THORNTON O'CONNOR
TOWN PLANNING

Lifecycle Report

Planning Application

In respect of a Build-to-Rent Residential Development

at

The former Aldi Site, Carmanhall 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 Planning Policy Context

This Building Lifecycle Report sets out the appropriate framework of responses and requirements that are required subsequent to the adoption of the *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities* (March 2018). This is to adhere to the requisite legal and financial arrangements to support the effective and appropriate resourcing and maintenance for the operation of proposed residential schemes.

Under the adopted Apartment Guidelines there is a requirement to consider the long-term running costs for each resident, in addition to considering how proposals are compliant with the Multi-Unit Development Act (2011), which is required in the assessment of apartment developments. As such, applications are now required to produce a '*Building Lifecycle Report'* which sets out the long term running and maintenance costs as they apply per residential unit at the time of making such a planning application. This Report must also demonstrate that the Applicant/Agent has considered measures and design choices which will aid in the effective management and reduction in costs to the benefit of future residents.

Section 6.13 of the Apartment Guidelines, 2018 requires that planning applications for apartment developments shall:

> *'include a building lifecycle report which in turn includes an assessment of long term running and maintenance costs as they would apply on a per residential unit basis at the time of application, as well as demonstrating what measures have been specifically considered by the proposer to effectively manage and reduce costs for the benefit of residents.'*

This Building Lifecycle Report responds appropriately to the requirements set out in Section 6.13 of the Apartment Guidelines.

1.2 Site Location

The subject site is located between Blackthorn Drive and Carmanhall Road and has an area of 15,426 sq m (1.542 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 1.1: **The Location of the Subject Site which Fronts Blackthorn Drive and Carmanhall Road.**

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

The subject site is bound by a mixed use residential scheme (Rockbrook Phase I) and a brownfield site (Rockbrook Phase II) which has recently been granted permission by An Bord Pleanála (Ref.: ABP-304405-19) for a mixed use development.

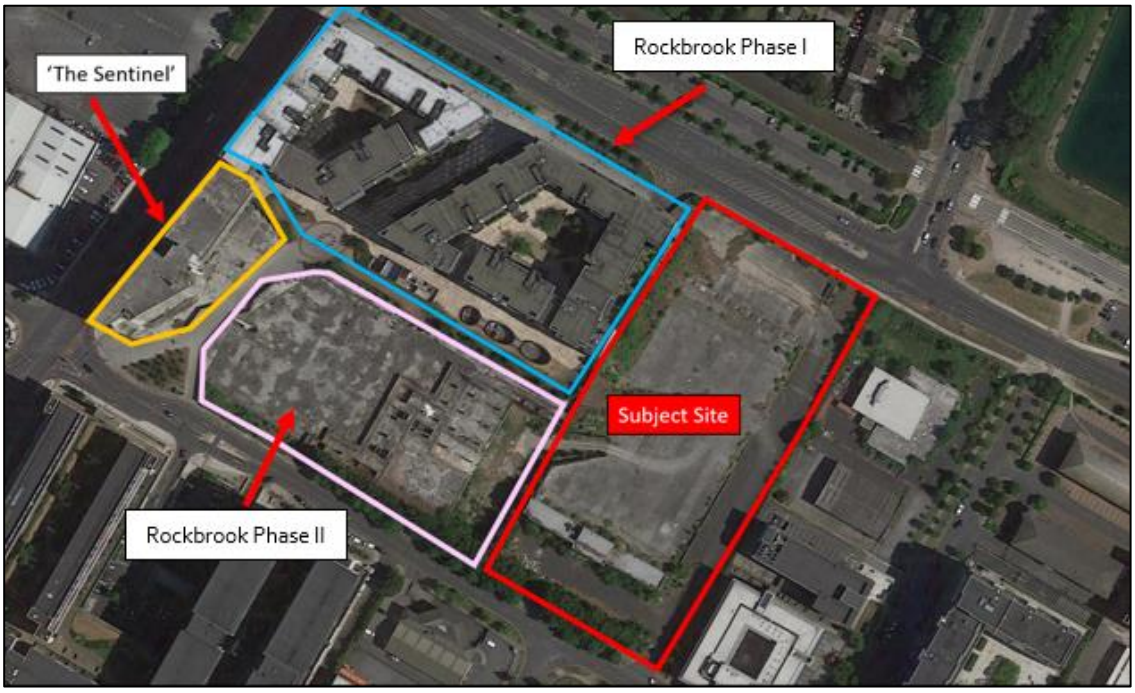

Figure 1.2: **Immediate Area of the Subject Site with Recent and Proposed Developments.**

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. Further north is characterised by suburban low density housing (typically 3 No. bed semi-detached dwellings), with the Stillorgan reservoir located to the north-east. South of the subject site is primarily commercial in nature with more recent mixed-use developments located within the Beacon Quarter as shown on the aerial photograph below.

Figure 1.3: **Wider Surrounding Context of the Subject Site.**
Source: **Google Earth, annotated by Thornton O'Connor Town Planning,2019.**

1.3 Description of Proposed Development

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.

1.3.1 Key Site Statistics

The following key statistics pertain to the subject lands and the proposed development:

Site Area:	15,426 sq m (1.54 ha)
Extent of Demolition proposed:	1,145 sq m
Gross Floor Area (above ground):	49,342 sq m
Gross Floor Area (including carpark Lo & L1):	58,931 sq m
Site Coverage:	31.6%
Plot Ratio:	3.20
No. of Units per Ha.	366 No.
Communal Internal Amenity Space:	1,095 sq m
Car Parking Spaces:	285 No.[254 No. at Level 0 and 31 No. at Level 1]
Cycle Parking Spaces:	1,178 No.

Proposed Heights	
Block	**Maximum Height**
A	34.63 metres
B	25.62 metres
C	16.63 metres
D	52.38 metres
E	31.63 metres
F	43.63 metres

1.4 Preparation of this Report

This Report has been collated by Thornton O'Connor Town Planning in conjunction with the wider design team as follows:

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2.0 ASSESSMENT OF LONG TERM RUNNING AND MAINTENANCE COSTS

2.1 Property Management Company, Owners Management Company and Common Areas

A Property Management Company will be engaged at an early stage of the development to ensure that all property management functions are dealt with for the development and that the maintenance and running costs of the development's common areas are kept within agreed budgets. The Property Management Company will enter into a contract directly within the Owners Management Company (OMC) for the ongoing management of the completed development (it is intended that this contract will be for a period of c. 1 – 3 years and in the form prescribed by the Property Services Regulatory Authority (PSRA)).

The Property Management Company will have the following responsibilities for the development once completed:

- Timely formation of an OMC. All future purchasers will be typically obliged to become members however, this proposal is for a Build-to-Rent development where all apartments will be owned by the OMC, with potentially only the Part V or social housing units owned separately;
- Preparation of annual service charge budgets for the development's common areas;
- Allocating of the annual operational charges in line with the Multi Unit Development (MUD) Act 2011 (equitable division);
- Engagement of independent legal representation on behalf of the OMC in keeping with the MUD Act 2011 – including completion of Developer OMC Agreement and transfer of the common areas;
- Estate Management / Third Party Contractors Procurement and Management;
- OMC reporting / accounting services / corporate services / insurances management;
- After hours services; and
- Staff administration.

2.2 Service Charge Budget

The Property Management Company will have several key responsibilities most notably, the compiling of the service charge budget for the development for agreement with the OMC.

In accordance with the MUD Act 2011, the service charge budget typically covers items such as cleaning, landscaping, external lighting, building heating and hot water systems, refuse management, utility bills, insurances, maintenance of mechanical / electrical lifts / life safety systems, building security and property management fees within the development's common areas.

This service charge budget also includes an allowance for a sinking fund and this allowance is determined following the review of the Building Investment Fund (BIF) report prepared by the OMC.

