone of notification for any known or recorded archaeological sites. There are no recorded archaeological sub-constraints located within the site. The closest consists of the site of Mulchanstown Castle (SMR: DU023-045), located 433.7m to the north east and which is not scheduled for inclusion in the next revision of the SMR.

The topographic files contain records of all recorded finds held in the NMI archive that have been donated to the state in accordance with national monuments legislation. A review of the files did not list any finds recovered from within the immediate subject area. The nearest 'stray find' was recovered in Murphystown, 0.84km from the subject site.

A review of the Excavations Bulletin (1970-2018) has shown that no previous archaeological investigations have been carried out within the proposed development area. The nearest published excavation site was 0.49km from the site but did not yield any features of archaeological significance. Features were uncovered in the excavations at Carmanhall, 0.75km and 1km from the subject site respectively. These predominantly consisted of the foundations of possible medieval or post medieval field boundaries. This is consistent with the information from cartographic sources. Analysis of the historic cartographic resources has shown that the site formerly consisted of fields prior to the development of the industrial estate. The remains of a bronze age Flat Cemetery was also identified at Carmanhall. The stray find was also a Bronze Age axe head, suggesting Bronze Age activity in the wider area but more than 500m from the site.

The subject site fronts onto Carmanhall Road and Blackthorn Avenue. A field inspection has been carried out as part of this assessment. The site was inspected and photographically recorded as part of the process of researching and planning the future development of the site. This clearly illustrated the developed nature of the site and no previously unrecorded features of archaeological potential were noted. The potential impacts of the proposed development, associated services, the car park and landscaping on any underlying archaeological features as well as the long term maintenance of the site has also been considered.

The proposals include the construction of basements and lower ground floors on the site. It is possible that groundworks associated with the proposed development may have a direct and negative impact on any unknown archaeological remains. However significant level changes relating to the former light industrial use of the site were noted, particularly at the north end. Given the evidence presented above, the previous 20th century development of the site and the level changes noted it is probable that any potential unidentified archaeological remains may have already been significantly disturbed or removed altogether and it is therefore unlikely that archaeological features of finds will be uncovered.

Though it is very unlikely that archaeology will be uncovered during the course of construction works, in line with best practice, archaeological monitoring of any excavation works is recommended to address the possibility of any potential archaeological features being uncovered and to ensure that the appropriate course of action is taken.

There are no protected structures on site, and no buildings on site which are included in the National Inventory of Architectural Heritage. None of the structures forms part of a demesne landscape. The existing structures on the site comprise a late 20th century office building and the remains of a light industrial unit, specifically the concrete flooring. What remains on site is of no architectural interest and is in poor/dangerous condition and have been unused for a long period of time.

Clonmore House (RPS ref: 1434) is the nearest Protected Structure and is located 0.5km from the subject site. Although the reservoir is located across the road, 0.4km to the north, the protected structures associated with it are located 0.8km to the east. All of the nearby buildings which have been included in either NIAH Building or Garden inventories for Dun-Laoghaire-Rathdown are located 0.7km from the subject site and their demesne landscapes have been largely denuded by suburban or industrial development. The nearest Architectural Conservation Area, the Foxrock ACA is located 1.4 km to the east.

All of the identified buildings and features of architectural interest are located some distance away, with large areas of industrial, commercial and residential development located in between. It is not anticipated that the proposed development will be visible from the majority of them. The proposed 16-17 storey tower at Block D will be located at the junction the Carmanhall Road, Blackthorn Avenue and St Raphaella's Road and will be visible from the Vartry Waterworks Complex (RPS Ref: 1524) and the former Stillorgan Railway station (RPS Ref: 1533). The sensitive design of the proposed blocks should ensure that the proposed development results in no significant negative visual impact on the surrounding area.

7.0 BIODIVERSITY

A review of the biodiversity of the site was carried out by Openfield Ecological Services and this included a study of existing information from the area and a site survey. The site survey was carried out in February 2019. February is normally outside the optimal season for general habitat survey however in this case habitats are entirely artificial in nature and so this was not seen as a constraint to carrying out a full assessment.

It was found that the site is not within or adjacent to any area that is designated for nature conservation at a national or international level. There are no plants recorded from the site that are listed as rare or of conservation value. There are no habitats that are examples of those listed on Annex I of the Habitats Directive. There are no alien invasive plant species as listed on Schedule 3 of SI No. 477 of 2011. The site can be described as artificial in nature and is nearly entirely covered with hard surfaces. A treeline and hedgerow were both assessed as of 'lower significance' using methodology from the Heritage Council as they are predominantly composed of non-native species. There are no water courses on, or directly adjacent to, the site. Overall the habitats on the site have been evaluated as 'negligible value'. The site contains no suitable roost locations for Bats and surrounding urban habitats provide few resources for feeding. There was no evidence of Badgers using the site.

Sustainable drainage systems (SUDS) will be used to attenuate surface water running off the site. Additional landscaping will compensate for the loss of habitat that will occur. With the suggested mitigation in place, the ecological impacts by this proposed development will be neutral. There are no impacts that could affect any area designated for nature conservation.

8.0 LANDSCAPE AND VISUAL IMPACT

The LVIA summarises the impact of the proposed development on the landscape character and visual amenity of the current site and on the contiguous area and the site environs. It includes an outline of the methodology utilised to assess the impacts and descriptions of the receiving environment (baseline) and of the potential impacts of the development. Mitigation measures introduced to ameliorate, or offset impacts are considered and the resultant predicted (residual) impacts outlined.

This report should be read with reference to the photomontages produced by Visual Lab, which are included with the planning application. It should also be read in conjunction with the Architectural Design Statement prepared by Henry J Lyons Architects which also accompanies the planning application.

8.1 Existing Context for the Proposed Development

The subject site occupies a prominent position on the northern edge of Sandyford Business Estate which is located between the south-east fringe of Dublin City and Dun Laoghaire to the east. The area is currently undergoing a fairly rapid change in character, driven primarily by the *Sandyford Urban Framework Plan (SUFP) 2016-2022.* Up until the late 1990's the area was dominated by low density and low rise manufacturing sites. In the interim, the Business/Industrial Estate has been gradually developed into the Sandyford Business District with the introduction of medium to high density technology units, office, retail and medical developments as well as more recent residential developments. It is gradually becoming a place to live and work.

The subject site proposed for development is one of a number of vacant and hoarded sites which had been prepared for development prior to the financial crash of 2008. It forms part of the Mixed Inner Core Area of the Business District outlined in the SUFP 2016-2022. As such, the SUFP envisages high rise, high density residential development for this site, with a supporting mix of facilities including an active commercial component at ground level. Beyond the Mixed Inner Core Area, existing development is a mix of lower height industrial/commercial businesses and more recent office blocks forming the Mixed Outer Core, which gives way in the outer fringes to traditional 2 storey residential development. The site is flanked to the north by Blackthorn Drive/Blackthorn Avenue which is one of the main distributor roads in the area, linking into the city via Benildus Avenue and alongside this, the LUAS Green line which is supported by substantial surface car parking.

The general building forms in the Business District are large scale and higher rise i.e., in the order of 4-10 storeys, though the Beacon Tower building is clearly identifiable as significantly taller than this. The current SUFP indicates allowable building heights of up to 14 storeys in the inner core area. Building materials within the area are greatly varied and tend to be manufactured brick, concrete, glass and steel.

8.2 The Proposed Development

The proposed development will principally consist of: the demolition of the existing structures on site and the provision of a Build-to-Rent residential development comprising 564 No. apartments in 6 No. blocks as follows:

- Block A (part 10 to part 11 No. storeys over basement);
- Block B (8 No. storeys over basement);
- Block C (5 No. storeys over lower ground);
- Block D (part 16 to part 17 No. storeys over lower ground;
- Block E (10 No. storeys over semi basement);
- Block F (14 No. storeys over semi basement).

The development provides communal amenity spaces including concierge, gymnasium, lounges, games room and a panoramic function room at the roof level of Block D; a creche ; café; a pedestrian thoroughfare from Carmanhall Road to Blackthorn Drive also connecting into the boulevard at Rockbrook to the west; vehicular access off Carmanhall Road with servicing and bicycle access also provided off Blackthorn Drive; 285 No. car parking spaces; 21 No. motorcycle spaces; set-down areas; bicycle parking; bin storage; boundary treatments; hard and soft landscaping; lighting; plant; ESB Substations and switchrooms; sedum roofs; and all other associated site works above and below ground.

