HHP-HRA-ZZ-RP-A-001-CAE-PO2

Climate Action Energy Statement

For:

Housing at Holywell, Swords, Co. Dublin

Prepared by: Henchion Reuter Architects

www.henchion-reuter.com

Sept 2023

Content:

1.0 Introduction

This Climate Action Energy Statement has been prepared by Henchion Reuter Architects as part of the planning documentation for a proposed residential development at Holywell, Swords County Dublin in response to CAP 12 and DMSO261 in the Fingal County Development Plan 2023-2029.

The proposed development relates to a site of 7,700 m2 at Holywell link Road, Swords, Co Dublin.

The development seeks the construction of 57 no. Housing Apartments in three pavilion blocks ranging from 6 – 6 storeys in height.

The project will be delivered by D&B contract; as such this report will need to anticipate that some details will be confirmed at a later date and some options, as regards heating source for example need to be kept open until a final design and been proposed by the bidding contractor.

The development will also include the provision of car parking, cycle parking, new pedestrian / services, drainage and attenuation, and all associated site and infrastructural works.

This report identifies the energy standards with which the proposed development will have to comply and also sets out the overall strategy that will be adopted to achieve these energy efficiency targets.

The dwellings will be required to minimise overall energy use and to incorporate an adequate proportion of renewable energy in accordance with Building Regulations Part L 2022, Conservation of Energy & Fuel (hereinafter referred to as “Part L 2022 Dwellings”).

This report also will also address the following Polices of the Fingal County Development Plan 2023-2029 as follows:

CAP 11 Climate Adaptation Actions in the Built Environment (Addressed in section 6)

CAP 12 Climate Action Energy Statements (Addressed in all sections of the report)

CAP 13 Energy from Renewable Sources (Addressed in section 4)

CAP 18 Waste Heat, District Heating and Decentralised Energy (Addressed in section 4)

CAP 19 Supporting the Potential of District Heating in Fingal (Addressed in section 4)

CAP 20 Capture and Utilisation of Waste Heat (Addressed in section 4

1.1 Project Team:

Client:
Fingal County Council Housing Department:

For Fingal County Council Architects Department:
Carmel Brennan, Patrick Conway

Architects
Henchion Reuter Architects:
Martin Henchion, Elizabeth Wheeler, Karina Krestinov Priddle

Civil and Structural Engineers:
ROD Ltd
Andrew Thompson. Ben gallery, Nicholas McCann.

M&E Engineers
MOMA
Sean O Sullivan

Planning and Environmental Assessment:
The Planning Partnership
Wessel Vosloo.

Quantity Surveyor
Walsh Associates
Paul Malone, Martin Ruane

Fire Safety Consultant
EOBA
Stephen Lee

Disability Access Consultant
EOBA
Stephen Lee

2. Building Regulations Part L 2022 Dwellings

Compliance with Building Regulations Part L 2022 is broken down into six distinct categories, known as Regulation 8; parts (a) to (f).

A summary of each of these parts as listed in Technical Guidance Document L 2011 is provided below together with a description of what is required to demonstrate compliance and suggested routes to meeting the required standards.

2.1 Regulation 8 Part (a)

The regulation requires that:

Providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related carbon dioxide (CO2) to that of a nearly zero energy building within the meaning of the Directive insofar as is reasonably

Regulation 8 Part (a) is the overarching compliance target which stipulates the required overall reduction in energy consumption and carbon emissions for new dwellings.

2.2 Regulation 8 Part (b)

The regulation requires that:

> *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;*

2.3 Regulation 8 Part (c)

The regulation requires that:

> *Limiting heat loss and, where appropriate, availing of heat gain through the fabric of the building;*

This requires that the fabric of the building is designed to minimise heat loss from the building and that the air permeability of the structure limits the unwanted passage of air into the building.

Typical compliant U-Values are as follows.

Pitched roof 0.16 W/m2K

Flat roof 0.20 W/m2K

Walls 0.18 W/m2K

Floor 0.18 W/m2K

Windows 1.4 W/m2K

The u-values of individual elements can be relaxed if required provided that compensatory measures are taken on other elements and that the overall area weighted u-value for the entire dwelling is the same as it would have been if all individual elements had complied.