The BIF report once adopted by the OMC, determines an adequate estimated annual cost provision requirement based on the needs of the development over a 30-year cycle period, as required by the Multi-Unit Developments (MUD) Act, 2011. In line with the requirements of the MUD Act 2011, the members of the OMC will determine and agree each year at a General Meeting of the members, the contribution to be made to the Sinking Fund, having regard to the BIF report produced.

Notwithstanding the above, it should be noted that the detail associated with each element heading in the BIF report, can only be determined after detailed design and the procurement and construction of the development.

3.0 MEASURES TO MANAGE AND REDUCE COSTS

3.1 Treatments, Materials and Finishes

The materials specified are simple, thoughtful and robust bringing a new dynamic of materials to the Sandyford neighbourhood. The predominant material used within the scheme is brick in an array of shades. The material palette is designed to create a unified 'neighbourhood' feel, with brick in complementary tones. Visual interest and a sense of individual building identity is created through subtle changes in brick colour from block to block. Brick is used due to its durability, robustness and grounds the scheme within its residential context.

The brick facades work in contrast, to the window frames, balustrades, copings and gates which are in tonal greys to tie these elements into the wider material strategy for the scheme. The ground floor of the scheme is generally clad in metal with a glass reinforced concrete (GRC) paneling system finished with a satin charcoal grey colour coating. This offers residents and visitors an element of way-findings through the scheme. The metal cladding has been introduced at key nodes within the development (balcony fascia and soffits, set-backs ground floor units) due to its robustness and ease of maintenance. The foyer and reception areas are designed as bright and welcoming spaces with glass, metal and brick being used due to their robustness.

At ground floor level, the water-based landscape proposal together with virtual enclosures in polyester powder coated metallic screens 'popping out' of the building envelope, defines the private open space and provides privacy and screening for the ground floor apartments. The material selection has been chosen with care to enhance the soft landscape elements and to create a distinctive neighbourhood within Sandyford. The public and communal amenity spaces provide different character areas for varying age groups in the development. The material palette chosen for the landscaping elements is robust and durable and is described in detail in the landscaping section.

All materials outlined above will help create buildings that resist deterioration over time. The building and open space elements can be easily maintained and managed by the future operators of the scheme.

Appropriate safety systems are incorporated into the roof design for safe access and maintenance.

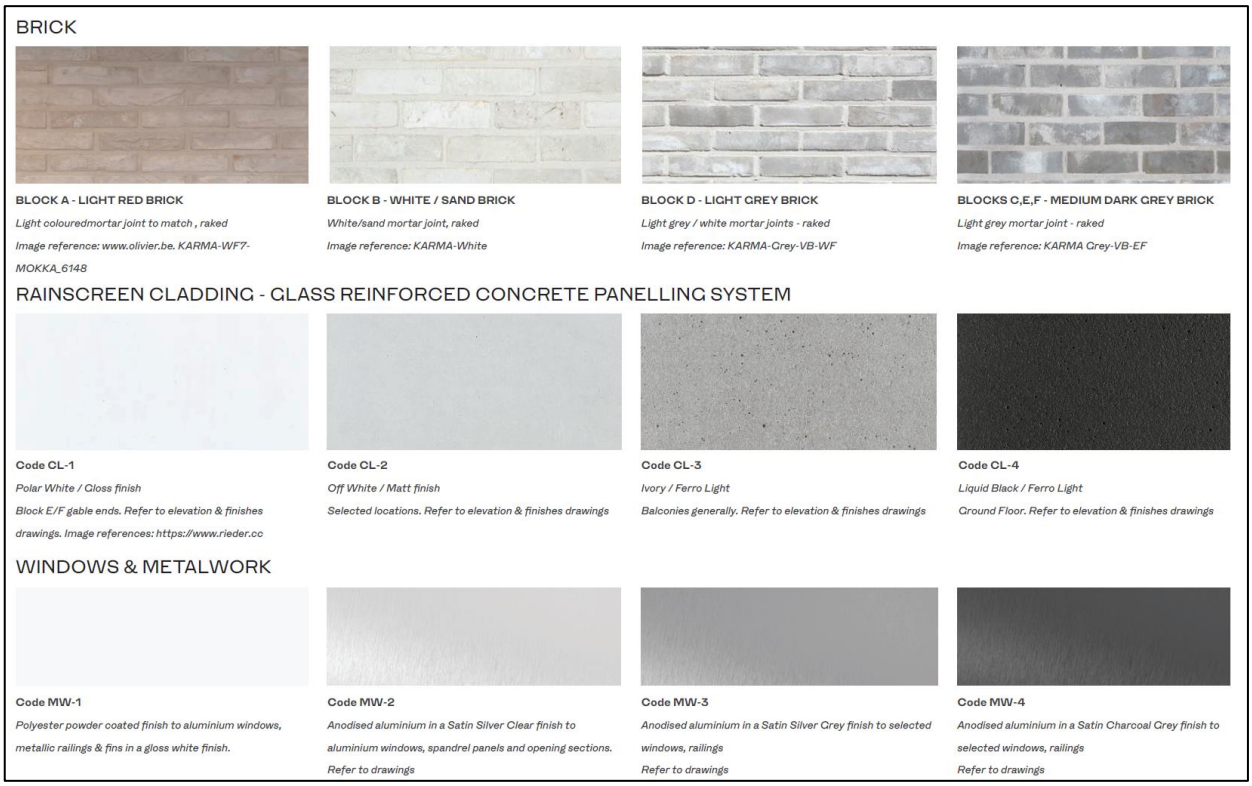

Figure 3.1: Proposed Material Palette.

Source: Henry J Lyons Architects, 2019.

3.1.1 Buildings

The proposal consists of 6 No. Blocks with a north-south pedestrian link between Carmanhall Road and Blackthorn Drive and an east/west connection into Rockbrook phase II. The scheme has been designed with consideration of the envisaged public open space as set out within the *Sandyford Urban Framework Plan 2016-2022* which is located on the south side on Carmanhall Road.

The scheme provides for a total of 564 No. apartments on ground and upper floors. Apartments were designed in line with the provisions of the *Sustainable Urban Housing Design Standards for New Apartments, 2018* with a dual aspect ratio of 57% exceeding the minimum requirements set out in the guidelines.

The slope of the site is used to accommodate a basement and semi basement for car parking and ancillary accommodation, creating a car-free "podium" level with open amenity spaces for the use of residents. As part of the Build to Rent proposal resident amenities are provided in Block C, D and A, located at either entrance to the scheme.

While floor plates were designed to maximise the efficiency of vertical circulation cores, the central corridors have been provided with external windows wherever possible. Apartment glazing areas have been carefully considered with floor to ceiling windows to ensure each apartment receives adequate natural daylight. The site layout ensures that the courtyards receive sufficient sunlight throughout the day. The proposed buildings are designed to be built and certified under BCAR to ensure compliance with all aspects of the Building Regulations.