8.3 Landscape and Visual Impact

Construction Phase

The site will be surrounded by hoarding and will be occupied by the plant, machinery and storage elements normally associated with construction sites. The visual effects over the construction of the development will **vary from moderate and neutral to moderate and negative**, depending on one's location, the stage of construction, and the intensity of site activity. These effects will however be of **short term** duration.

Operational Phase

As regards the **impact on the perceived landscape character of the area and on social and cultural amenity**, it would be expected that the completion of almost any proposed development on this derelict urban site would be perceived to improve the appearance and functioning of the site and the area immediately around it, simply as a consequence of completing the work. The proposed permeability through the site and its connections with neighbouring lands and developments is a major social (and therefore landscape) improvement. However, ultimately the final development will be judged by many, primarily on its finished appearance and the impact of time, use and the elements upon it. The proposed development is well-researched and will provide living accommodation and a living environment of high quality which is both sustainable and durable. It is also designed in a manner which is respectful of its broader urban context and of the design details and fabric that sustain it. In terms of its effects on **landscape character** it will provide **significant positive effects** - these effects will be **long term**.

As regards **impact on the visual environment and visual amenity,** the proposed scheme is of similar type and scale to its existing context and therefore most impacts, if perceptible, are generally of relatively **low magnitude and sensitivity**. Such impacts are also generally assessed as **positively improving** upon the receiving environment. Unplanned events have been considered throughout the preparation of Chapter 8.

From a total of 20 No. views;

- in 7 No. views the proposed development is assessed as **imperceptible**
- in 7 No. views the impact is assessed as **slight** (of which 5 No. are **neutral** and 2 No. are **positive**)
- in 4 No. views the impact is assessed as **moderate** (of which 1 No. is **neutral** and 3 No. are **positive**)
- in 2 No. views the impact is assessed as **significant** (of which 1 No. is **neutral** and 1 No. is **positive**)
- in no views is the impact assessed as negative.

As previously outlined, these findings result partly from the current poor quality baseline conditions but perhaps more importantly from the high quality and well-considered architectural and landscape design of the proposed scheme.

8.4 Cumulative Effects

The central Sandyford area is currently experiencing a resurgence in higher rise, higher density development. Several adjacent permitted schemes may add a cumulative effect to the impact created by the subject scheme, however in the general context of the planned aims of the Sandyford Urban Framework Plan, this is not surprising. Even so, none of the adjacent permitted developments exerts a particularly significant influence in this respect, save perhaps for the Rockbrook Central scheme (recently commenced construction) which if anything largely reduces the visual impact of the subject scheme, through its future masking effect in several of the illustrative photomontages.

9.0 LANDS, SOILS AND GEOLOGY

Chapter 9 Land, Soils and Geology which has been prepared by O'Connor Sutton Cronin Consulting Engineers assesses the likely and significant impacts associated with the proposed residential and commercial development on the geological environment. It provides a description of the project (in connection with soils and geology); the baseline soils and geology environments for the project site; and a statement of the likely significant impacts associated with both the construction and operation phases of the development. A 'do nothing' scenario has also been considered. Mitigation measures are proposed in the form of avoidance, prevention, reduction, offsetting, and reinstatement or remedial measures and recommendations for monitoring are included where appropriate. Predicted residual effects are described.

The assessment followed a phased approach as outlined in Chapter 4.4 of the Advice Note (EPA, 2015) and the IGI Guidelines (IGI 2013). A Conceptual Site Model (CSM) was developed in order to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development.

Ground Investigations Ireland (GII) undertook a site investigation in February 2019 that included the excavation of 6 No. trial pits, and 10 No. rotary core boreholes. The site is currently an open yard in the northern and central section with an industrial/commercial building located in the southern section. The southern section is more elevated than the central and northern sections with a ramp located along the eastern boundary linking the areas. The site has a shallow fall from Carmanhall Road to Blackthorn Drive of approximately 4m.

The proposed development includes for 2 No. full basements and 2 No. semi-basements; basements are not proposed for a further 2 No. buildings. The proposed ground floor level (lowest level), across the site is +81.3mOD. There is an existing concrete slab from a previous warehouse building at a level of approximately 81.3m with the basement beneath therefore the total amount of excavation for the site is expected to be low with fill required in areas.

The Construction Phase holds the highest number of activities which could potentially impact on the geological environment. These activities primarily pertain to the excavation and infilling activities required to construct the basements. The operational phase of the project has very few if no activities which would constitute a risk to the soil and geological environment.

In order to reduce the impacts on the soils and geology environment a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of Soil Excavation and Export from Site;
- Sources of fill and aggregates for the project;
- Fuel and Chemical handling, transport and storage; and
- Control of Water during Construction.

During the operational phase of the Sandyford Central development site there is limited to no potential for site activities to impact on the geological environment of the area. The proposed scheme will have a combination of district and local heating systems all of which will be fuelled

by mains gas. Therefore, there is no requirement for fuel oil storage thus removing any potential source.

The primary residual impacts from the construction phase is the land take/change of use and removal of soil to facilitate the basement construction. These impacts are unavoidable given the nature, requirement and design of the proposed development. It is considered that once the mitigation measures are employed, the potential for residual impacts on this aspect of the environment is negligible.

In the event that the proposed development does not progress, there would be no resulting additional impacts on the geological environment in the area of the project site.

10.0 WATER - HYDROLOGY

Chapter 10 which has been prepared by O'Connor Sutton Cronin Consulting Engineers provides a description of the project (in connection with hydrology, water and hydrogeology); the baseline hydrology, water and hydrogeology environments for the project site; and a statement of the likely significant impacts associated with both the construction and operation phases of the development.

The assessment of the development followed a phased approach to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development. A number of these have been identified with respect to both the construction and operation phases of the proposed development. As a result, these phases have the potential to impact on the environment with respect to respect to hydrology and hydrogeology.

The site is a brownfield site and currently an open yard in the northern and central section with an industrial/commercial building located in the southern section. The southern section is more elevated than the central and northern sections with a ramp located along the eastern boundary linking the areas. The site has a shallow fall from Carmanhall Road to Blackthorn Drive of approximately 4.0m. The site topography is generally level with an existing concrete slab from a previous warehouse building at a level of approx. 81.3m.

The site is situated in the catchment of the Carysfort Maretimo stream in Dún Laoghaire and drains to the Dublin Bay which flows in a north easterly direction passing under Stillorgan and Blackrock to join the Sea at Blackrock west of Dún Laoghaire Harbour West Pier Wall.

The Granite underlying the site is generally unproductive poor aquifer except for local zones. The bedrock aquifer was not encountered during site investigations. Due to the high urbanisation of the site area, groundwater recharge to the aquifer is low. There are no recorded groundwater abstractions / users within the study area and the there are no source protection zones mapped in the area. There was no groundwater encountered during investigations. Ecosystems in the vicinity of the site which are dependent on the groundwater are The Booterstown Marsh. Groundwater data indicates that the Groundwater Vulnerability is classified as moderate. It is not proposed to abstract water from ground and the underlying aquifer. It is not proposed to discharge foul water to ground via percolation areas.

The site is located within the Dún Laoghaire Rathdown County Council local authority. Dún Laoghaire Rathdown County Council is responsible for the operation and maintenance of surface water sewer networks within the county. The site has an existing surface water pipe connection to the public surface water sewer on Blackthorn Drive which is to be reused. The existing surface water network discharges to the Carysfort Maretimo stream. The Carysfort Maretimo stream is a highly modified waterbody which is affected by the quantity and quality of surface water run-off from the adjacent lands. This catchment discharges into the South Dublin Bay.

The proposed development will not give rise to any likely significant long term effects. Slight negative effects may be experienced during the construction phase with disruptions to supply caused by the surface water connection to the Carysfort Maretimo stream which will be temporary in nature. During the Operational Phase there will be no significant environmental effects. Unplanned events have been considered throughout the preparation of Chapter 10.

The implementation of a range of SuDS methods including surface water attenuation will result in an improvement in the potential impact the surface water receiving waters being slight and long term. Discharge of runoff to ground will be facilitated as part of the SuDS strategy not to seal the interface between the SuDs components and the underlying soil (where practical / outside podium), thereby reducing discharge to surrounding watercourses and providing the natural recharge of groundwater with treated water. The proposed SUDS strategy also includes the limiting of flow from the site to Greenfield runoff levels and the storage of same within SuDs components. There will be no adverse increase in the discharge rates to receiving water bodies during and following completion of the development as there will be a decrease in surface water flows from the site and improvement in the water quality.

The completion of the proposed residential development will result in an increased discharge of surface water but it will be attenuated below Greenfield levels in accordance with GDSDS. This flow will be discharged to the public surface water network on Blackthorn Drive which ultimately discharges to Dublin Bay.

