Dundrum Village Strategic Housing Development
Energy & Sustainability Statement

RE: DUNDRUM VILLAGE
STRATEGIC HOUSING DEVELOPMENT (SHD)

APPLICANT: Dundrum Retail GP DAC
(Acting for and on behalf of Dundrum Retail Limited Partnership)

BDP Job No: P3000832
Issue: Planning
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BDP.

Contents

1 Introduction

This report was prepared by the project Building Services and Sustainability consultant BDP on behalf of the Applicant; Dundrum Retail GP DAC (Acting for and on behalf of Dundrum Retail Limited Partnership)

The report provides information on the exemplary environmental performance that is proposed for the design, construction and operation of the Dundrum Village Strategic Housing Development (SHD).

The proposed Dundrum Village SHD site is indicated in red on Figure 1 below.

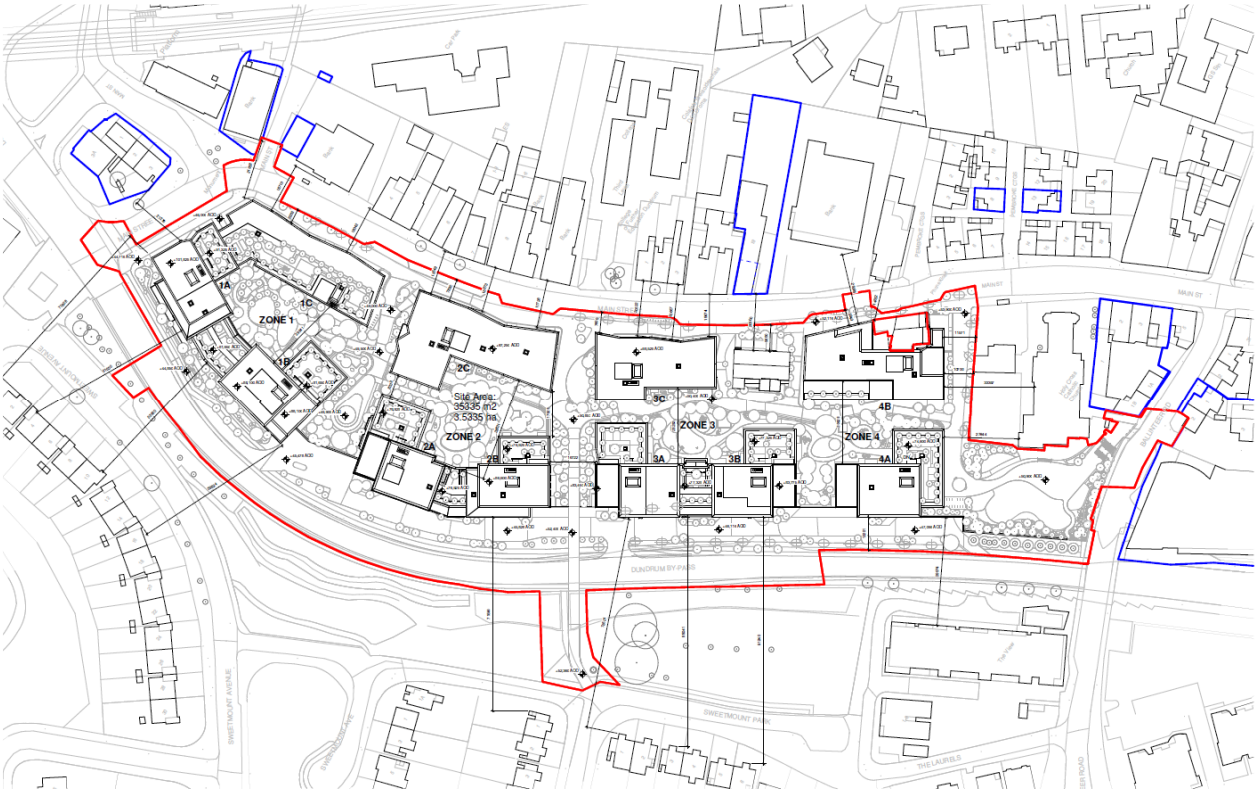


Figure 1: Location of Proposed Dundrum Village SHD (in red)