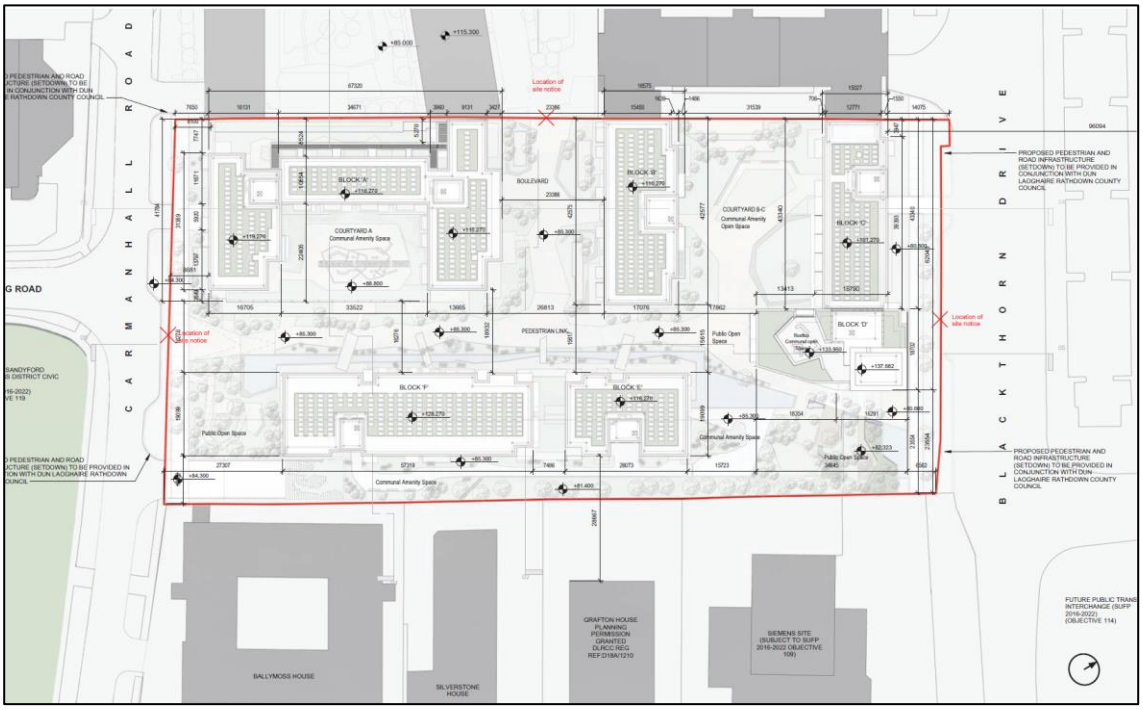

Figure 3.2: Proposed Site layout.

Source: Henry J Lyons Architects, 2019.

3.1.2 Construction Methodology

The construction methodology proposed with high quality detailing and materials will maximise efficiency and indoor environment quality. The structural scheme for the proposed building consists of concrete frame construction with brick or brick panel system, or rainscreen cladding as outer leaf. A flat roof system and associated sedum / green roof system is proposed on tapered insulation designed to fall on the concrete slab and discharged at ground floor level for further attenuation.

Balconies comprising of their structural elements, treated timber deck floors and the balustrade system comprising metallic post and rails in a polyester powder coated finish and safety glass infill panels are intended to be pre-fabricated off site with certified quality controls and mounted onto the building fabric through a "Glide-on" system.

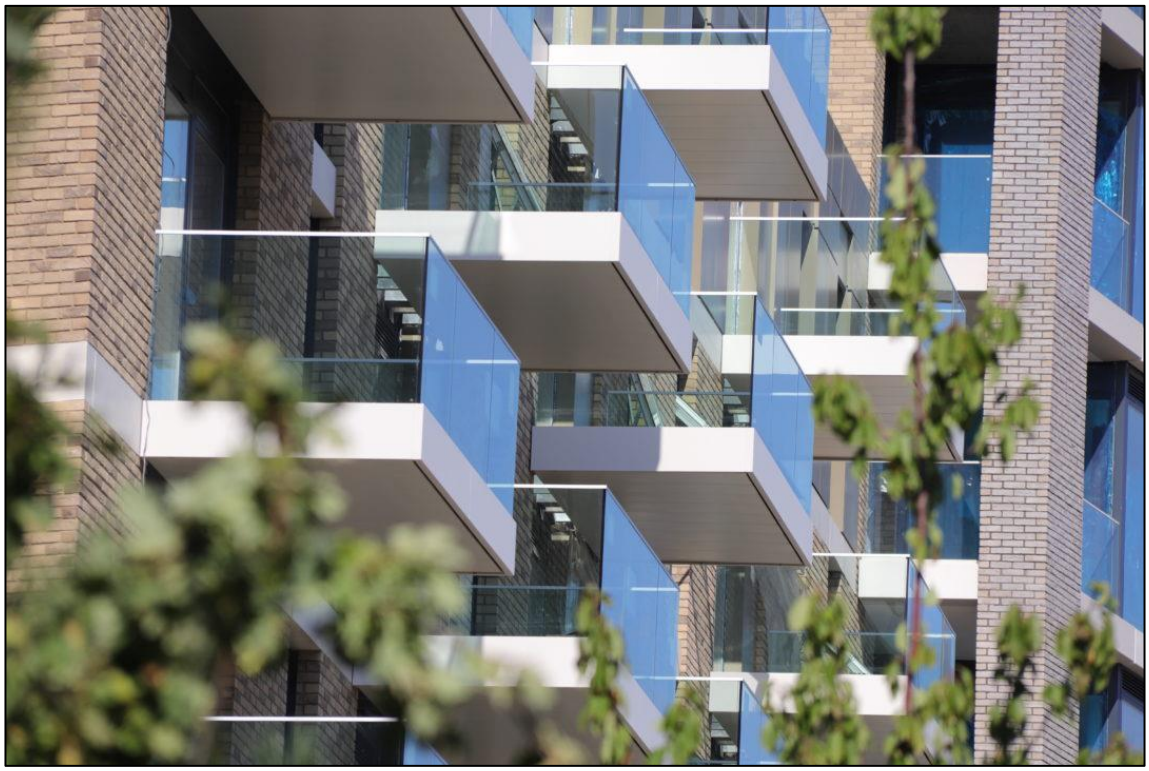

Figure 3.3: **Sample prefabricated balcony system.**

Source: **www.saphire.eu, 2019.**

Anodised aluminium or polyester powder coated aluminium windows and doors, balustrade systems to balconies are the secondary building elements that will help reduce construction and maintenance costs throughout the lifecycle of the building.

Figure 3.4: **3D visualization and sample image for proposed Block F.**

Source: **Henry J Lyons Architects, 2019.**

3.1.3 Material Specification

Consideration is given to the requirements of Building Regulations in relation to durability and design life. The development is designed to incorporate the guidance and best practice principles to ensure that the long term durability and maintenance of materials is an integral part of the design and specifications of the proposed development.

High quality brickwork is proposed on the external facade. These will not require ongoing maintenance or associated costs. The use of robust factory finished windows, doors and glass balustrade balconies will also reduce ongoing maintenance costs

Figure 3.3: CGI of Proposed Scheme.

Source: Visual Lab, 2019.

3.1.4 Landscaping

The landscape design has taken the nature of the site and the context of the wider area in Sandyford into account in order to create an environment that will be enjoyed by it is users by proposing durable materials and a sustainable drainage system. The landscape design is seeking to withstand the test of time with planting well considered so that it can thrive in the weather

conditions of the area. Over time the landscaping will mature and look better. The following details will benefit the future residents of the scheme.

3.1.4.1 Green Roofs

The use of green roofs and traditional roof coverings with robust and proven detailing to roof elements.

Benefit: Water attenuation reduces the burden on vulnerable rainwater goods, resulting in fewer elements that could require replacement or repair.

3.1.4.2 Hard Landscape/Paving Surfacing Materials

The use of good quality paving and in situ concrete aggregate as external surfacing

Benefit: The use of a stone paving material will ensure that it is widely accessible for any future repairs that may be needed. Furthermore, the in situ concrete is a durable material that can last a lifetime.

3.1.4.3 Hard Landscape/Other Materials

Robust metal (such as corten type) and concrete upstands are used to form planters along the podium. High quality metal light fittings are also proposed for this project. In addition to steel railings proposed for the boundaries of the project.

Benefit: The selection of those materials will give a long lifespan to the hard landscape and will require less frequent maintenance.

3.1.4.4 Soft Landscape/planting

The selection of suitable planting types for different areas around the site will ensure the longevity of the soft landscape. Planting on raised planters located on podium and roof levels will be drought tolerant. Planting in different areas that receive less sunlight will be shade tolerant. A mixed selection of plants will be able to provide year round nectar and shelter. In addition, gadgets such as tree anchoring systems and supports will be made of durable materials.