It is proposed to infiltrate surface water runoff to ground underneath SuDS systems where suitable. It is determined that the risks to ground water is 'low or medium'. Analysis of groundwater risk mapping from the EPA notes that the ground water on site is 'not at risk'. No extra measures may be required for discharges to groundwater bodies as groundwater is not a protected at this site.

Proposed mitigation and monitoring measures relate to the construction phase only and are summarised under the following aspects:

- Control of soil excavation and export from site.
- Sources of fill and aggregates for the project.
- Fuel and chemical handling, transport and storage.
- Control of water during construction.
- Monitoring shall be carried out as specified in any Discharge Licence associated with the construction phase of the project.
- Record keeping and monitoring of import and export of materials shall be carried out in accordance with the Waste Management Act.

It is considered that once the mitigation measures discussed above are employed, the potential for residual impacts on this aspect of the environment is negligible.

11.0 AIR QUALITY & CLIMATE

AWN Consulting Limited has been commissioned to conduct an assessment of the likely impact on air quality and climate associated with the proposed development at Sandyford, Dublin 18.

In terms of the existing air quality environment, data available from similar environments indicates that levels of nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns and less than 2.5 microns and benzene are generally well below the National and European Union (EU) ambient air quality standards.

Impacts to air quality and climate can occur during both the construction and operational phases of the proposed development. With regard to the construction stage the greatest potential for air quality impacts is from fugitive dust emissions impacting nearby sensitive receptors. Impacts to climate can occur as a result of vehicle and machinery emissions. In terms of the operational stage air quality and climate impacts will predominantly occur as a result of the change in traffic flows in the local areas associated with the proposed development.

Any potential dust impacts can be mitigated through the use of best practice and minimisation measures which are outlined in Chapter 11. Therefore, dust impacts will be short-term and not significant at all nearby sensitive receptors. It is predicted that impacts to climate will be short-term and imperceptible during the construction stage due to the duration and nature of the works.

The local air quality modelling assessment concluded that levels of traffic-derived air pollutants resulting from the development will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in Transport Infrastructure Ireland's guidance document 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes' the impact of the development in terms of PM10, PM2.5, CO, NO_2 and benzene is negative, long-term and imperceptible. The proposed development is not predicted to significantly impact regional air quality and climate during the operational stage. Unplanned events have been considered throughout the preparation of Chapter 11. Increases in traffic derived levels of NOX, VOCs and CO_2 have been assessed against Ireland's obligations under the EU Targets and emissions ceilings set out by Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC". Impacts to regional air quality and climate are deemed imperceptible and long-term with regard to NOX, VOCs and CO_2 emissions.

As the National and EU standards for air quality are based on the protection of human health, and concentrations of pollutants for both the construction and operational stages of the proposed development are predicted to be significantly below these standards, the impact to human health is predicted to be negative but overall imperceptible in the short and long term.

No significant impacts to either air quality or climate are predicted during the construction or operational phases of the proposed development.

12.0 NOISE AND VIBRATION

AWN Consulting Limited has carried out an assessment of the likely noise and vibration impacts associated with the proposed residential development at Sandyford Central, Dublin, which is provided at Chapter 12.

The existing noise climate in the vicinity of the proposed development has been surveyed. Prevailing noise levels are primarily due to local road traffic with some contribution from the LUAS line adjacent to the development.

The noise impact assessment has focused on the potential outward impacts associated with the construction and operational phases of the proposed development on its surrounding environment, as well as the inward impact of noise on the proposed residential dwellings.

During the main construction phase the assessment has determined that there is the potential for some temporary significant noise impacts when works are undertaken within close proximity of the receptor locations. However, these occurrences will only be temporary and the majority of the construction works will take place at distances from the receptors where no significant impacts are predicted and the construction criteria will be complied with. A schedule of noise mitigation measures will all be employed to ensure any noise and vibration impacts during this phase will be reduced as far as is reasonably practicable. A specific set of mitigation measures apply to the temporary school that lies on the eastern boundary of the site, here works that are expected to exceed the noise thresholds will have restricted operating hours during school times when the works are within 50m distance of the school building.

During the operational phase, the outward noise impact to the surrounding environment will be limited to any additional traffic on surrounding roads, plant noise from the commercial buildings as part of the development and breakout noise from café and residential amenity areas. Suitable criteria have been selected for plant noise emissions and breakout noise that will be adhered to at the design stage. The impact assessment has concluded that additional traffic from the proposed development will not have a significant impact on the surrounding noise environment. The resulting impact is neutral, not significant and permanent. Unplanned events have been considered throughout the preparation of this chapter.

The inward noise impact assessment has determined that some facades of the development will require enhanced glazing and ventilation specifications to meet the proposed internal noise criteria. Specifications for glazing and ventilation systems have been proposed in order to mitigate noise intrusion from external sources, however it should be noted that these specifications are preliminary and provide the evidence that the internal noise criteria may be achieved. There may be alternative specifications that are found to achieve the internal noise criteria at the design stage.

13.0 WIND

13.1 Introduction

Wind and Micro-climate assessments have been carried out in Chapter 13 to identify the possible wind patterns around the proposed Sandyford Central Development considering mean and peak wind conditions typically occurring in Dublin. The criteria of Lawson's Wind Comfort and Distress have been adopted to define if a specific area of the development could be comfortable and safe to pedestrians for its designated activity (i.e. standing/walking/strolling).

Results of the wind analysis have been discussed with the design team so as to configure the optimal layout for proposed development for the objective of achieving a high-quality environment for the scope of use intended of each areas/building (i.e. comfortable and pleasant for potential pedestrian) and without compromising the wind impact on the surrounding areas and on the existing buildings.

13.2 Methodology

The wind modelling study has been performed through an Advanced Computational Fluid Dynamics (CFD) analysis; this numerical methodology simulates the movement of wind within the prescribed area. The simulations have been carried out using the concept of Large Eddy Simulation (LES) and Reynolds Average Navier-Stokes (RANS).

A total of 18 No. different wind scenarios have been studied considering variation of wind magnitude and directions in line with their frequency of occurrence based on 30 years of historical weather data. An exceedance of occurrence of 5% of the duration was considered in line with the Comfort and Distress criteria.

The wind profile built using the data from Dublin Airport was also compared with the one obtained using the data collected on-site. Except few differences, both the wind speed daily mean and the wind gust daily mean recorded on site followed the same patterns as the ones recorded at Dublin Airport. Despite the location of the site, the speed levels registered on-site were below those ones registered at Dublin Airport. This confirmed the fact that using wind data from Dublin Airport ensures a conservative analysis of the wind impact on the development. Through the wind assessment it has been possible to highlight, at design stage, areas of concern in terms of downwash/funnelling/downdraft/ and to identify critical flow accelerations that could potentially occur.

The assessment has been carried out considering the impact of wind on the following configurations:

- The "Existing Receiving Environment": in this case the assessment has considered the impact of the local wind on the existing area / buildings prior to construction of the proposed development. For this assessment a statistical analysis of 30 years of historical weather wind data has been carried out to find the most critical wind speeds and directions and the frequency of occurrence of the same.

- The "Potential Impact": in this case the assessment has considered impacts of wind on the existing environment area, the proposed development, and its immediate vicinity, with the aim to identify potential impacts on future nearby buildings. For this scenario, the proposed development will introduce no negative wind effect on adjacent, nearby or future phase developments (already planned) within its vicinity. Wind modelling of future phases around this development will need to be performed for all future phase developments.

- The "Cumulative Impact": in this case the assessment has considered the impact of wind on the existing area including the proposed Sandyford Central Development and the adjacent Rockbrook Phase 2 buildings for which permission was recently granted (ABP Ref. PL06D304405). For this scenario, the Sandyford Central Development has been simulated inclusive of its mitigation measures impact in the locations identified as critical during the "Proposed Development" scenario.

13.3 Potential and Cumulative Impacts

The Potential Impact of the Proposed Development has considered the impact of wind on the existing area including the proposed Sandyford Central Development. For this scenario, the analysis has been used to identify the critical areas of the proposed development that requires implementation of mitigation measures.

CFD modelled results of the proposed development scheme showed that:

- The results of the simulations have shown that the proposed development will produce a quality environment that is attractive and comfortable for pedestrians. The development does not introduce major critical impacts on the existing environment and does not appear to be impacted negatively by the adjacent Rockbrook Phase 2 buildings once constructed, indeed Sandyford Central and Rockbrook Phase 2 have similar heights and massing and are surrounded by further developments with similar characteristics.