The development comprises 11no. Urban blocks arranged around the central pedestrian spine and a series of 4 courtyards corresponding to 4 separate “zones” or character areas. The buildings range in height from 4-5 storeys on Main Street to 9-16 storeys to the Dundrum Bypass. The development will consist of c. 881no. Residential units. This development also includes a food store, retail, café/restaurant and a crèche are at ground floor level, fronting Main Street, as detailed in the Schedule of Accommodation included with this submission. The development will include the demolition of all existing structures on the site with the exception of No.’s 1-3 Glenville Terrace which will be refurbished. Vehicular and cycle parking is provided below podium with visitor cycle parking spaces in the public realm. Vehicular access to serve the proposed development will be provided via Dundrum Bypass. The existing vehicular entrance on Main Street will be closed. Pedestrian connections and linkages are proposed through the site, forming connections that are not currently possible from within the site to Main Street; to the south via Church Square and Don Marmion Bridge; and west via the proposed new Sweetmount Bridge connecting Main Street to the residential communities west of the Bypass.

A very high standard of sustainable design has been incorporated into the project with the project brief requiring implementation of a ‘Positive Places’ strategy and high environmental goals. The applicant has a track record of delivering projects of a highly sustainability and energy efficient nature. For example within the Dundrum town centre area; the applicant delivered Pembroke Square which was highly commended under the sustainability category at the RIAI 2021 awards and it went on to achieve BREEAM Excellent certification.

This target was overseen by a dedicated Sustainability Coordinator (BDP) who were appointed by the applicant to facilitate regular Sustainability Review meetings with the whole project design team to ensure the project targets and Sustainable Design Brief requirements were implemented.

Dundrum Retail GP DAC Sustainability Implementation Plan was used to track the specific elements of design relating to:

Carbon	**Water**	**Wellbeing**	**Biodiversity**	**Transport**
Resource use	**Climate change**	**Socio-economic**	**Management**	**Sustainability Certifications**

This Sustainability Implementation Plan adopted by this project includes benchmarking the development against more than just the statutory standards of NZEB. Sustainability assessment tools like BREEAM, CRREM Risk Assessments (Carbon Risk Real Estate Monitor) and Passivhaus standards have been used as benchmarks.

The Dundrum Village SHD development will minimise its environmental impact by targeting low embodied carbon buildings and significantly reducing energy and water consumption relative to that of similar residential developments. Of particular importance is how the design will demonstrate the role that buildings can play in supporting Ireland's strategy of decarbonising the national grid. Ireland is committed to installing more efficient electrical energy generation plant and increasing the proportion of renewable energy that feeds into the national grid. The buildings within the Dundrum Village SHD will use highly efficient electrical systems that take advantage of this low carbon generation strategy.

A summary of the key environmental performance targets that have been set for Dundrum Village SHD are as follows:

- The buildings are aspiring to meet a Net Zero Carbon strategy to align with the aspirations of Dun Laoghaire Rathdown County Council.
- The design intent at present for the developments hot water, heating and cooling system designs are based on a combination of highly efficient heat pumps with no fossil fuels being consumed throughout the entire project, avoiding the production of local pollution within an urban environment.
- The buildings will meet and exceed the new NZEB (Nearly Zero Energy Buildings) requirements set out in the current Part L document
- The Dundrum Village SHD buildings will achieve a BER "A" rated energy certificate for all domestic and non-domestic buildings.
- The Dundrum Village SHD buildings will target a reduction in mains water consumption of up to 60% when compared to similar developments and this will be further explored post planning.
- The Dundrum Village SHD development has set progressive targets for embodied carbon in its brief, based on recently published LETI (London Energy Transformation Initiative) targets for 2030.
- Up to planning stage the buildings have been benchmarked against the Sustainability Assessment tool BREEAM where applicable. As a minimum, the scheme will adopt the principles and pursuing the formal rating and certification will be subject to cost/benefit feasibility post planning.
- The development has been assessed against the CRREM Risk Assessment tool

2 Receiving Environment

The existing site which shall be developed to become the Dundrum Village SHD is of low environmental value, supporting a poor occupant density and offering a very limited ecological value. Many of the buildings within the site were built in the 1970's and therefore have a very poor energy performance.

The Dundrum Village SHD seeks to restore vitality and creativity to an area while creating a landmark destination that all people can be proud of.