Benefit: The selection of drought tolerant planting will withstand wind, dry conditions and the rising of the temperatures due to the climate change. The extended flowering period of the planting provides food and shelter to a big number of living organisms and boosts the ecology of the area.

3.1.5 Waste Management

AWN Consulting have set out the following measures in relation to waste management which will be utilised within the scheme and will benefit the future residents.

3.1.5.1 Construction and Demolition Waste Management Plan

A Construction and Demolition Waste Management Plan prepared by AWN Consulting is enclosed as Appendix 15.1 of the accompanying Environmental Impact Assessment Report.

Benefit: The Plan demonstrates how the scheme will comply with national, regional, and local waste legislation along with best practice.

3.1.5.2 Operational Waste Management Plan

Similarly, an Operational Waste Management Plan prepared by AWN Consulting is enclosed as Appendix 15.2 of the accompanying Environmental Impact Assessment Report.

Benefit: The OWMP will demonstrates how the scheme has been designed to comply with national regional, and local waste legislation, the DLR Guidelines and with best practice.

3.1.5.3 Storage of Non-Recyclable Waste and Recyclable Household Waste

Inclusion of centralised communal waste storage areas, with enough space to accommodate weekly storage of bins for dry mixed recyclable, glass, organic waste and mixed non-recyclable waste.

Benefit: Easily accessible by all residents, facilities management personnel and the waste contractor(s), minimises potential littering of the scheme, reduce potential waste charges and does not limit waste contractor selection.

Domestic waste management strategy:

- Dry mixed recyclable, glass, mixed non-recyclable waste and organic waste segregation.

Benefit: Helps reduce potential waste charges and does not limit waste contractor selection.

- Security restricted waste storage rooms.

Benefit: Reduce potential for fly tipping by residents and non-residents.

- Well signed waste storage rooms and bins.

Benefit: Help reduce potential cross contamination of waste and reduce waste charges.

3.1.5.4 Composting

Organic waste bins to be provided in the communal waste storage areas.

Benefit: Helps reduce potential waste charges and compliance with national policy and legislation regarding segregation of biodegradable waste.

3.1.6 Human Health and Wellbeing

The apartments have been designed with the health and wellbeing of the user in mind. The design team considered the quality of the shared living spaces and the importance of natural daylight by providing large glazed windows and generous floor to ceiling heights. In addition, all units will comply with the accessibility requirements as required by building regulations and the scheme is designed to incorporate passive surveillance of communal areas. Screens will be provided to adjoining balconies for the residents' privacy residents and to avoid overlooking.

Acoustic insulation and attenuation have been considered from the outset in the specification of party walls, internal walls and slabs and will be in line with the standards set out in the Building Regulations.

Ventilation will comprise of a mixed system including a high efficiency balanced mechanical ventilation system, with opening windows for purge ventilation, in line with the requirements set out in the Building Regulations.

Another factor in the health and wellbeing proposal of the scheme is the internal communal amenity spaces. These areas will provide spaces for residents to gather, relax, work and exercise which will foster a sense of community. Amenities are located at both entrance points ensuring active frontage and easy access for residents.

The garden design of the scheme is integral to the health and wellbeing approach of the development. Upon entering the proposed open spaces, residents can explore elements for social interactions, play and rest.

A function room designed as a glass pavilion and an associated communal amenity open space and roof garden will provide residents with a unique social space to encourage social interaction amongst the residents overlooking spectacular views of the sea and the Wicklow mountains.

3.1.8 Residential Management

3.1.8.1 Owner / Operator

The management of the property will ultimately be the responsibility of the final purchaser / owner and operator of this Build-to-Rent scheme. Consideration has been given to ensure that the purchaser / owner has a clear understanding of the property. Owner packs will be provided to building operator of the Build-to-Rent scheme. This will provide information to the purchaser in relation to their new property. This pack will typically include information in relation to connections with utilities and communication providers, contact details for all relevant suppliers and instructions for the use of any appliances and devices in the property. An Operational Management Plan has been prepared by Hooke and McDonald and is submitted with this application.

3.1.7.2 Tenants

Tenant packs prepared by the OMC will also be provided and will include information on contact details for the managing agent, emergency contact details, transport details and a clear set of rules and regulations for tenants of the property. This will ensure residents are appropriately informed, so any issues can be addressed in a timely / efficient manner and cost-effective manner. This will ensure the successful operation of this Build-to-Rent scheme.

3.2 Energy and Carbon Emissions

This section sets out various energy conservation measures which are proposed in order to reduce costs for future residents of the scheme.

The proposed development will comply with Part L 2019 (NZEB). As part of the development's efforts to further reduce energy consumption, the project is targeting an A2/A3 BER (Building Energy Rating) throughout. Extensive work has been carried out to develop a balanced design approach to achieve these onerous targets with a number of sustainable features being incorporated into the design from the early stages.

3.2.1 Design

The building includes the following number of energy conservation measures in aiming to achieve the best energy performance as possible, as following:

- High-performance thermal envelope - to include low U-values and better than required g-values;
- Air tight construction;
- Mechanical ventilation system with Heat Recovery;
- Mechanical Whole-House Extract Ventilation;
- Combined Heat and Power (CHP) Technology;
- Exhaust Air Heat Pump (EAHP) Technology;
- Photo-Voltaic (PV) Panels; and
- Energy efficient lighting to be used throughout.

The sustainable design of the proposed development ensures that each unit in the development performs efficiently and complies with the upcoming NZEB criteria. The sections below outline the elements (based on passive and active measures) that aid in the reduction of energy consumption, carbon emissions and cost throughout the building lifecycle. The table also provides information to be used in the DEAP assessment for each specific unit in the development:

3.2.1.1 High Performance Construction Fabric

The construction U-values being analysed for each unit within the development is outlined in the building regulations Technical Guidance Document – Part L (2019). The performance

requirements in Part L (2019) perform better than the U-value requirements set out in the previous Part L (2011) document.

- **Current U-value Requirements: (W/m².k)**
- **Window = 1.40 (g-value ≥0.63)**
- **Wall = 0.18**
- **Roof = 0.18**
- **Floor: 0.18**

High-performance building fabric elements are being considered and selected in order to minimise unnecessary heat loss from the internal spaces.

During analysis of the development's beneficial properties, a number of passive designs has been considered for use throughout. One method of passive design is the window design intent of maximising daylight and solar heat gains where achievable in order to reduce the artificial lighting and space heating load requirements. In addition, trying to minimise solar gains during the summer months to reduce the risk of dwelling overheating issues, to be in accordance with CIBSE TM59 criteria.

In addition to the reduction in energy consumption and associated carbon emissions for space heating and ventilation through a high performance fabric, high efficiency heating systems are being proposed for use throughout the development. Both systems currently being investigated are renewable energies which are high efficiency and proven systems. This has a net effect of further reducing embodied energy consumption associated with the wasteful use of fossil fuels, as well as the reduced input now required from the national electricity grid and from fossil fuel sources (natural gas).

Outcome: Minimising heat losses through the buildings fabric as well as a lower then required air permeability rate, helps to ensure lower energy consumption rates and associated carbon emissions are achieved throughout the year.

Reduces overall cost of heating for the end user.

3.2.1.2 Air Tightness Construction

The building will be designed to ensure it will achieve compliance and also exceed the air tightness requirements outlined in the Part L (2019) TGD document.

The current proposal for air tightness in the Part L document is set to a maximum value of 5.0 m3/hr/m2 @50Pa. The development will aim to achieve an air tightness rate ≤ 3.0 m3/hr/m2 @ 50Pa (or ≤ 0.15 ach infiltration equivalent) per dwelling.

Outcome: Minimising heat losses through the building fabric, in addition to an increased air tightness level, ensures that there is a reduction in heating load requirements. This reduces equipment sizes and also the energy and carbon footprints as a result

3.2.1.3 Thermal Bridging

The limitation of thermal bridging will be achieved in accordance with guidance under Section 1.3.3 and Appendix D within the Technical Guidance Document Part L (2019) regulations.