- Good shielding is achieved on all critical roads. There are some funnelling effects around both the roads abutting the Sandyford Central development and some high velocities in the main road on the east side of the development (Carmanhall Road). However, high velocity areas are limited to the part of the roads where the cars pass. Footpaths are successfully shielded by vegetation. The funnelling across the development does not reach critical velocities and would be mitigated by the presence of the trees. These high velocities appear to be already present before construction of Sandyford Central Development and not a consequence of its construction.

- Assessment of the velocities on the terrace of Block D shows that the velocities are always below critical values and the roof terrace is being constructed in such a way to provide coverage to the occupants.

- The pedestrian comfort assessment, performed accordingly to the Lawson criteria, identified the areas that are suitable for the different pedestrian activities in order to guarantee pedestrian comfort and showed that the entire development is suitable for any activities. Moreover, in terms of distress, no critical conditions were found for "Frail persons or cyclists", neither for members of the "General Public", in the surrounding of the development.

Therefore, the wind study carried out has shown that, under the assumed wind conditions and the proposed mitigation measures:

- The development is designed to be a high-quality environment for the scope of use intended of each areas/building (i.e. comfortable and pleasant for potential pedestrians), and,

- The development does not introduce any critical impact on the surrounding areas and on the existing buildings.

13.4 Mitigation Measures

The proposed mitigation measures for this development is landscaping using tree plantings, which creates a further reduced vorticity, making it possible to reduce incoming velocities, thus further reducing wind impacts on the buildings, public spaces or pedestrian paths. This proposed tree planting mitigation measures are needed to be implemented within the development and have been considered by the landscape designer along the design process.

13.5 Residual Impacts

The impacts of implementing mitigation measures such as tree planting will result in further shielding of public spaces and pedestrian footpaths from wind. This impact is a positive effect.

14.0 MATERIAL ASSETS - TRAFFIC AND TRANSPORTATION

This assessment has been carried out in accordance with relevant guidelines from the Chartered Institution of Highways and Transportation and Transport Infrastructure Ireland (TII). Full details of the assessment carried out can be found in the Traffic Impact Assessment submitted under separate cover in support of this application.

The assessment was carried out based on existing traffic conditions on the local study area which were established through a number of bespoke surveys carried out on Thursday 11th April 2019 & Thursday 23rd May 2019 which included junction turning counts, queue lengths surveys and pedestrian crossing counts.

Additional traffic allowed for as part of the assessment included:

- Natural background traffic growth in accordance with TII growth factors;
- Additional traffic from the proposed development;
- Additional traffic from approved developments in the local area.

The local road network was assessed using guidance from the Design Manual for Roads and Bridges (DMRB) and TRANSYT 15/Junctions 9 traffic modelling software.

The receiving environment is an undeveloped site at present, located within Sandyford Business Park directly adjacent the Luas and bus services. The main transportation arteries in the study area are Carmanhall Road, Blackthorn Road and Blackthorn Drive/Avenue which ultimately link to the major transport arteries outside of the study area i.e. the R133, R113 and M50. Outside of the study area, development generated traffic will dissipate and so is expected to have a negligible impact on the operation of the wider network.

The receiving environment is an undeveloped site at present, located within Sandyford Business Park directly adjacent the Luas and bus services. The existing key traffic route Hearse Road/Main Street. This will be complimented by the upcoming completion of the Donabate Distributor Road which bypasses the town and serves the LAP lands.

The proposed development consists of a residential development comprising 564 no. apartments with ancillary creche and residential amenities. The key aspects with respect to transportation are summarised as follows:

- The site is bounded by Carmanhall Road to the south, Blackthorn Drive to the north and unrelated third party lands to the east and west;

- Car parking is proposed in accordance with the *Guidelines for Planning Authorities, Design Standards for New Apartments (March 2018)* from the Department of Housing, Planning and Local Government. This takes into consideration the Build-to-Rent nature of the development, the existing demand for car parking and car usage locally based on data from the 2016 Census combined with existing and proposed public transport, cycle and pedestrian infrastructure locally and a series of comprehensive parking management proposals for the development;

- It is proposed to dedicate a minimum of 10 No. vehicles to use by a car club facility such as GoCar which will be available for use by residents at the development as part of the overall parking management strategy, ensuring access to a vehicle for non-commuting

purposes without the need to own a car (please see GoCar Letter of Support enclosed as Appendix B in the Response to Opinion Document submitted as a separate document with this Planning Application);

- The majority of car parking (254 No. spaces) is to be provided under-development at Level 0 which will be accessed via an entrance point on Carmanhall Road, in the southeast corner of the site and replacing the existing site entrance;

- Some additional parking (31 No. spaces) is to be provided at Level 1 which will be accessed by an additional entrance on Carmanhall Road, just west of its junction with Corrig Road;

- Both vehicular entrances will operate under a simple uncontrolled layout designed in accordance with the Design Manual for Urban Roads and Streets (DMURS);

- A total of 30 No. electric vehicle parking spaces are proposed with provision made for the upgrade of all spaces to facilitate electric vehicle charging in the future;

- Cycle parking is also being provided in accordance with the *Guidelines for Planning Authorities, Design Standards for New Apartments*. A total of 1,178 spaces are proposed at a rate of 1 space per bedroom for residents and 1 space per 2 units for visitors;

- A dedicated cycle parking access route to the Level 0 parking area is provided on Blackthorn Drive. This will also facilitate infrequent servicing access requirements including the movement of bins during collections periods. The Level 0 ramp access from Carmanhall Road also includes a segregated 2.0m wide cycle access ramp at a shallower 1:14 gradient. A raised ramp will be provided to ensure pedestrian priority across the proposed pedestrian entrance on Carmanhall Road;

- 21 No. motorcycle parking spaces are proposed in accordance with the DLRCC Development Plan standards;

- All car parking is to be dedicated for use by residents with none proposed to serve the creche facility. This is based on the expectation that users of the creche will be based within the development site or the local area and that the accessible nature of the site is more than sufficient to serve the travel needs of staff;

- Apartment rental prices will be quoted without parking. Should a perspective occupier require parking this will be provided at an additional cost on a first come, first served basis.

- Set down and servicing parking areas are proposed on both Carmanhall Road and Blackthorn Drive which will facilitate activities such as creche drop off/collection, waste collection and other servicing needs. It is stressed that these areas are not proposed to serve as visitor parking or any long term parking usage;

- Pedestrian access is provided through the site via a north-south link providing a direct route to the Luas. Due to the topography of the site, stairs are provided at the northern end along with an internal lift which will be open to public use. Cyclists may also use this route through the site with manoeuvring of the steps facilitated by a bike channel;

- Access for fire tender and other emergency vehicles is also catered for via the north-south link with a swept path analysis having been carried out for such vehicles

The overall impact of the proposed development is summarised as follows:

Construction Stage

- The peak traffic hours have been defined as 08:00-09:00 and 16:15-17:15. The normal permitted construction working hours are 08:00 to 19:00 on a weekday. As a result, staff travelling in private vehicles will arrive and depart the site outside of the peak traffic hours;

- An appropriately limited amount of on-site parking will be provided to encourage staff to car share and to travel by the numerous public transport options serving the locality. However, the provision will be adequate to prevent overspill parking in the local area;

- Heavy vehicles will facilitate the movement of materials to and from the site including excavated material and deliveries. Given the current topography and proposed design, the amount of excavation will be relatively limited and the duration of such works will be very short term in nature. Furthermore, heavy vehicles travelling to and from the site will be spread across the course of the working day with efforts made to limit the number of arrivals and departures during the peak traffic hours where possible;

- The majority of contractor vehicles are expected to arrive and depart just before and after the site opening and closing hours respectively, with a small number spread across the course of the day;

- The peak hour vehicle movements for the construction phase are notably lower than that predicted for the operational stage.

Mitigations measures proposed include the provision and implementation of a Construction Management Plan.

It is considered that the impact of the construction phase on Traffic and Transport will be likely and adverse but moderate and short-term.

Operational Stage

The impact of the operational stage was considered in the following context:

- Do-Nothing – no development taking place in the local area and only allowance for natural background traffic growth;
- Do-Something – Natural background traffic growth and the additional traffic estimated to be generated by the proposed development;
- Do-Maximum – Natural background traffic growth, the additional traffic estimated to be generated by the proposed development and relevant but unrelated 3rd party developments either approved or lodged for planning within the local area.

The Do Nothing analysis shows that all junctions, with the exception of Junction 3 (Carmanhall Road/Blackthorn Road priority junction) operate within capacity. Junction 3 is seen to operate above capacity without any additional development in place.