The Dundrum Village SHD has excellent potential for a quality sustainable development due to its prime location and outstanding public transport links that include Bus services, Luas services and Cycle networks. The Dundrum Village SHD will actively encourage the use of sustainable transport systems through its support facilities for cycling, minimal onsite parking and infrastructure for electrical vehicle charging points.

The Dundrum Village SHD development will provide 1,750 cycle spaces in total (1508 Residential and 242 Visitor spaces).

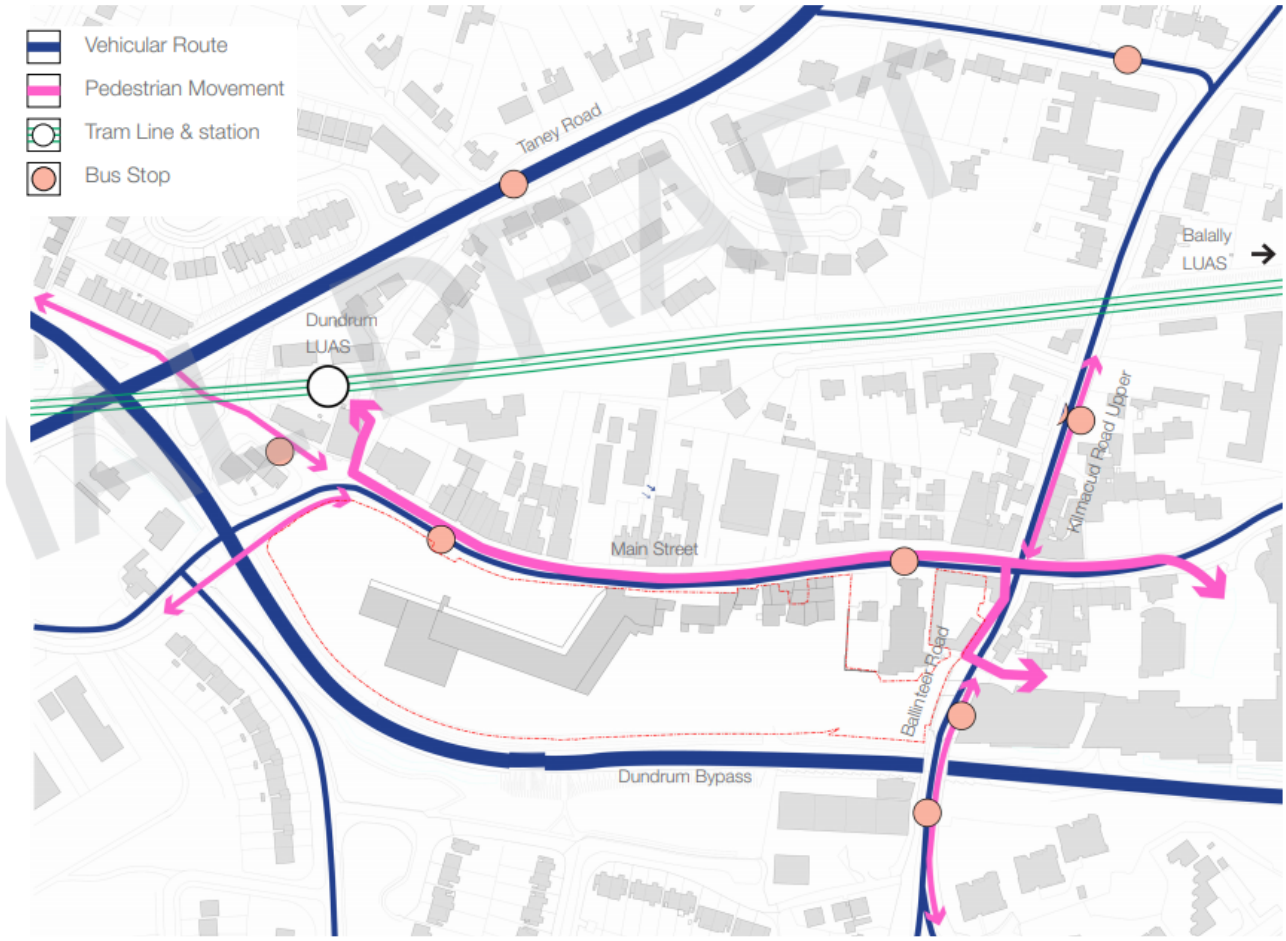


Figure 2: Public Transport within vicinity of the site

At present a large proportion of the site has hard landscaping with no attenuation or SUDs measures. The Dundrum Village SHD SUD's measures and ecological quality would be notably improved through the use of extensive landscaping and green roofs throughout.