To account for thermal bridging performance from Part L (2019), it is a recommendation for performance between the junctions to achieve less than a 0.05 W/m2.K value upon completion of required thermal bridge assessments.

When the detail of elements between key junctions are known, the transmission heat loss coefficient shall be calculated using Psi values, based on confirmed construction details.

Outcome: A better than required thermal bridging factor will aid in minimising heat losses at junctions between construction elements, thus further lowering energy consumption and carbon emission rates.

Thermal bridging recommendations should be incorporated as much as practically possible in order to allow a greater reduction in heat loss of the façade elements.

3.2.1.4 Daylight and Lighting

Provision for natural daylight in modern buildings helps to create a better internal environment for occupants and helping to assist in the well-being of the inhabitants.

Daylight can also represent an energy source through the reduction in the reliance on artificial lighting. The provision of higher levels of glazing maximises the use of natural daylight to help further enhance visual comfort, without compromising thermal performance. This will require further analysis to ensure the requirements of CIBSE TM59 are also adhered to in relation to overheating criteria.

All light fittings are to be based on LED type (A+ Rated bulb) located throughout each occupiable space, such as bedroom, lobby, living/dining etc. A significant reduction in electrical energy usage may therefore be achievable through the use of high efficiency lights.

Outcome: Enhance healthier residence environment through the maximisation of natural daylight.

Reducing electrical load whilst also maximising internal comfort will aid in reducing the overall energy usage and carbon emission footprint of the development.

Minimising the time required for controlling the lighting system by increased daylight levels, thus further reducing running costs to occupants.

3.2.1.5 HVAC systems

Ventilation System

Each apartment is to be fitted with a high efficiency balanced mechanical ventilation system in order to sufficiently ventilate each dwelling space.

There are two options currently being analysed for use within the development.

i) The first is a 'mechanical ventilation with heat recovery system (MVHR). The unit works by extracting warm, stale air from 'wetrooms' (kitchen, utility, bathroom, etc.), and extracting the embodied energy (heat) from this exhaust air and re-introducing this captured energy into the incoming fresh air.

ii) The second option is the introduction of a 'whole house extract ventilation system' (MEV), which like option 1, operates by extracting warm, stale air from dwelling wetrooms, but then re-directs the embodied energy to produce hot water for both space heating and DHW production.

The specific fan power of the mechanical ventilation system is to be selected upon achieving a SFP rating of 0.7 (W/l/s) or better.

As part of the developments strategy in achieving compliance with Part L (2019) renewable obligations, 2 No. systems are currently under analysis for use within the development.

Combined Heat and Power (CHP) and Exhaust Air Heat Pumps (EAHP).

In order to comply with building regulations, 20% of the primary energy delivered to a dwelling (i.e. apartment) must be achieved through the use of renewable energy technologies. Both CHP and EAHP systems are classified as renewable technologies under Part L (2019).

i) Combined Heat and Power (CHP) System with Gas Boiler backup

The local district heating system will be integrated into the design for all apartments in the development. This allows each apartment access to space heating and hot water.

The primary system which is CHP provides the building with space heating and hot water requirements throughout the year. In addition to this, CHP also provides the building with electricity.

During the peak hours of operation, the secondary heating system (gas condensing boilers) becomes active.

The operational efficiencies are increased due to both the primary and secondary systems running simultaneously.

ii) Exhaust Air Heat Pump (EAHP) System

Exhaust air heat pumps collect warm air as it leaves a building via the ventilation system and then reuses the heat that would otherwise be lost to the outside environment to heat water stored in a cylinder. Exhaust air heat pumps operate on a similar basis to other heat pumps, such as air source heat pumps and are also suitable for providing all space heating and hot water requirements for residential dwellings. EAHPs are also highly efficient systems with efficiencies ≥500% often achievable.

Outcome:
Both mechanical ventilation options have highly efficient operating cycles.
Heat recovered via exhaust air from wet rooms allow for a greater reduction in energy requirements, thus reducing the heating load requirements. This in turn increases heating plant operating performance overall.

In addition, both systems increase occupancy satisfaction rates by ensuring fresh, clean air is introduced at a steady rate and minimises dust/pollutants.

There are many cost-saving advantages to having district heating in a home. District heating allows the occupant to decide when, where and how much energy is needed. It also ensures thermal comfort as well as providing domestic hot water.

The use of heat pump technology allows for the use of a highly efficient system which can generate both space heating and DHW for use within each dwelling. No central energy centre required with this option as each apartment contains all necessary equipment.

Both options presented reduce the reliance on on-grid electricity as well as resulting in lower running cost for the end user. A reduction in energy requirements as well as the developments carbon footprint also seen as a result.

3.2.1.6 Renewable Technologies (CHP, EAHP and PV)

In addition to the systems discussed in the above, the inclusion of PV panels are being considered for use within the development. The renewable requirements of the Part L (2019) document stipulate a value of 20% of primary energy savings must come from renewable sources.

As a result, the extra provision of PV panels are being analysed in order to ensure that the required renewable energy targets can be readily achieved within the proposed development.

Outcome: The incorporation of additional renewable technologies (as required) will help to ensure a high percentage of primary energy comes from renewable sources. All renewable options presented help to reduce reliance on electricity on-grid as well as resulting in lower running cost to the end user. A reduction in energy requirements as well as the developments carbon footprint also seen as a result.

3.2.1.7 Hot Water System and Appliances

Low flow sanitary ware (≤6 ltrs/min) to be specified throughout. This is a way to further reduce unnecessary energy waste by restricting flowrates sufficiently. All hot water taps, including the shower head fittings, are to reach a maximum flow of six litres per minute, to allow for the conservation of water use as well as reducing energy used to heat hot water.

Outcome: Through the restriction of hot water usage, demands on the heating plant (CHP/EAHP) are reduced. As a result, equipment size can also reduce. This reduces cost of utility bills to tenant by also reducing equipment operating hours.

3.2.1.8 Heating Interface Unit (HIU) – CHP Option

A HIU is an integrated solution for delivering and recording the heat consumed by each apartment within a development. Robust and cost-effective solution to heating and hot water distribution.

HIU's allow an occupant to monitor and control their real-time heating usage and hence gives them a clearer picture of how to reduce their energy and carbon footprint.

An alternative to the HIU is achieved through the use of the EAHP. This omits the need for a HIU as all system elements are located within a centralised unit within each dwelling.

Outcome: Acts as a positive incentive for an occupant to reduce energy consumption and conserve energy in general.

3.2.1.9 Building Energy Management System

Central BMS allows for the metering of energy for all individual floors in order to monitor energy use. The energy management system will continuously review and fine-tune the operational efficiencies which will in turn help reduce the tenants overall energy consumption and carbon footprint as well as reduce energy costs.

Outcome: Further energy saving can be achieved by continuous energy monitoring. This is quantified by assessing the building lifecycle and allows for the lowering of the overall cost and carbon footprint.

3.2.2 Near Zero Energy Building Standard (NZEB)

The NZEB method of assessment is based on the *Technical Guidance Document (TGD) Part L (2019) – Conservative of Fuel and Energy*. This document sets out the minimum energy performance requirement for buildings required to achieve the Nearly Zero Energy Buildings standard.

The Part L (2019) document states that:

> "*Any new residential new building should be designed and constructed so as to ensure that the energy performance of the building is such as to limit the amount of energy required for the operation of the building and the amount of carbon dioxide (CO2) emissions associated with this energy use insofar as is reasonably practicable*".

The Energy Performance of Buildings Directive (EPBD) set out targets to be achieved by European countries in relation to energy conservation. For new dwellings, the requirements of the above should be met by:

> "*providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources including energy from renewable sources produced on-site or nearby*"

The Dwelling Energy Assessment Procedure 3 (DEAP 3) software is being phased out and replaced by an updated version of the software in order to correctly account for the new NZEB targets (DEAP 4). As such, preliminary analysis was performed in both software packages to ensure compliance can be achieved throughout each apartment in the development regardless of the software package used.