The Do-Something scenario shows minor impacts to the operation of the junctions in terms of capacity and queue lengths. Junction 3 continues to operate above capacity as would be expected, but shows only a very minor impact relative to the Do-Nothing scenario meaning the impact of the proposed development is negligible.

The Do Maximum scenario shows larger impacts to junction capacities, particularly at Junctions 1 & 3 during the P.M. peak hour. As noted above, Junction 3 is seen to operate above normal capacity limits regardless of any development taking place. Junction 1 (Carmanhall Road/Blackthorn Drive signalised junction) is shown to operate within capacity through a simple optimisation of its traffic signal plan which can be achieved using the existing infrastructure.

The link capacities for the study area road network will continue to operate within acceptable limits for all scenarios assessed.

Mitigation measures as part of the proposed development included a reduced rate of car parking provision, increased rate of cycle parking provision, increased permeability through the site and implementation of a bespoke Travel Plan at the development. Unplanned events have been considered in the preparation of Chapter 14.

It is considered that the impact of the operational phase on Traffic and Transport will be likely, neutral, slight and long-term.

15.0 MATERIAL ASSETS - WASTE MANAGEMENT

AWN Consulting Ltd. carried out an assessment of the potential impacts associated with waste management during the construction and operational phases of the proposed development. The receiving environment is largely defined by Dún Laoghaire Rathdown County Council as the local authority responsible for setting and administering waste management activities in the area through regional and development zone specific policies and regulations.

During the demolition and construction phases, typical C&D waste materials will be generated which will be source segregated on-site into appropriate skips/containers, where practical and removed from site by suitably permitted waste contractors to authorised waste facilities. Where possible, materials will be reused on-site to minimise raw material consumption. Source segregation of waste materials will improve the re-use opportunities of recyclable materials off-site. Completion of the basement and construction of new foundations, the installation of underground services and attenuation tank will require the excavation of c. 10,100m3 soil, stone, gravel, clay and rock. It is anticipated that all of the excavated material will need to be removed offsite. Excavated material which is to be taken offsite will be taken for offsite reuse, recovery, recycling and/or disposal.

A carefully planned approach to waste management and adherence to the site-specific Construction and Demolition Waste Management Plan (Appendix 15.1) during the construction phase will ensure that the effect on the environment will be short-term, neutral and imperceptible.

During the operation phase, waste will be generated from the residents as well as the commercial tenants. Dedicated communal waste storage areas have been allocated throughout the development for residents. The waste storage areas have been appropriately sized to accommodate the estimated waste arisings in both apartments and shared residential areas. The commercial tenants will have dedicated waste storage areas allocated within the development and can be viewed on the drawings submitted with the application. The waste storage areas have been allocated to ensure a convenient and efficient management strategy with source segregation a priority. Waste will be collected from the designated waste collection areas by permitted waste contractors and removed off-site for re-use, recycling, recovery and/or disposal.

An Operational Waste Management Plan has been prepared which provides a strategy for segregation (at source), storage and collection of wastes generated within the development during the operational phase including dry mixed recyclables, organic waste, mixed non-recyclable waste and glass as well as providing a strategy for management of waste batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture (Appendix 15.2). The Plan complies with all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the development.

Provided the mitigation measures outlined in Chapter 15 are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be long-term, neutral and imperceptible.

16.0 MATERIAL ASSETS – SITE SERVICES (CIVILS)

Chapter 16 provides a description of the project associated with the material assets, specifically in connection with the site services, drainage and water supply. A statement of the likely significant impacts associated with both the construction and operation phases of the development have been presented in this chapter including relevant mitigation and monitoring measures.

The assessment of the development followed a phased approach to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development. A number of these have been identified with respect to both the construction and operation phases of the proposed development. As a result, these phases have the potential to impact on the environment with respect to site services, drainage and water supply.

The site is a brownfield site and currently an open yard in the northern and central section with an industrial/commercial building located in the southern section. The southern section is more elevated than the central and northern sections with a ramp located along the eastern boundary linking the areas. The site has a shallow fall from Carmanhall Road to Blackthorn Drive of approximately 4.0m. The site topography is generally level with an existing concrete slab from a previous warehouse building at a level of approx. 81.3m. The Stillorgan Reservoir is adjacent the site to the north east corner of the site on Blackthorn Drive. The available data shows that the site is at negligible risk from Stillorgan Reservoirs and existing watermain infrastructure.

The site is situated within the Sandyford Business District which is in jurisdiction of Dún Laoghaire Rathdown County Council (DLRCC). There is significant existing infrastructure throughout the area, which served the buildings demolished on site including potable water, foul and surface water.

There is an existing public water network on Carmanhall Road and an existing watermain traversing the site and connects to the existing watermain on Blackthorn Drive. The proposed development will result in an additional potable water demand of 243 cubic metres per day. It is proposed to construction the internal potable network in accordance best practice and with the Dún Laoghaire-Rathdown County Council and Irish Water regulations. This additional demand can be catered for in the existing network and has been confirmed by Irish Water.

The site is located in the Dún Laoghaire West Pier – West foul water catchment. The foul drainage discharges the site and drains by gravity to a pumping station at the Dún Laoghaire Harbour West Pier before it is pumped across Dublin Bay to Ringsend WwTP. It is proposed to reuse the foul connection from the site and or complete upgrade works. The proposed development will result in the discharge of 267 cubic meters of foul water per day. Irish Water have confirmed that the existing sewer network has adequate capacity to facilitate sewage from this development.

The site has an existing surface water pipe connection to the public surface water sewer on Blackthorn Drive which is to be reused. The existing surface water network discharges to the Carysfort Maretimo stream. The Carysfort Maretimo stream is a highly modified waterbody which is affected by the quantity and quality of surface water run-off from the adjacent lands. This catchment discharges into the South Dublin Bay.

The available data shows low level flooding fluvial flooding on Blackthorn Drive, Corrig Road and parts of Carmanhall Road close to the site for the 0.1% AEP event. This flooding relates to the surcharging of the drainage network as a result of inundation of overland flows upstream from the culverted Crayfort Martimo Stream.

The proposed development will not give rise to any likely significant long term effects. Slight negative effects will be experienced during the construction phase with disruptions to supply caused by the drainage and water supply diversion and connections to local infrastructure which will be temporary in nature.

During the Operational Phase there will be an increase in potable water demand and foul water discharge. The development site is limited in site activities to impact on the drainage and water supply of the area.

This connection and discharge attenuated flowed in accordance with the Local Authority requirements and the Greater Dublin Strategic Drainage Study. This will have a positive impact on the surface water runoff from site.

17.0 MATERIAL ASSETS - SITE SERVICES (UTILITIES)

Chapter 17 details that for the proposed development, a new gas, water, power and communication utility service will be required.

The water supply will come from the Irish Water main connection and will be applied for by the Civil Engineer. The proposed water connection will come from Carmanhall Road.

The gas supply will come from Gas Networks Ireland main connection and will be applied for by the Mechanical Engineer. The proposed gas connection will come from Carmanhall Road.

The power supply will come from ESB main connection and will be applied for by the Electrical Engineer. The proposed ESB connection will come from Blackthorn drive and the Carmanhall Road.

The telecommunications supply will come from EIR main connection and will be applied for by the Electrical Engineer. The proposed EIR connection will come from Blackthorn drive and the Carmanhall Road.

18.0 INTERACTIONS AND CUMULATIVE IMPACTS

Chapter 18 of this EIAR outlines the most significant interactions associated with the proposed development.

18.1 Interactions between Population and Air Quality and Climate

Interactions between population and air quality/climate are discussed in Chapter 5 and 11. The main interactions are predicated to arise during construction stage as there will be dust emissions associated with the construction of the proposed development. Mitigation measures such as a Dust Minimisation Plan (outlined in Appendix 11.3) will minimise dust emissions during construction stage and ensure that no significant adverse impacts will occur on population and human health. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and neutral with respect to human beings.

18.2 Interactions between Population and Noise and Vibration

Interactions between population and noise/vibration are discussed in Chapter 5 and 12. Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. During the operational stage, the predicted noise level associated with additional traffic is predicted to be of insignificant impact along the existing road network. In the context of the existing noise environment, the overall contribution of traffic is not considered to pose any significant impact to nearby residential locations. It can be concluded that, once operational, the predicted change in noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network.