3 Characteristics of Dundrum Village SHD

Overview of sustainability enhancements

Dundrum Village SHD will improve the quality of the local area externally and offer high quality residential accommodation for the area. The buildings will actively encourage the use of sustainable transport systems through minimal car parking provision and its support facilities for sustainable transport such as the provision of secure cycle parking for residents, guests and visitors.

The energy usage of Dundrum Village SHD is minimised through a number of key measures. Preference is given to the use of passive measures to minimise the buildings' demand for energy and these measures are then supported by active energy systems that generate and distribute energy in an efficient way.

These measures include the following:

- The level of insulation and unwanted air leakage control will be excellent. The design team will minimise air leakage and check construction quality by closely monitoring the constructions on site. Ultimately the air leakage and insulation levels will be tested through the use of air leakage and thermography tests.
- The ratio of solid to glazed areas have been carefully designed for each facade and orientation in order to achieve an appropriate balance between natural light, ventilation, heat gain and heat loss.
- The buildings and external lighting systems are intended to be entirely LED based.
- The air and water systems are designed to vary their output in proportion to the demand in order to minimise their energy usage.
- All main air handling units are fitted with heat recovery systems, offering the recovery of waste heat energy.
- Heating and cooling is generated through highly efficient heat pumps in order to completely remove the carbon impact of heating and a central energy plant will maximise efficiencies for the building.
- Hot water is generated by highly efficient heat pump plant that contributes towards the Renewable Energy Ratio requirement in the current Part L document
- Solar Photovoltaics at roof level of all buildings where practical shall be provided to generate clean renewable on-site energy.
- Information on the key technologies used to reduce the energy consumption of each of the buildings will be displayed to encourage the promotion of sustainable construction.

Sustainability Assessments

The design will promote sustainable development by demonstrating an integrated approach to the social, environmental and economic wellbeing of the area and functions served, both now and for future generations. To provide assurance against this sustainability performance, environmental assessment certifications including BREEAM, CREEM and Passivhaus have been considered.

With various sustainability assessment schemes for the built environment, there is not always a single general method for assessing all stages of a building's life. Performance requirements for each of the assessment methodologies have been compared to identify which standards provide the most benefit to the project, and to help streamline the process of achieving certification for more than one. Dundrum Village SHD is currently designed to meet targets set out in BREEAM and CREEAM and has adopted many of the Passivhaus design intent without pursuing it formally at this stage.

The Carbon Risk Real Estate Monitor (CRREM) provides the real estate industry with transparent, science-based decarbonization pathways aligned with the Paris Climate Goals of limiting global temperature rise to 2°C, with ambition towards 1.5°C.

BREEAM is a multi-attribute rating system that is well established in the UK and Europe, and forms one of the Sustainable Design Brief targets. Whilst the development has been designed within the performance framework formal certification shall be pursued post planning subject to cost/benefit feasibility. As a minimum, the scheme will adopt the principles of BREEAM.

Dundrum Village SHD is currently achieving a preliminary 'Excellent' rating (≥70%), in accordance with the BREEAM International New Construction 2016 scheme. A preliminary score of 79.95% has been established for the Residential element, surpassing the minimum requirement for 'Excellent' (≥70%).

These pre-assessment scores are based on the current design proposals, discussions with the design team and previous project experience. The final score will be subject to change as the design develops and if full certification is pursued, but the overall performance objective and target rating is achieved.