As a result of the analysis carried out on the proposed development, it can be concluded that, all units within the proposed development has been shown to achieved Part L (2019) compliance with respect to MPEPC and MPCPC values for both energy and carbon performance requirements. As a result of this, overall NZEB compliance can be shown throughout the proposed development.

3.2.3 Transport and Accessibility

The subject site is well served by public transport particularly as result of the proximity to the green luas line. As noted at Section 1.2 the subject site is ideally located in proximity to a range of services and facilities that can be accessed by walking, cycling and public transport.

The proposed development provides 285 No. car parking spaces including electric vehicle car parking spaces and 1,178 No. bicycle parking spaces. The provision of this quantum of bicycle parking spaces and the proximity of the site to public transport will reduce the reliance on the private car therefore minimising impacts on the environment.

3.2.3.1 Cycling

The National Transport Authority – Greater Dublin Area Cycling Network (2013) proposes regional cycle network upgrades for Dublin City and satellite settlements. We refer to the existing and proposed cycle networks as illustrated below:

Figure 3.4: **GDA Cycle Network Plan Illustrating the Existing Cycle Facilities Surrounding the Subject Site.**

Source: ***NTA Greater Dublin Area Cycle Network Plan (2013)*, annotated by Thornton O'Connor Town Planning, 2019.**

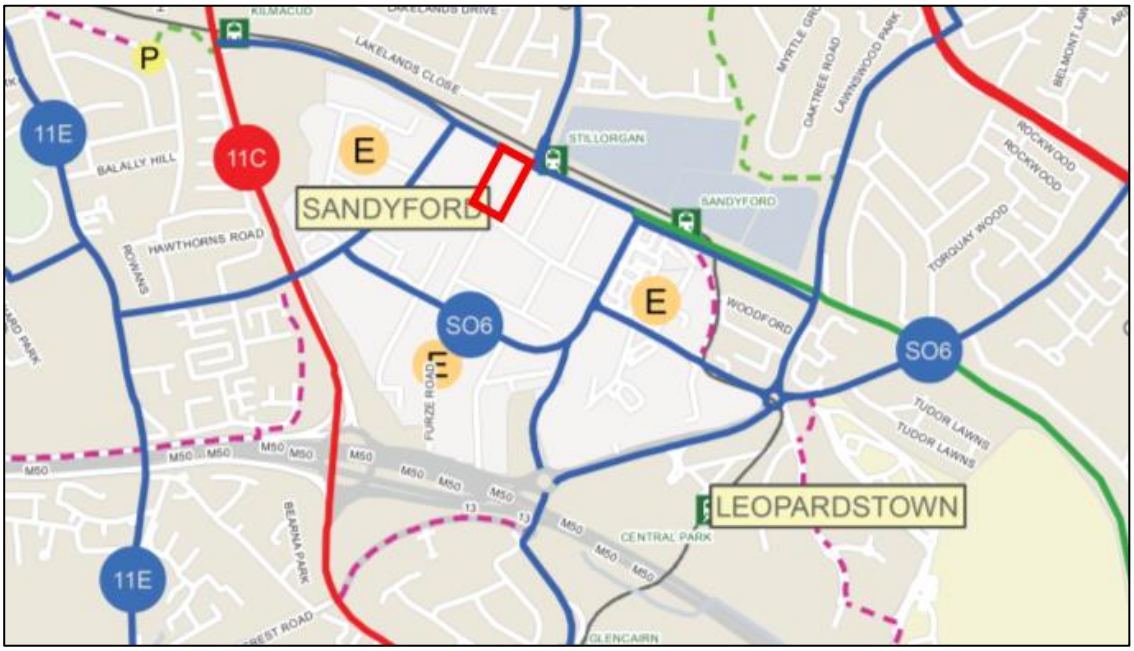

Figure 3.5: **GDA Cycle Network Plan Illustrating the Proposed Cycle Facilities Surrounding the Subject Site.**

Source: ***NTA Greater Dublin Area Cycle Network Plan (2013)*, annotated by Thornton O'Connor Town Planning, 2019.**

On a local level, the *Dún Laoghaire-Rathdown Development Plan 2016-2022* sets out a plan to provide radial and orbital cycle routes through the County as shown below:

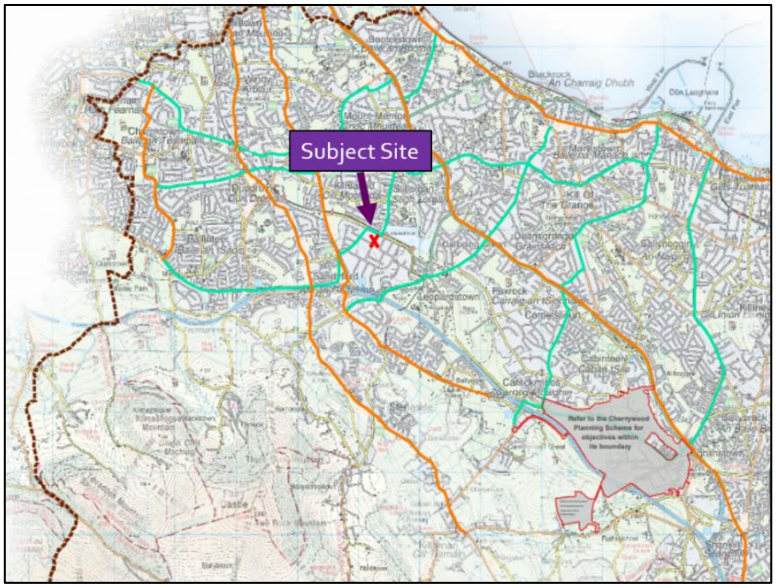

Figure 3.6: **Map Illustrating the Existing Radial Cycle Route (orange) and Orbital Cycle Route (teal) Surrounding the Site (Red X) (Indicative Only).**

Source: ***Dún Laoghaire-Rathdown Development Plan 2016 -2022.***

The *Sandyford Urban Framework Plan 2016-2022* has also made provisions for improvements to the walking and cycling facilities of the area as illustrated at Figure 3.9. The SUFP proposes improvements and connections which will make the environment safer for pedestrians, including elements of traffic calming and a proposed 30 Km/h zone which encompasses the subject site.