18.3 Interactions between Population and Human Health and Traffic and Transportation

The scheme will be developed in line with the Traffic and Transport chapter (Chapter 14 of this EIAR) and the separately enclosed Preliminary Construction Management Plan (PCMP) to ensure any impacts on local traffic is minimised during the construction stage. The PCMP notes that a large quantum of the on-site employees will arrive in shared transport therefore reducing the potential for associated temporary negative impacts on the surrounding road network.

As the development proposes some 564 No. residential units, small scale commercial development and associated (albeit) reduced car-parking, there will be additional traffic movements at the site and in the vicinity, which will have a minor negative impact on the existing population. However, the promotion of sustainable modes of transport from the site during the operational stage will significantly mitigate against any potential impacts that may arise on traffic in the area.

If the development does not proceed at the subject lands, there would be a potential negative impact for pedestrians in the local area as the significantly enhanced pedestrian permeability through the site would not be provided.

18.4 Interactions between Population and Human Health and Landscape and Visual Impact

Chapter 8 provides a Landscape and Visual Impact Assessment prepared by Mitchell and Associates Landscape Architects. The chapter provides an assessment of Landscape Character Impact which is an assessment of effects on the character of the landscape arising from the insertion of the proposed development into the existing landscape context. This 'landscape' aspect is relatively subjective and can be described broadly as the human, social and cultural experience of one's surroundings. These combined impacts will elicit responses whose significance will be partially dependent on how people perceive a particular landscape and how much the changes will matter in relation to other senses as experienced and valued by those concerned.

The visual effects over the construction of the development will vary from moderate and neutral to moderate and negative, depending on one's location, the stage of construction, and the intensity of site activity. These effects will however be of short term duration. During the construction phase, it is inevitable that there will machinery and materials located on site in addition to ancillary storage, facilities for workers and hoarding for example. There may be potential for a slightly negative impact on the visual appearance of the site. It is anticipated that the impact will be temporary in nature and will ultimately provide a positive visual appearance on completion of the development. Notwithstanding the above, the provision of site hoarding along the property boundaries will substantially address many potential effects of construction operations during the delivery stage.

Chapter 8 concludes that it would be expected that the completion of almost any proposed development on this derelict urban site would be perceived to improve the appearance and functioning of the site and the area immediately around it, simply as a consequence of completing the work. The proposed permeability through the site and its connections with neighbouring lands and developments is a major social (and therefore landscape) improvement. However, ultimately the final development will be judged by many, primarily on its finished appearance and the impact of time, use and the elements upon it. The proposed development is well-researched and will provide living accommodation and a living environment of high quality which is both sustainable and durable.

18.5 Interactions between Wind and LVIA

The Landscape and Visual Impact Assessment provided in Chapter 8 stipulates that it is important to note that the proposed design has responded to the findings of the wind study undertaken. In particular, the final planting incorporated into the design will significantly mitigate the wind effects around and within the scheme. This is outlined in the Wind Assessment carried out in Chapter 13.

18.6 Interactions between Population, Biodiversity and Water-Hydrology

There are interactions between biodiversity and the water-hydrology chapter. Measures to enhance the surface water characteristics from the site (through SUDS) will benefit water bodies by improving water quality and reducing pulse flow impacts and therefore there will be no negative impacts on population and human health in relation to water quality.

18.7 Interactions between Biodiversity and Landscape

The landscaping strategy incorporates the introduction of soft landscaping which will provide habitat for invertebrates and birds.

18.8 Interactions between Land, Soils and Geology, Water-Hydrology and Site Services (Civils)

Excavated and stripped soil can be disturbed and eroded by site vehicles during the construction phase. Rainfall and wind can also impact on non-vegetated/uncovered areas within the excavation or where soil is stockpiled. This can lead to run-off with high suspended solid content which can impact on water bodies. The potential risk from this indirect impact to water bodies and/or habitats from contaminated water would depend on the magnitude and duration of any water quality impact.

Construction phase dewatering may be required to excavate the basements and associated infrastructure and to maintain dry working conditions in the excavation (for rainfall). Pumped water will require discharge offsite (discharge to sewer). Potential for dewatering is addressed in Chapter 10.

As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed to percolate to the aquifer. This is discussed further in Chapter 10. The potential main contaminants include:

- Suspended solids (muddy water with increase turbidity) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage; and contaminated groundwater within the site from previous site activities;
- Wastewater (nutrient and microbial rich) – arising from poor on-site toilet and washrooms.

18.9 Interactions between Land, Soils and Geology and Air Quality and Climate

There is a potential for dust from excavations or stockpiles to impact on air quality. This is discussed further in Chapter 11 Air Quality and Climate.

Chapter 11 outlines that in compiling this impact assessment, reference has been made to the project description provided by the project co-ordinators, project drawings provided by the project architects and traffic flow projections associated with the development provided by the traffic consultants as discussed in Chapter 9 (Land Soils and Geology), Chapter 10 (Water-Hydrology) and Chapter 14 (Traffic and Transportation).

With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and soil and geology

18.10 Interactions between Land, Soils and Geology and Noise and Vibration and Traffic and Transportation

Noise and vibration will be generated through the construction phase particularly during excavation work. It is anticipated that conventional excavation techniques (i.e. hard digging) will suffice. Noise and vibration impacts are considered in detail in Chapter 12, Noise and Vibration.

The construction phase and any import or export of material to the site (as part of excavation or infilling works) will have implications for traffic in the surrounding road network. Excavated and stripped soil can be disturbed and eroded by site vehicles during the construction. These impacts are considered further in Chapter 9 Lands, Soils and Geology, Chapter 12 Noise and Vibration and Chapter 14 Traffic and Transportation.

18.11 Interactions between Waste and Land, Soils and Geology

During the construction phase excavated soil, stone, gravel, clay and rock (c. 10,100 m3) will be generated from the excavations required to facilitate site levelling, construction of the basement, construction of new foundations, the installation of underground services and attenuation tank. It is envisaged that all of excavated material will need to be removed offsite. Where material has to be taken off site it will be taken for reuse or recovery, where practical, with disposal as last resort. Adherence to the mitigation measures in Chapter 15 and the requirements of the Construction and Demolition Waste Management Plan will ensure the effect is long-term, imperceptible and neutral.

18.12 Interactions between Waste and Traffic and Transportation

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the development. The increase in vehicle movements as a result of waste generated during the construction phase will be temporary in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase and has been addressed in Chapter 14 Traffic and Transportation. Provided the mitigation measures detailed in Chapter 14 and the requirements of the OWMP (included as Appendix 15.2) are adhered to, the effects will be short to long-term, imperceptible and neutral.

18.13 Interactions between Site Services (Utilities) and Land, Soils and Geology

Trench excavations to facilitate site service installation will result in exposure of subsoils to potential erosion and subsequent sediment generation. Mitigation measures are outlined in Chapter 9 Land & Soils (i.e. service trenches to be backfilled as soon as practicable to minimise potential erosion of subsoils).

18.14 Interactions between Air Quality and Traffic

Chapters 11 and 14 outline interactions between air quality and traffic. Interactions between air quality and traffic can be significant with increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

18.15 Cumulative Impacts

At the time of writing this Environmental Impact Assessment Report, it appears that there are no current projects in the immediate vicinity of the site seeking planning permission. There has been one planning application 'Rockbrook Phase II' in close proximity to the subject site which has recently been granted permission for the construction of a Build-to-Sell mixed use scheme (Ref.: ABP-304405-19) This scheme has been reviewed and included within the enclosed EIAR chapters.

The cumulate effects with other existing and/or approved projects in the area have also been considered to determine whether these could be sufficient to generate impacts of significance on the environment. Any predicted specific cumulative impacts are outlined in the various EIAR chapters, and tend to be temporary; related to the construction period; and manageable by way of mitigation. No significant interactions are envisaged in terms of interactions arising from cumulative impacts.

Therefore, it is not proposed to include any specific measures for monitoring or mitigation to be undertaken in relation to cumulative impacts.

Interactions	Population and Human Health	Archaeology & Cultural Heritage	Biodiversity	LVIA	Lands, Soil & Geology	Water-Hydrology	Air Quality & Climate	Noise & Vibrations	Wind	Traffic & Transportation	Waste Management	Site Services: Civils	Site Services: Utilities
Population and Human Health			✓	✓		✓	✓	✓		✓			
Archaeology & Cultural Heritage													
Biodiversity				✓		✓							
LVIA									✓				

Lands, Soil & Geology						✓	✓	✓		✓	✓	✓	✓
Water-Hydrology												✓	
Air Quality & Climate										✓			
Noise & Vibrations										✓			
Wind													
Traffic & Transportation											✓		
Waste Management													
Site Services: Civils													
Site Services: Utilities													

Table 18.1 Matrix of Significant Interactions Discussed Throughout Chapter 18

19.0 MITIGATION AND MONITORING

A summary of mitigation measures and monitoring proposed throughout this Environmental Impact Assessment Report is set out in this section. We note that this is a summary of measures proposed and further detail should be sought in each individual chapter.