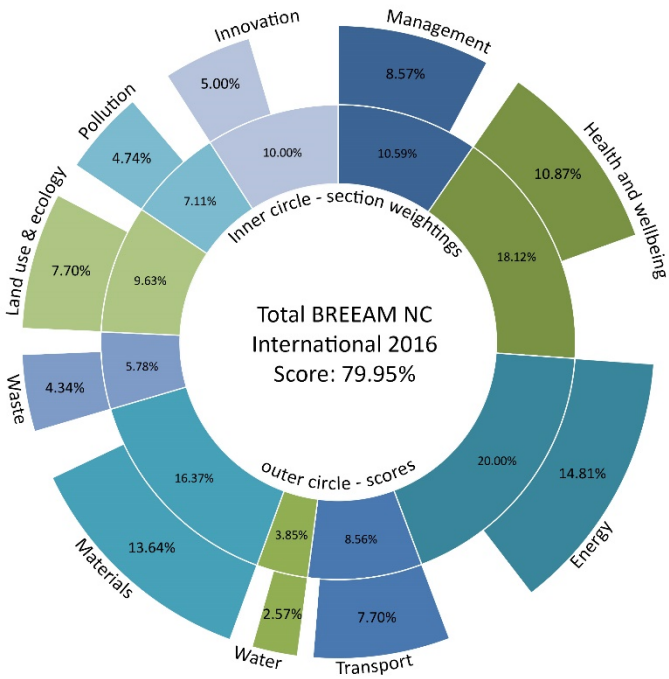


Figure 3: BREEAM Doughnut

Heating, Cooling & Hot Water

It is the aim of Dundrum Village SHD to make considerable progress towards a net zero carbon target for buildings, which aligns with the aspirations of Dun Laoghaire Rathdown County Council outlined in section 3.4.1.1 - "*Policy Objective CA5: Energy Performance in Buildings*" within the DLRCOCO County Development Plan 2022-2028 (that will become operative on 21st April 2022).

During the planning and design process thermal dynamic simulations were undertaken of each of the buildings using IES software. This IES software will be utilised to achieve the optimum energy efficiency design with consideration of plant loads, day-lighting, air flow, renewable energy technologies, ventilation, daylight, overheating and indoor air quality all being considered.

The Dynamic thermal simulation will provide an insight into the projected building energy use, under varying design criteria including the NZEB standards and the proposed carbon neutral building energy standards that forms the basis of this proposal. The completed design process resulted in the most favourable designs being adopted to deliver the carbon neutral building.

Heat Pumps

The Dundrum Village SHD buildings' hot water, heating and cooling system designs are based on a combination of highly efficient heat pumps with no fossil fuels being consumed, avoiding the production of large amounts of local pollution within a suburban environment.

Unlike almost every other development of this scale in Ireland, the current design intent burns no fossil fuels and this will be further explored and targeted post planning.

The use of heat pump for heat generation creates zero local emissions and has a current carbon dioxide emission implication that is approximately 20% lower than the use of natural gas even if 100% of the electricity used comes from the national grid. This figure assumes no heat transfer takes place but the use of the heat transfer can reduce this emission factor further.

Where possible the electricity to power the heat pumps comes from the large array of on-site photovoltaic panels which has zero operational carbon dioxide emissions.

It is not practical to feed the entire scheme with on-site renewable electricity. The remaining amount of electricity comes from the national grid and the carbon impact of the national grid is set to reduce over the life of the system, resulting in significant carbon savings. In the short term it is intended to purchase electricity from a provider who can guarantee 100% of the generation is through renewable sources like wind and solar but this shall be further explored post planning.

Domestic Hot Water Generation.

Domestic hot water must be generated at a temperature of 60°C in order to ensure that bacterial growth is not promoted. This is notably higher than that required for building heating and cannot therefore be gathered directly from the heating system. To achieve this a water to water heat pump shall be utilised to boost hot water generated from heat pumps to 60°C ensuring there is no legionella risk.

Small demand such as retail units can easily and efficiently be provided by local electric heaters but with the large users the heat pump option will be considered.

4 Carbon, Materials & Water

Renewables

Solar Photovoltaics

With the implementation of an advanced heat pump solution for heating, cooling and hot water there is no statutory requirement to include Solar Photovoltaics on this project. However, the Dundrum Village SHD intends to exceed the minimum building regulation requirements for renewable energy generation on site and therefore has allowed for Solar Photovoltaics on the roof of buildings where practical.

Photovoltaic panels have reduced in price dramatically over the last ten years and are now economically attractive as an energy investment. The payback period of the panels varies between 6 and 10 years depending on the complexity of the panel supports.

Operational Carbon Emissions

The TM54 calculation methodology was used to estimate the operational energy of the buildings and look at ways of reducing the carbon emissions associated with the buildings operation. TM54 methodology has been developed by CIBSE for the purpose of estimating the energy use of a building. The project Sustainability Design Brief set energy usage targets for the various sites and the design team ensured these targets were met.