The thermal bridging details of junctions in the envelope of the building (floor-wall; wall-window; wall-roof, etc) must also be designed and constructed in accordance with the guidance set out in Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details

Every dwelling must also be subjected to an air pressure test to determine the air tightness. All dwellings must achieve and air tightness of less than 5m3/m2 /hour when tested at 50 Pascals. In multiple dwelling developments with repeating apartment types, testing can be conducted on a representative sample of units in accordance with *Table 1.5.4.3 of TGD Part L 2022 Dwellings.*

2.4 Regulation 8 Parts (d & e)

The regulation requires that:

> *Providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls;*
>
> *Providing that all oil and gas fired boilers shall meet a minimum seasonal efficiency of 90%;*

2.6 Requirements for Common Areas

2.7 S.I No 393 of 2021 - Regulation 5 Part (e)

The regulation requires that:

> *For a new building (containing one, or more than one, dwelling), where there are more than 10 car parking spaces, ducting infrastructure, consisting of conduits for electric cables, should be provided for every parking space, to enable the subsequent installation of recharging points for electric vehicles where:*
>
> *• the car park is located inside the building, e.g. a basement car park; or*
>
> *• the car park is physically adjacent to the building, i.e. the car park is within the curtilage of the site.*

This requires that ducting provision for the future installation of car charging point be made in all carparks with more than 10 parking spaces associated with multi-unit residential buildings.

3. Building Fabric

Before considering efficient building services or renewable energy systems, the form and fabric of a building must be assessed and optimised so as to reduce the energy demand for heating, lighting and ventilation. Target performance levels have been identified by the design team and are presented below.

3.1 Elemental U-Values

The U-Value of a building element is a measure of the amount of heat energy that will pass through the constituent element of the building envelope. Increasing the insulation levels in each element will reduce the heat lost during the heating season and this in turn will reduce the consumption of fuel and the associated carbon emissions and operating costs.

It is the intention of the design team to exceed the requirements of the building regulations. Target UValues are identified below.

U-Values	Range of Target Values Proposed	Part L 2022 (Dwellings) Compliant Values
Floor	0.10 to 0.18 W/m2K	0.18W/m2K
Roof (Flat)	0.12 to 0.20 W/m2K	0.20 W/m2K
Roof (Pitched)	0.10 to 0.16 W/m2K	0.16 W/m2K
Walls	0.10 to 0.18 W/m2K	0.18 W/m2K
Windows	0.9 to 1.4 W/m2K	1.4W/m2

3.2 Air Permeability

A major consideration in reducing the heat losses in a building is the air infiltration. This essentially relates to the ingress of cold outdoor air into the building and the corresponding displacement of the heated internal air. This incoming cold air must be heated if comfort conditions are to be maintained. In a traditionally constructed building, infiltration can account for 30 to 40 percent of the total heat loss, however construction standards continue to improve in this area.

With good design and strict on-site control of building techniques, infiltration losses can be significantly reduced, resulting in equivalent savings in energy consumption, emissions and running costs.

In order to ensure that a sufficient level of air tightness is achieved, air permeability testing will be specified in tender documents, with the responsibility being placed on the main contractor to carry out testing and achieve the targets identified in the tender documents.

A design air permeability target of **3 m3/m2/hr** has been identified for the apartments and houses on the site.

The air permeability testing will be carried out in accordance with BS EN 13829:2001 ‘Determination of air permeability of buildings, fan pressurisation method’ and CIBSE TM23: 2000 ‘Testing buildings for air leakage”.

3.3 Thermal Bridging

Thermal bridges occur at junctions between planar elements of the building fabric and are typically defined as areas where heat can escape the building fabric due to a lack of continuity of the insulation in the adjoin elements.

Careful design and detailing of the manner in which insulation is installed at these junctions can reduce the rate at which the heat escapes. Standard good practice details are available and are known as Acceptable Construction Details (ACDs). Adherence to these details is known to reduce the rate at which heat is lost.