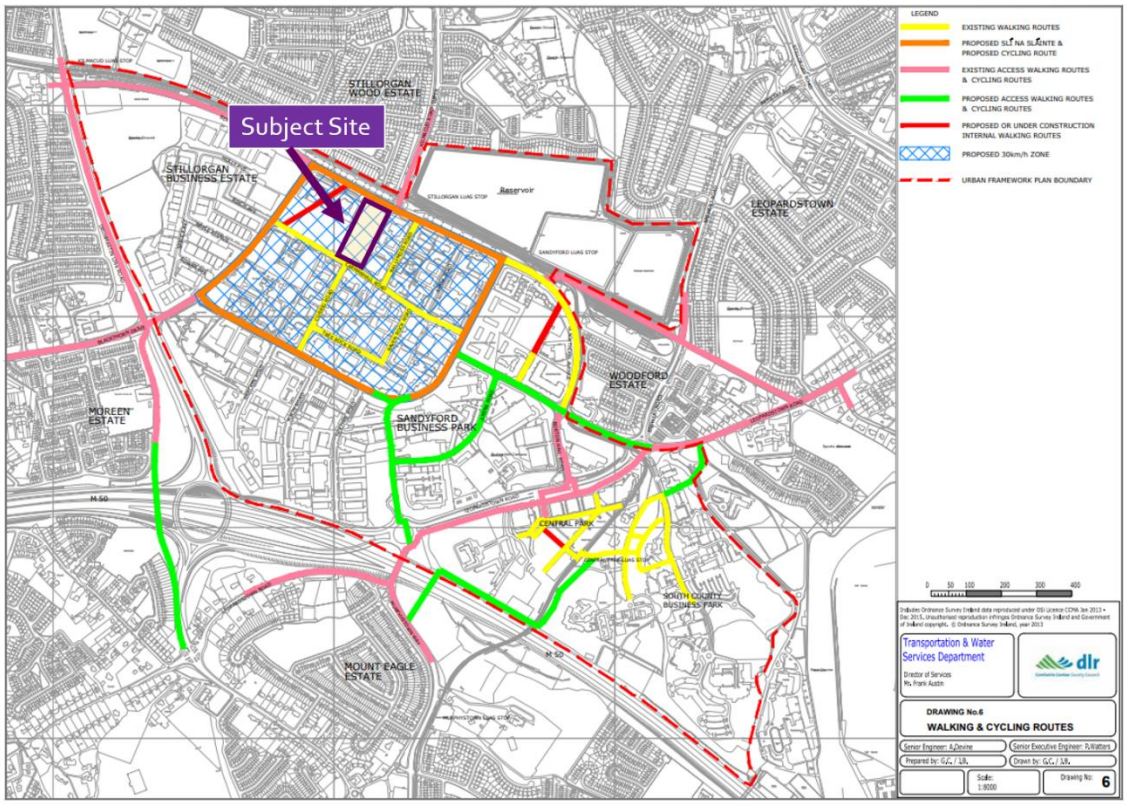

Figure 3.7: **Local Level Walking and Cycling Improvements Proposed within the SUFP.**

Source: ***Sandyford Urban Framework Plan 2016-2022*, Walking and Cycling Routes, annotated by Thornton O'Connor Town Planning, 2019.**

Benefit: The existing and proposed cycle networks that serve the site will allow for residents to easily commute to their place of employment and/or utilise existing services and amenities in the surrounding area whilst promoting a healthy and active lifestyle.

3.2.3.2 Bus Services

The following bus services are provided within the immediate area of the subject site:

Bus Services				
Route No.	**Direction/ Bus Stop**	**Distance to Stop**	**Peak Frequency**	**Off-Peak Frequency**
11	Wadelai Park to Sandyford Business District	c. 50 m	10-20 mins	30 mins
47	Poolbeg Street to Belarmine	c. 115 m	30 mins	Hourly
116	Ticknock to Blackrock Dart Station	c. 115 m	-	Daily

It is noted that the Aircoach (Route No. 700) serves the Sandyford Luas stop (every c.15- 30 mins), located c. 445 m to the east of the site. We note that there are a number of additional bus routes accessible within a short distance as illustrated below.

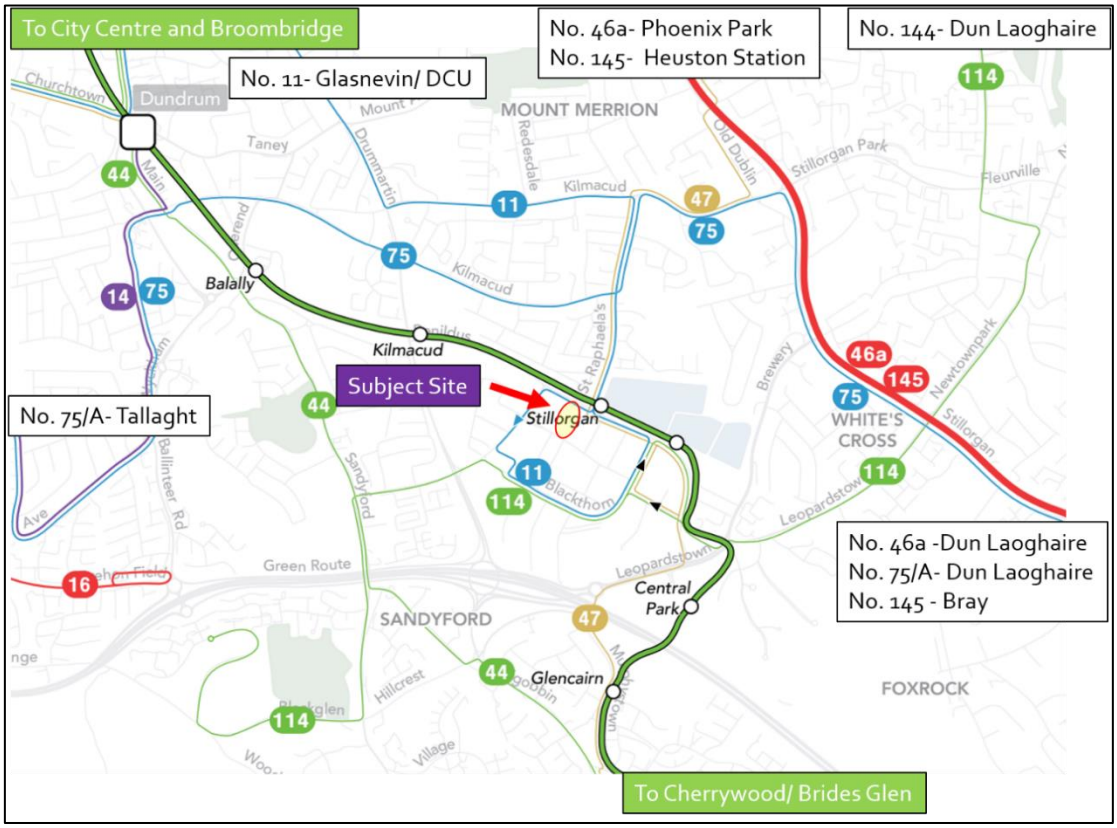

Figure 3.8: Existing Bus Services Surrounding the Subject Site.

Source: Busconnects.ie, Map No. 1 Existing Bus Network, annotated by Thornton O'Connor Town Planning, 2019.

The *Transport Strategy for the Greater Dublin Area 2016-2035* and *Rebuilding Ireland 2040: National Development Plan 2018-2027* outline the proposed provision for upgrades to the Greater Dublin Area bus network. The following bus network is proposed to operate in the area surrounding of the subject site following the upgrade works of Bus Connects.