The methodology was developed in the interest of achieving more accurate estimates of energy use at the design stages of a project in a context where many engineers were using the Building Regulation compliance tool SBEM (BER Certificates) to estimate building energy usage or were using out of date energy benchmarks. SBEM was never intended as an energy usage estimation tool and is simply intended to compare the energy performance of different buildings in a relative sense.

While the TM54 methodology does have limitations it has been proven to offer reasonably accurate estimates of energy use in buildings. The method is not full prescriptive but does set out principles of calculation. The method combines dynamic simulation results for heating and cooling loads with system calculations to provide a combined energy model.

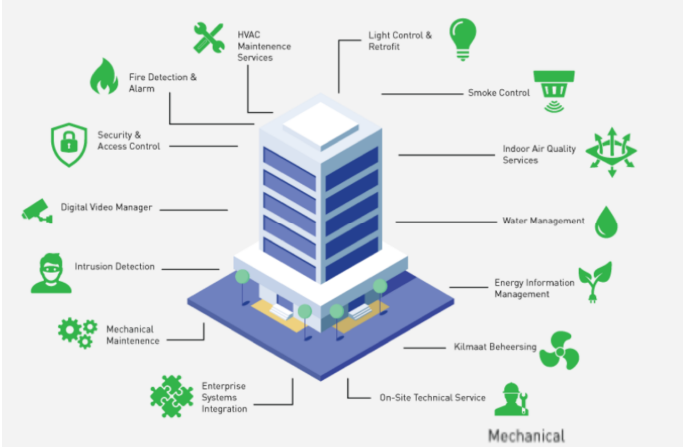
The TM54 analysis is useful for testing the viability of the project energy targets and also for identifying key areas where further improvements can be achieved. The analysis also reduces time spent trying to generate savings in an area where the associated energy use will be insignificant.

A target of 35 kWh/m^2 GIA have been set by Dundrum Retail GP DAC for Energy Use Intensity of each building and the designs are currently on target:

Monitoring

The Dundrum Village SHD buildings energy and water usage impact will be monitored in detail through a series of BMS connected meters.

A detailed energy and water monitoring and targeting program will be implemented, transport usage will be monitored and sustainable transport will be encouraged and can be promoted.



Lighting

LED fittings shall be used throughout the Dundrum Village SHD development. Natural light and contact with the external produces a better living environment, in addition to reducing lighting energy usage and so detailed daylight analysis has been carried out for all of the spaces ensuring high quality access to natural daylight.

Materials & Embodied Carbon

Although often overlooked by other developments; the design of these buildings shall also encourage measures to optimise material efficiency in order to minimise the environmental impact of material use and waste without compromising on structural stability, durability or service life of the buildings.

Dundrum Retail GP DAC has set progressive targets for embodied carbon in its brief, based on recently published LETI design guide targets for 2030. As such, the design team for this development is undertaking an assessment of the upfront embodied carbon emissions [A1-A5] associated with construction of the development using the cloud-based tool OneClickLCA. This tool enables the teams to model the proposed elements to identify where carbon savings should be made. It also enables the design team to have an idea of performance against the targets throughout various design stages and when major elements or components are altered.

A focus on specification and procurement of responsibly sourced construction products and materials with a low environmental impact over the full life cycle of the building will be implemented and environmentally conscious decisions such as exposed structural materials and retaining historic and feature buildings and facades have been explored to minimise the need for materials and reduce the carbon impact of the building.

During the planning design stage the design team was tasked with utilising this powerful tool to build a baseline development and compare and find better performing materials and test different options to attain a low embodied carbon building. The applicant along with BDP are members of the Irish Green Building Council's EPD (Environmental Product Declaration) Campaign and have committed to preferencing products that hold an EPD or challenging suppliers to attain one. As such throughout the detailed design phases the design teams will be tasked with sourcing materials that hold and EPD.

One Click LCA

EPD IRELAND
THE ENVIRONMENTAL PRODUCT DECLARATION PROGRAMME

Water Consumption

The water use of Dundrum Village SHD would be dramatically reduced through the following methods:

- Dual low flush WC's;
- Self-closing taps;
- Use of blending valves on all hot water outlets
- Waterless urinals where appropriate
- Restrictors added to showers

The following table outlines some of the sanitary ware fittings design intents discussed during planning. The actual fittings and flowrates can only be finalised during detail design and through discussion with building owners and operators.