The rate at which heat is lost is quantified by the Thermal Bridging Factor of the dwelling and measured in W/m2K. The Thermal Bridging Factor is used in the overall dwelling Part L calculation, this value can be entered in three different ways:

0.15W/m2K Used where the ACDs are not adhered to

0.08W/m2K Used where the ACDs are fully adhered to

< 0.08 W/m2K Used where the thermal details are thermally modelled and considered to perform better than the ACDs

It is intended that the ACDs will be adhered where suitable benchmarks exist, and that thermal modelling will be carried out for any non-standard junction details within proposed development and that the resultant Thermal Bridging Factor will be less than 0.08W/m2K for houses. For apartments thermal modelling of non-standard details will not be required and the resultant Thermal Bridging Factor will be 0.15W/m2K.

Confirmation will be required from the Contractor that all key junctions in the scheme have been designed and constructed in accordance with the ACDs or that thermal modelling has been completed where this is not feasible.

They will require the following: ·

- List of thermal bridging junctions in the building, noting all key junctions ·
- Plan, elevation and section drawings identifying all key junctions and the ACD that are designed and constructed in accordance with signed details sheets of all ACDs used.

4. Heat Sources & Renewable Energy Options & Proposals

The following section addresses the policy CAP 13, CAP 18, Cap 19 and CAP 20 of the Fingal Development Plan 2023-2029. Section 4.1 – 4.6 address CAP 13 and section 4.3 addresses CAP 18, CAP 19 and CAP 20 of the Fingal Development Plan 2023-2029.

All new dwellings must meet overall energy performance levels (as defined by the Energy Performance Coefficient - EPC) and must have a portion of their annual energy demand provided by renewable energy sources.

The renewable energy source can be thermal energy such as solar thermal collection, biomass boilers or heat pumps or it can be electrical energy as generated by photovoltaic solar panels or wind turbines. The minimum renewable energy contributions defined in Part L 2022 Dwellings Part (b) is 20% of the total energy consumption for the dwelling.

Two main fuel sources are generally available for developments of this nature, natural gas and electricity. Each present distinct options for compliance with the new standards. Solutions involving gas as the primary fuel source will typically include a solar technology such as PV panels to meet the renewable energy requirements while solutions relying on electricity will include heat pump technology.

The options presented in Sections 4.1 to 4.3 below set out 3 possible means of complying with Part L 2022 Dwellings for the apartments. Each is based on the building fabric performance levels identified in Table 1 in Section 3. Section 4.4 sets out the typical means for complying with Part L 2022 BOTD for the landlord areas.

The final selection and combination of technologies will most likely be selected from these options based on a more in-depth technical and financial appraisal of the technologies which will be carried out during detailed design.

4.1 Option 1 – Individual electric (per apartment) air source heat pumps (ASHPs) to meet the space heating requirements of the apartment via radiators & pipework. The ASHP in each case will also be used to meet the domestic hot water heating requirements of each apartment.

The ASHPs will also provide renewable energy in operation that will ensure that the renewable energy ratio (RER) target in Part L of the Building Regulations is met for each dwelling.

4.2 Option 2 – Space heating in each apartment to be provided using direct electric heaters. An individual (per apartment) electric exhaust air hot water heat pump (EAHWHP) shall be provided to meet the domestic hot water heating requirements (and provide a contribution to the requisite apartment RER).

The renewable energy contribution will be further supplemented by installation of electric photovoltaic (PV) solar panels – which will produce renewable electrical energy for each apartment to ensure (along with the renewable energy contribution from the EAHWHP) that the RER target in Part L of the Building Regulations is met.

4.3 Option 3 – Individual (per apartment) high efficiency condensing gas combi boilers to meet the space heating requirements of the apartment via radiators & pipework. The boiler in each case will also be used to meet the domestic hot water heating requirements of each apartment.

The renewable energy contribution will be met by installation of a suitably sized array of electric photovoltaic (PV) solar panels – which will produce renewable electrical energy for each apartment to ensure that the RER target in Part L of the Building Regulations is met.