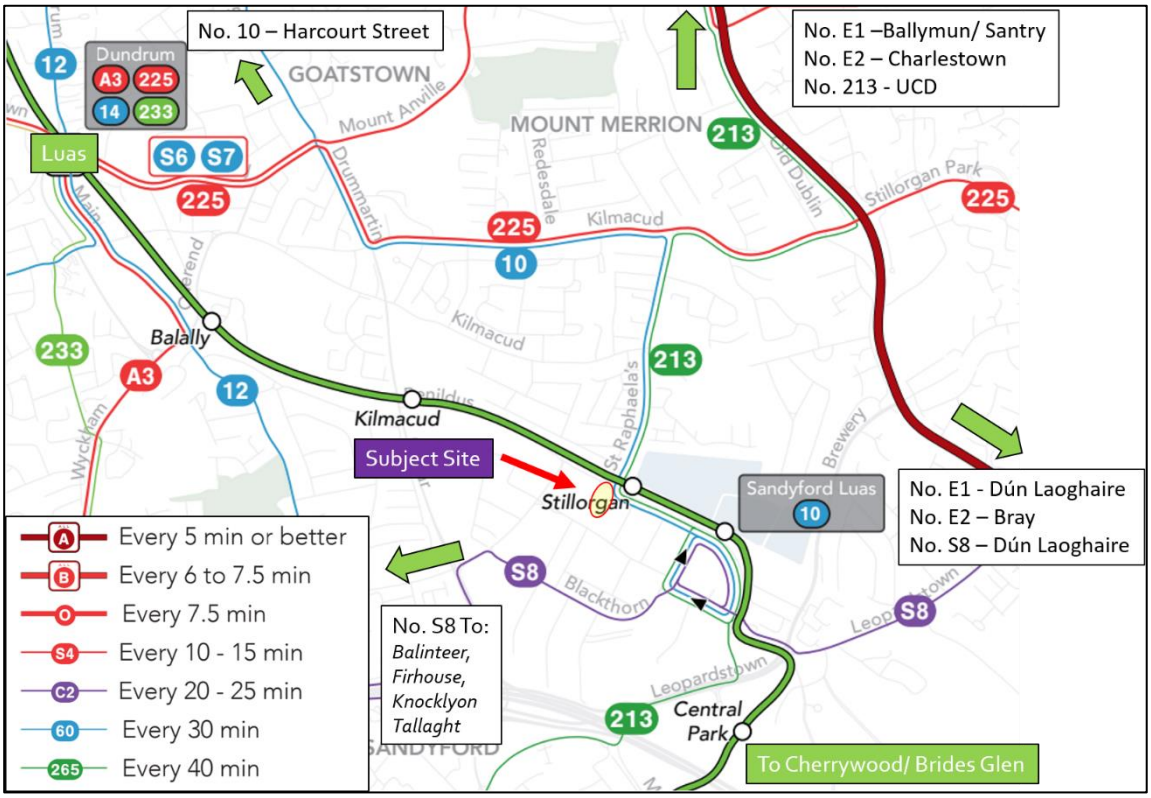

Figure 3.9: Proposed Bus Network New Routes Surrounding the Subject Site.

Source: Busconnects.ie, Map No.2 Proposed All Day Network, annotated by Thornton O'Connor Town Planning, 2019.

Benefit: The existing bus network that serves the site, in addition to the proposed bus network improvements will provide for a high quality bus service for future residents of the scheme.

3.2.3.3. Luas Green Line

The subject site is located less than 100 m of the Stillorgan Luas stop, which also benefits from Park and Ride facilities. The stop is also in close proximity to the Sandyford stop which is an additional 445 m to the east. The Sandyford stop was originally the terminus of the line and still contains the main maintenance facility for the Luas Green Line.

Figure 3.10: **Aerial Photograph Illustrating the Proximity of the Application Site to the Green Luas Line.**

Source: **Google Maps, annotated by Thornton O'Connor Town Planning, 2019.**

The green Luas line features significant trip generators along its length and therefore it provides accessibility to a large number of employment, retail, services and entertainment/ cultural institutions. We note that the Stillorgan stop benefits from some of the highest all-day frequency of services on the green line due to its proximity to the depot/ terminus and the interchange with the Brides Glen Branch. The route of the green Luas line is provided below:

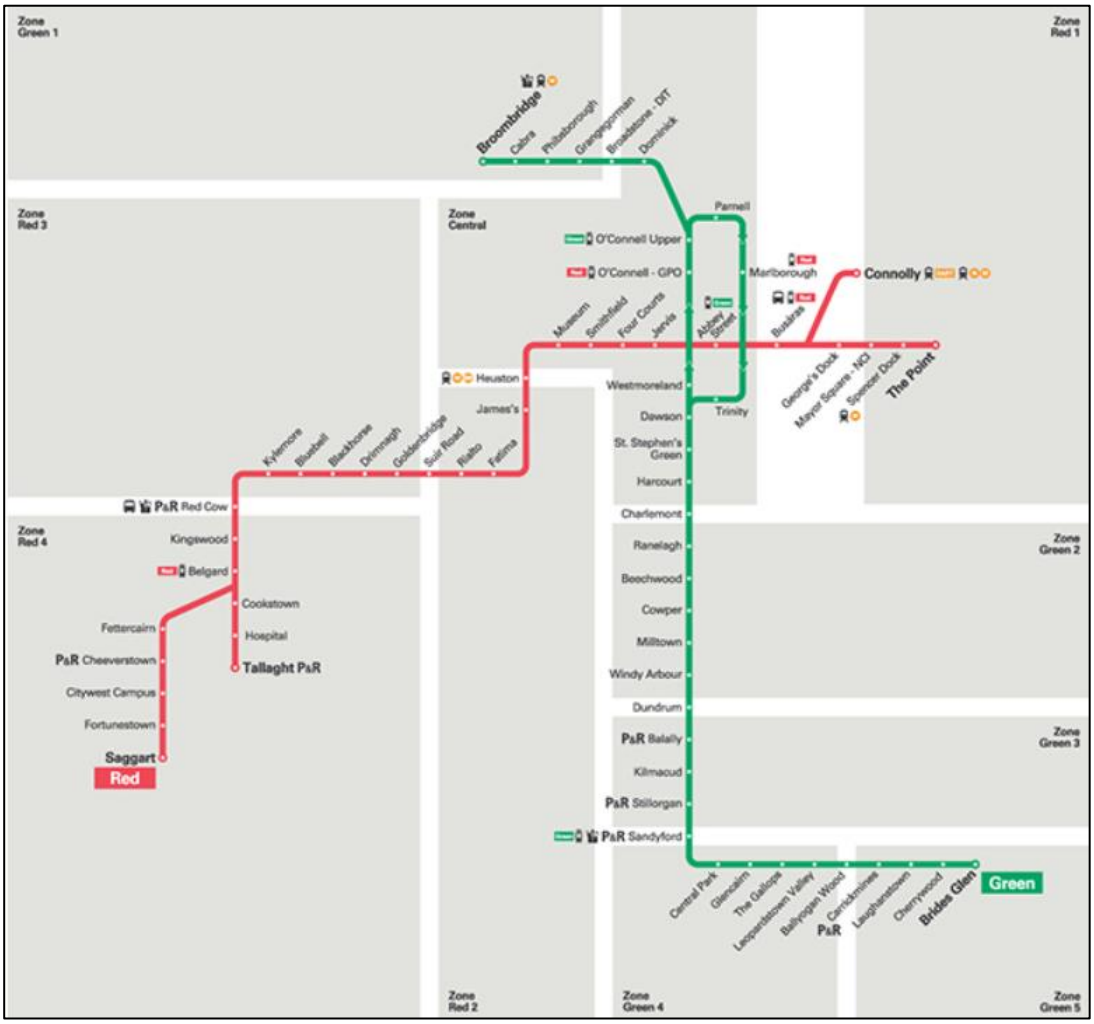

Figure 3.11: Luas Network Map, 2018.

Source: Luas.ie.

Benefit: The high frequency and capacity of the green Luas line facilitates excellent connectivity with a wide range of locations throughout the city for future residents of the scheme.

3.2.3.4 Accessibility of the Site via Walking/Cycling

There are numerous large employers situated within walking of the application site such as Salesforce, Chill Insurance, ESB Networks and the Beacon private hospital. In general, we note that employment within Sandyford Industrial Estate, the Beacon Quarter and Stillorgan Business Park are within less than c. 800 m/ c.15 min walk of the application site. According to the Sandyford Business District (www.sbd.ie), there are currently 20,000 No. people employed in Sandyford Business District alone. It states that it has the capacity to double that number and is growing quickly as an increasing number of multinationals and indigenous companies relocating to the location. The range of employment opportunities in close proximity to the

subject site are discussed in detail in the accompanying Planning Report prepared by Thornton O'Connor Town Planning.

Benefit: The sustainable location of the subject site within the Sandyford Business District will allow future residents of the scheme to access essential services and facilities by foot and will contribute towards a healthy lifestyle.

4.0 CONCLUSION

We submit that this report provides significant detail in relation to the building lifecycle of the proposed development for the consideration of the Planning Authority.

The proposed development will be constructed to the highest standards and in compliance with all relevant guidelines and policies which seek to provide for energy efficient and liveable multi-unit developments that will reduce maintenance costs for residents over time.

In consideration of the above we trust that Dún Laoghaire-Rathdown County Council and An Bord Pleanála will be satisfied with the details of this Report in accordance with Section 6.13 of the *Apartment Guidelines, 2018*.

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