	Dundrum SHD	Typical
Residential	WC – 4 litre effective flush WHB – 1.9 litres/min Showers – 6.9 litres/min Kitchen tap – 5 litres/min Washing Machines – 40 litres/use Domestic Dishwashers – 12 litres/cycle	WC – 6 litre effective flush WHB – 8.3 litres/min Showers – 9.5 litres/min Kitchen tap – 8.3 litres/min Domestic Washing Machines – 60 litres/use Domestic Dishwashers – 18 litres/cycle

5 Other Environmental Impacts

Overview

The other environmental impacts of the proposal are as follows:

- Provision of quality and sustainable residential accommodation in an appropriate location
- Improved environmental quality of public space in the vicinity of the development due to visual and interactive enhancements, including an enhanced public route through the site to a new public square that has been incorporated into the Architectural design.
- Energy usage and the associated carbon impact of the development shall meet or exceed the NZEB regulations and target future Energy Performance of Buildings Directives expected in 2030.
- It is estimated that the mains water usage of the development would be approximately 60% lower than a typical new development and this will be explored further post planning.
- The ecological value of the site would be improved through site planting that will be quantifiably improving biodiversity.

On-Site Emissions

All energy used within the Dundrum Village SHD buildings shall have no direct site emissions. The global emissions associated with the heating and hot water generation is removed due to the use of technology in the heat pumps to maximise efficiency and avoid the reliance on fossil fuels. Furthermore the buildings electrical energy usage will be partly offset by an extensive array of on-site Solar Photovoltaics.

The Dundrum Village SHD project is aspiring to be one of Ireland's first Net Zero Carbon schemes offering residents a low carbon footprint alternative for Dublin.

SUDs Measures

The Dundrum Village SHD location currently has a large proportion of hardstanding.

The development of this site will provide a significant gain to Dun Laoghaire Rathdown in reducing surface water runoff to the sewers through the extent of soft landscaping and SUDs measures in the form of green roofs and attenuation tanks to significantly reduce the storm water flow to sewer during a weather event.

Space quality

The internal environmental quality provided by the Dundrum Village SHD development will be excellent and the following will generally be provided:

- Access to daylight and views
- Advanced Lighting controls and efficient LED fittings
- Thermally comfortable spaces
- High air quality

The buildings within Dundrum Village SHD have been orientated to optimise natural daylight/sunlight to the residential units and amenity spaces. Many units are dual aspect and benefit from natural cross ventilation as well. The internal layouts have been carefully planned to meet all the requirements of the 'New Apartment Guidelines' in terms of areas, floor to ceiling height and provision of internal storage and outdoor amenity. To that end, all new build units in the development enjoy access to private outdoor amenity spaces in the form of roof terraces and balconies, as well as a planted communal courtyard.

The development has been designed in accordance with Part M regulations, with minor exceptions where historic retained building or fabric is concerned.

Site Lighting

The Dundrum Village SHD lighting scheme has been designed to create safe, inspiring places for people that has the power to expel crime and create harmonious social spaces. The lighting used will integrate light into bespoke architectural features to create an atmospheric environment.

All external lighting schemes shall be designed in accordance with the Council's Public Lighting Specification and Guidelines and take consideration of night time pollution.

Please refer to the Public Lighting drawing issued as part of the planning pack which includes isolines showing lux levels proposed.

Ecological value

As detailed within the Biodiversity chapter of the EIAR; due to the suburban nature of the site, the only habitats identified within the proposed development were buildings and artificial surfaces with small isolated areas of ornamental/non-native scrub growing. As these areas have little to no ecological value due to the lack of vegetation and urbanised environment, the habitats within the proposed development site are valued as being of local importance (lower value).

Therefore as part of the redevelopment of the area the use of green roofs and planting in the landscaped external spaces will notably improve the sites ecological value and biodiversity relative to the existing site. The team ecologist has assessed the landscaping proposals to ensure that the planting proposed is in keeping with and is an enhancement to the local ecosystem.

Landscaping Plans for Dundrum Village SHD will be at ground floor in the courtyard and at roof level where some of the amenity space is provided. The courtyards proposed for the ground floor shall have trees planted, along with a mixture of bed species which is all detailed within the Landscape drawings and report. These planting areas will provide positive visual benefits for residents, whilst also providing habitat for invertebrates, and birds.

For the roof area low-level planting across separate beds is proposed providing year round dense, sheltered habitat for small birds, mammals and insects.