4.4 Landlord Areas – Space heating to be provided using direct electric heaters.

The renewable energy contribution will be met by installation of a suitably-sized array of electric photovoltaic (PV) solar panels – which will produce renewable electrical energy for the landlord areas to ensure that the RER target in Part L of the Building Regulations is met.

5. Electric Vehicle Charging

All new commercial buildings (residential and non-residential) must make a provision for charging electric vehicles. This applies where more than 10 parking spaces are provided.

For residential buildings, the regulations state that future provision, in the form of cable ducting and capacity on distribution boards and meters etc. be made for at all parking spaces associated with multiunit developments with more than 10 parking spaces.

The proposed multi-unit residential development includes a total of xxx parking so future provision for all spaces will be required and 20% of spaces will incorporate EV charging points. Since the development will also include Part M compliant accessible spaces, the location of the charging point will be such that it can serve one accessible parking space and one standard parking space.

6. Climate Change Adaptation Actions in the Built Environment

The following measures have been implemented in the design to address policy CAP 11 of the Fingal Development Plan 2023-2029. This is a summary of the measures with separate reports addressing each measure in more detail.

6. Climate Change Adaptation Actions in the Built Environment

The following measures have been implemented in the design to address policy CAP 11 of the Fingal Development Plan 2023-2029. This is a summary of the measures with separate reports addressing each measure in more detail.

6.1 On-site Construction

The construction and waste management proposals for the scheme are comprehensively addressed in the Resource Waste Plan submitted with this planning application, the measures below are provided as a summary of the recommendations contained within the plan.

The demolition arising on site will consist of the following expected demolition waste: -

- MADE GROUND (sample taken on a mound of fill on the site) firm grey-brown sandy slightly gravelly CLAY with low cobbles content. ·
- COHESIVE DEPOSITS either firm grey brown sandy slightly gravelly CLAY or stiff black slightly sandy gravelly CLAY with low cobbles content.
- Only after in-situ reuse and recycling options have been fully considered will the demolition waste will be disposed of off-site by licensed waste contractors.

- During the construction phase of the project, proposals for the minimisation / reuse and recycling of construction arisings will be implemented as set out in the Resource Waste Plan including: ·
- In the case of topsoil, careful planning and on-site storage can ensure that this resource is reused on-site as much as possible ·
- Earthworks for road, drainage and structure foundation forms a major part of the quantity of waste that will be generated by the construction phase of this project. To optimise the impact of the generation of surplus material due to excavation every attempt to optimise cut and fill volumes will be undertaken ·
- The treatment of excavated materials (cement / lime stabilisation) where necessary to allow their reuse as fill materials, further reducing the need to remove these materials to landfill, and import stone and concrete materials ·
- Appropriate material ordering to minimise waste ·
- Reuse of Concrete blocks, engineering bricks and clay bricks that are surplus can be broken up and used for hardstanding areas. ·
- It is envisaged that most of the recyclable waste on site will come from house construction in a form of wood and metal. Any excess wood or metal generated on site will be kept segregated and removed off site to a licenced recycling facility.

6.2 Long-term Management

Encouraging the use of public transport by using the principles of environmental assessment methodologies to reduce the reliance on cars and encourage a shift to less carbon intensive modes of transport.

All in-curtilage parking spaces will be capable of being fitted with EV charging points. All off-curtilage spaces will be ducted for EV charging, with 20% fitted out from the outset.

6.3 Transport

The traffic and transport proposals for the scheme are outlined a follows:

- Car and Bicycle parking for the proposed development have been designed in accordance with the requirements set out in the current Fingal Development Plan. ·
- The location of the site ais such that pedestrian and cycling trips are a genuine alternative to private car use. The Barryspark & Crowcastle development anticipated to the north of the site will intensify the opportunities for pedestrian and cycling interconnectedness on completion

The use of private cars for daily commuting and for recreational purposes is unavoidable however the potential long term climate impacts of private car use can be off-set by forward planning of electrical vehicle charging infrastructure. Providing ducting & ESB metering capabilities within the scheme will allow for future expansion of electric vehicle charging facilities to meet increasing demand in the short to medium term.