Chapter 5: Population and Human Health

- Implementation of a Dust Minimisation Plan, a Mobility Management Plan and Parking Strategy.
- The Contractor shall be responsible for overall management of the site for the duration of the proposed works and must progress their works with reasonable skill, care, diligence and to proactively manage the works in a manner most likely to ensure the safety and welfare of those carrying out construction works.
- The scheme will be developed in line with the Traffic and Transport chapter (Chapter 14 of this EIAR) and the separately enclosed Preliminary Construction Management Plan to ensure any impacts on local traffic is minimised during the construction stage.
- The promotion of sustainable modes of transport from the site during the operational stage will significantly mitigate against any potential impacts that may arise on traffic in the area.
- Filtering of surface water that is likely to be contaminated by soil particles in order to reduce the silting effects of these particles in the receiving downstream watercourse;
- Construction of suitable silt traps prior to the surface water out-falling to the existing watercourse;
- The contractor will be required to ensure construction activities operate within the noise and vibration limits set out within this assessment. The contractor will be required to undertake regular noise and vibration monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.
- Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.
- Vibration monitoring should be conducted in accordance with BS 6472 for human disturbance and BS ISO 4866:2010 for building damage.

Chapter 6: Archaeological and Cultural Heritage

- Though it is very unlikely that archaeology will be uncovered during the course of construction works, archaeological monitoring of any excavation works is recommended to address the possibility of any potential archaeological features being uncovered and to ensure that the appropriate course of action is taken.

Chapter 7: Biodiversity

- Deliberate disturbance of a bird's nest is prohibited unless under licence from the National Parks and Wildlife Service. If possible, site clearance works should proceed outside the nesting season, i.e. from August to February inclusive. If this is not possible, vegetation must first be inspected by a suitably qualified ecologist.

- Best practice guidance from Inland Fisheries Ireland (2016) will be followed to prevent pollution. Dangerous substances such as oils and fuels will be stored at all times in a bunded area. Only clean water should enter public surface water sewers.

Chapter 8: Landscape and Visual Impact

- The provision of site hoarding along the property boundaries will substantially address many potential effects of construction operations during the delivery stage.

- Mitigation measures proposed during the construction stage of the development, revolve primarily around the implementation of appropriate site management procedures during the construction works – such as the control of lighting, storage of materials, placement of compounds, control of vehicular access, and effective dust and dirt control measures, etc. The Construction Management Plan for the project, submitted with the planning application, sets out the basic measures to be employed in order to mitigate potential negative effects during construction. This is a working document which is refined and added to as the project proceeds.

- The success of the proposed development is dependent on the proposals being properly executed as approved. Detailed agreement on finishes and materials to be employed needs to be ensured through the provision of and on-going adherence to reference samples provided on site for the duration of the construction works and defects period.

Chapter 9: Land, Soils and Geology

- In order to reduce the impacts on the soils and geology environment a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

    - Control of Soil Excavation and Export from Site.
    - Sources of Fill and Aggregates for the Project.
    - Fuel and Chemical Handling, Transport and Storage.
    - Control of Water during Construction.
    - Incorporated Design Mitigation.

- In advance of work starting on site, the works Contractor will author a Construction Methodology document taking into account their approach and any additional requirements of the Design Team or Planning Regulator. The Contractor will also prepare a Construction Management Plan and Environmental Plan. The Construction Management Plan sets out the overarching vision of how the construction of the project will be managed in a safe and organised manner by the Contractor with the

oversight of the Developer. The CMP is a living document and it will go through a number of iterations before works commence and during the works.

- Monitoring of the water discharged to sewer shall be carried out as specified in any Discharge Licence associated with the Construction Phase of the Proposed Development.

- Record keeping and monitoring of import and export of materials shall be carried out in accordance with the Waste Management Act. Regular auditing of construction/mitigation measures will be undertaken (e.g. concrete pouring, refuelling in designated areas etc.).

Chapter 10: Water-Hydrology

- The following mitigation measures shall be implemented with the construction of the surface water sewer network:

    - The filtering of surface water that is likely to be contaminated by soil particles in order to reduce the silting effects of these particles in the receiving downstream watercourse;
    - Construction of suitable silt traps prior to the surface water out-falling to the existing watercourse;
    - Locating existing services to ensure there is no conflict which could lead to a negative impact;
    - Methods statements to ensure appropriate works methodologies.

- The drainage system for this development will contain a range of treatment methods for surface water including:

    - Green roofs and on podium storage will provide a first level of treatment and storage level of apartment blocks. The removal of pollutants or sediments, ecological value and a reduction of surface water runoff volumes and discharge rates for small events (Interception) will be provided;
    - Raingardens & Basins will be provided downstream of the above SuDs components for attenuation during an exceedance event.
    - Infiltration to natural ground for surface water runoff will be facilitated underneath filter drains, raingardens, basins, landscaped areas and permeable paving outside of podium where practical.
    - Filter drains underneath SuDS systems will likely provide attenuation, conveyance and treatment runoff;
    - Swales will be used to convey and treat road runoff;
    - Bio-retention Areas will be provided extensively throughout the site by tree pits and planters on podium;
    - Trees/planting within the soil filled tree pits / raingardens will collect, store and treat runoff for small events (Interception) while providing amenity and biodiversity;
    - Permeable Paving / Open Graded Crushed Rock (OGCR) will be provided below hardstanding and landscaping on podium. The outfalls of each sub catchment will be limited / throttled to provide attenuation storage in the sub-base. The

removal of pollutants at source and a reduction of surface water runoff velocities at source will be provided. The surface water flows through the stone medium at first level of treatment of runoff before controlled release to SuDS components downstream;
- Attenuation Storage will be provided to ensure that there is adequate attenuation storage for the required limited discharge of surface water volumes.
- Limiting discharges from attenuation tanks will ensure that discharge rates are maintained below the greenfield runoff rate for SOIL Type 4;
- Catch Pits will remove sediments and silts upstream and downstream of all SuDS systems. The storm tech isolator row will capture any sediment which is not removed by catch pits upstream;
- A Petrol Interceptor will be provided for the treatment of all surface water runoff before it is discharged from site. A full retention oil separator (NSBA020) will separate oil and silts in accordance with EN858-1 and PPG3 from surface water before it discharges to the public surface water network;
- During the operational phase of the project trapped gullies will lessen debris discharging into the surface water system;
- SuDS components reduce urban runoff contamination;
- Best management drainage policies in accordance with SuDS will be implemented and incorporated into the design of the surface water drainage.
- Discharge will be made to this existing public surface water sewer via the proposed attenuation and flow control device (Hydrobrake). The proposed Hydrobrake restricts discharge.
- Discharge for the development will be restricted to a rate of 8.1/s to the Greenfield Runoff for SOIL Type 4 (5.26l/s/ha).

- In advance of work starting on site the works Contractor will author a Construction Methodology document taking into account their approach and any additional requirements of the Design Team or Planning Regulator. The Contractor will also prepare a Construction Management Plan and Environmental Plan.

- The Construction and Demolition Waste Management Plan in included as Appendix 15.1 of Chapter 15 – Waste Management. Monitoring shall be carried out as specified in any Discharge Licence associated with the construction phase of the project.

Chapter 11: Air Quality and Climate

- A Dust Minimisation Plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. A detailed Dust Minimisation Plan associated with a high level risk of dust impacts is outlined in Appendix 11.3. This plan draws on best practice mitigation measures from Ireland, the UK and the USA in order to ensure the highest level of mitigation possible.

- In summary some of the additional measures which will be implemented will include:

    - Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic;

- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads;
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions; and
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.
- At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

- Due to the close proximity of the site to a number of high sensitivity receptors, monitoring of construction dust deposition at these nearby sensitive receptors during the construction phase of the proposed development is recommended.

Chapter 12: Noise and Vibration

- With regard to construction activities, best practice control measures from construction sites within *BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2* will be used to control noise and vibration impacts.

- Noise-related mitigation methods are described below and will be implemented for the project in accordance with best practice. These methods include:
  - No plant used on site will be permitted to cause an ongoing public nuisance due to noise;
  - The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations;
  - All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
  - Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
  - Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;

- During construction, the contractor will manage the works to comply with noise limits outlined in *BS 5228-1:2009+A1 2014. Part 1 – Noise;*
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures;
- Limiting the hours during which site activities which are likely to create high levels of noise or vibration are permitted;
- Monitoring levels of noise and vibration during critical periods and at sensitive locations.
- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of good quality site hoarding to the site perimeters which will act as a noise barrier to general construction activity at ground level;
- Erection of barriers as necessary around items such as generators or high duty compressors, and;
- Situate any noisy plant as far away from sensitive properties as permitted by site constraints.

- Specific mitigation measures apply to the temporary school on the east boundary. In this instance consideration of sensitive hours will be required when undertaking the works most likely to cause the highest impacts (e.g. piling and demolition works).

- In terms of vibration management, it is recommended that the contractor is proactive in engaging with local sensitive receptors and should notify them of any works forecast to generate appreciable levels of vibration, explaining the nature and duration of the works.

- The contractor will be required to ensure construction activities operate within the noise and vibration limits set out within this assessment. The contractor will be required to undertake regular noise and vibration monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.

Chapter 13: Wind

- Mitigation measures proposed as part of the subject development include:

  - Landscaping: the use vegetation to protect buildings from wind,
  - Sculptural screening (solid or porous): to either deflect the wind or bleed the wind by removing its energy,
  - Canopies and Wind gutters: horizontal canopies are used to deflect the wind and redirect the wind around the building and above the canopy.

Chapter 14: Traffic and Transportation

- The construction stage will be dealt with by the appointed contractor through the development and implementation of a Construction Management Plan.

- The implementation of a Parking Management Plan which will include:
    - Early and ongoing engagement with residents with respect to the availability of car parking;
    - Provision of 10 No. parking spaces dedicated to use by a car club which will facilitate access to more sustainable, infrequent car usage that doesn't support commuting by car;
    - Strict control of access to car parking including on-site monitoring of car parking usage with associated control measures e.g. clamping.

- A development specific Travel Plan will be implemented at the site which sets out a series of measures to facilitate and encourage a positive modal shift towards more sustainable modes of transport.

- The signal plan in operation at Junction 1 should be optimised to cater for the altered traffic flows in the future years, particularly the Do-Maximum scenario. This would be expected to occur naturally as part of the junction operation through the existing junction controller and on-site vehicle detection measures already present.

- Monitoring will be required with respect to the parking management strategy at the development to ensure the appropriate usage of parking.

Chapter 15: Waste Management

- Adherence to the high-level strategy presented in the C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to DLRCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

- A quantity of soil, stone, gravel, clay and rock will need to be excavated to facilitate the proposed development. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

- Building materials will be chosen with an aim to 'design out waste';

- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery.

- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible. All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;

- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);

- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;

- All construction staff will be provided with training regarding the waste management procedures;

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and

- All waste leaving the site will be recorded and copies of relevant documentation maintained.

- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

- A project specific OWMP has been prepared and is included as Appendix 15.2. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development.

- On-site segregation of all waste materials into appropriate categories.

- All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available; and

- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

- The management of waste during the construction phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

- The management of waste during the operational phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

Chapter 16: Site Services (Civils)

The following mitigation measures are recommended for the construction phase of the development:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the project;
- Fuel and Chemical handling, transport and storage;
- Control of Water during Construction;
- Intrusive testing by the appointed contractor to establish the location of underground services in advance of works commencing on site;
- Consultation with relevant services providers in advance of works to ensure works are carried out to relevant standards and specifications including procedures to ensure safe working practices are implemented for works in the vicinity of services such as live gas mains, works in the vicinity of overhead electricity lines and live electricity lines and works to distribution watermains;
- Neighbouring sites are to be advised of construction methodologies in advance of works, in situations which may affect them;
- Protection in place of all underground services for which diversions are not required;
- All decommissioned infrastructure to be sent to a suitably licenced waste management facility;
- Construction methods used by the contractor are to be tailored to reduce, where possible, dust noise and air pollution; to minimise interference with the environment and the neighbouring areas;
- Any spoil or waste material generated from the construction process is to be temporarily stored at an approved location on site, before being removed to a suitably licenced waste management facility;
- All new infrastructure is to be installed and constructed to the relevant codes of practice and guidelines;
- Potable water supply networks and waste water infrastructure are to be pressure tested by an approved method during the construction phase and prior to connection to the public networks, all in accordance with Irish Water Requirements;
- Connections to the service providers are to be carried out to the approval and / or under the supervision of the Local Authority or relevant utility service provider, prior to commissioning;
- All new sewers are to be inspected by CCTV survey post construction; to identify any possible physical defects for rectification prior to operational phase;

- Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption;

- All excavations within the public area are to be back-filled in a controlled manner and surface re-instated to the satisfaction of the Local Authority.

The following mitigation measures shall be implemented with the construction of the potable water network:

- Provide a potable water supply in accordance with Irish Water Code of Practice for Water Infrastructure;

- The potable site supply connection will be metered with ABB Magmaster electromagnetic flow meters or similar approved;

- The proposed network connection will be metered and provided with associated hydrants and valves as per Irish Water requirements;

- Provision of a water meter will be fitted on the incoming watermain into each block and individual properties will be fitted with a Talbot Matrix meter box for monitoring purposes;

- New water saving devices (low water usage appliances and aerated taps etc.) will be fitted as standard into the proposed new units;

- All new potable water networks will be tested by means of an approved pressure test during the construction phase and prior to connection to the public sewer system in accordance to Irish Water requirements;

- The connections to the public sewer will be carried out under the supervision of the Local Authority and will be checked prior to commissioning;

- Prior to commencement of excavations in public areas all utilities and public services will be identified and checked, to ensure that adequate protection measures are implemented during the construction phase;

- All excavations within the public roads will be back-filled in a controlled manner and the public road will be reinstated to the satisfaction of the Local Authority;

- Traffic Management Plans and Method Statements for all works to be carried out will be prepared and assessed prior to commencement of the works. All construction methods used will be tailored to reduce, where possible, dust and noise and interference with residents in neighbouring developments;

- All spoil and waste material will be removed to an approved location and storage of construction materials in public areas will be minimised;
- All oil/diesel stored on-site will be in suitable containers which will be located in a purposed built bonded area which will provide containment in the event of accidental spills;

- All plant will be maintained in a designated maintenance area.

The following mitigation measures shall be implemented with the construction of the foul sewer network:

- All foul pipes to be designed and laid at gradients for self-cleansing velocities so drainage can be maintained under normal operating conditions;
- The proposed internal network pipes are to be slung to the underside of the podium slab and will be in accordance with TGD H – Drainage specifications;
- All new foul sewers will be tested by means of an approved pressure test during the construction phase and prior to connection to the public sewer system in accordance to Dublin City Councils requirements;
- All foul sewers will be inspected by closed circuit cameras (CCTV) to identify possible physical defects;
- The connection of the new foul sewers to the public sewer will be carried out under the supervision of the Local Authority and will be checked prior to commissioning;
- Prior to commencement of excavations in public areas all utilities and public services will be identified and checked, to ensure that adequate protection measures are implemented during the construction phase;
- All excavations within the public roads will be back-filled in a controlled manner and the public road will be reinstated to the satisfaction of the Local Authority;
- Traffic Management Plans and Method Statements for all works to be carried out will be prepared and assessed prior to commencement of the works. All construction methods used will be tailored to reduce, where possible, dust and noise and interference with residents in neighbouring developments;
- All spoil and waste material will be removed to an approved location and storage of construction materials in public areas will be minimised;
- All oil/diesel stored on-site will be in suitable containers which will be located in a purposed built bonded area which will provide containment in the event of accidental spills;
- All plant will be maintained in a designated maintenance area.

The following mitigation measures shall be implemented with the construction of the surface water sewer network:

- The filtering of surface water that is likely to be contaminated by soil particles in order to reduce the silting effects of these particles in the receiving downstream watercourse; and

- Construction of suitable silt traps prior to the surface water out-falling to the existing watercourse.

- In advance of work starting on site the works Contractor will author a Construction Methodology document taking into account their approach and any additional requirements of the Design Team or Planning Regulator. The Contractor will also prepare a Construction Management Plan and Environmental Plan.

Chapter 17: Site Services (Utilities)

- A GPR utility survey (and slit trench investigation as required) will be carried out along Blackthorn drive and at Carmanhall Road in advance of commencing road works to confirm the location of the power and telecommunication infrastructure.

20.0 DIFFICULTIES ENCOUNTERED

There have been no significant difficulties encountered during the preparation and compilation of this Environmental Impact Assessment Report.

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