6.4 Environmental Assessment Methodologies

Addressing operational energy use in a manner set out in the preceding sections of this report is a vital component of any construction project however consideration must also be given to other aspects of sustainable design such as water use, material selection and minimising pollutants.

Various assessment methodologies have been developed by organisations such as the Building Research Establishment (BREEAM Methodology) and the US Green Building Council (LEED Certification) to measure the performance of various environmental and sustainable aspects of the design, construction and operation of proposed developments.

The Irish Green Building Council has also developed a similar assessment methodology in recent years which is specifically aimed at residential developments in Ireland. The Housing Performance Index (HPI) assessment provides a method for measuring the performance of residential developments against a range of verifiable indicators that are divided into five technical categories. ·

- Environment ·
- Economic ·
- Health and Wellbeing ·
- Quality Assurance ·
- Sustainable Location

It allows several levels of achievement based on good, better and best practice. The award of the certificate is based on the overall attainment across all categories.

A decision will be made during detailed design as to whether formal HPI certification will be sought on the project, however, the principles set out within the HPI system will be used as guidance throughout the design process regardless of whether certification is targeted.

6.5 Embodied Carbon:

Recent advances in the energy efficiency of buildings have reduced operational energy use to such an extent that the life cycle carbon emissions of a building are actually influenced more by the carbon that is embodied in the materials and processes used during the construction than it is by the carbon emitted as a result of energy used in the buildings operation. As such, the embodied carbon of a building must now be considered if a construction project is to be considered low carbon or “net-zero” carbon.

Addressing the embodied carbon requires that all the key building element categories (substructure, structure, façade, MEP services) are assessed to identify the optimal solutions in terms of embodied carbon and assess them through a multidisciplinary and holistic approach, considering implications in different areas such as efficiency, cost, programme etc.

The process of design and of material and product selection must include an analysis of the final embodied carbon and comparison with benchmarks to identify the areas that need to be optimised. This process allows the building designers and procurement managers to focus on how to eliminate the impact of the key identified hotspots, through comparative assessments and specification of products that demonstrate low embodied carbon and facilitate the production of the final embodied carbon assessment at the end of the detailed design to identify the expected impact of the Development.

6.6 Sustainable Urban Drainage (SuDS)

The Surface Water drainage proposals for the scheme are comprehensively addressed in the Engineering Report submitted with this planning application, the measures below are provided as a summary of the recommendations contained within the assessment.

The site appears to have no existing surface water drainage infrastructure within the boundary. The nearest surface water networks are located immediately west and north of the site on Holywell Distributer Road.

It appears that the current drainage regime for the subject site is that surface water drains via infiltration and via overland flow routes to the surrounding surface water network.

Proposed Surface Water Drainage

As part of the development, a number of different SuDS measures are proposed to minimise the impact on water quality and water quantity of the runoff and maximise the amenity and biodiversity opportunities within the site. The existing topography will allow for the site to drain by gravity to the nearby existing 1200 mm dia. surface water pipe located at Holywell Distributor Road to the southwest of the site.

It is proposed to construct a new surface water drainage system for the development to collect and convey runoff to the outfall location. The site will be served by a new network consisting of surface water pipes, blue / green roofs, permeable paving areas and a detention basin. The lower sub-base levels of the permeable paving, the blue/green roofs and detention basin will provide for the attenuation storage requirements on site as a result of the residential development.

SUDS Approach

The proposed SuDS measures for the site will include Source Control measures as part of a Management Train whereby the surface water is managed locally in small sub-catchments rather than being conveyed to and managed in large systems further down the catchment. The combination of the SuDS measures listed below will maximise the potential for surface water attenuation, reducing the impact on the existing surface water drainage network downstream. The proposed techniques will offer high level of treatment processes and nutrient removal of the runoff, particularly during the 'first flush'. Finally, the various measures will offer significant amenity and biodiversity opportunities compared to other drainage systems.

It is proposed to provide the following SuDS measures:

- Blue/green roof systems
- Permeable paving to all footway and parking bay areas
- Detention basin
- Flow control devices to limit discharge

A total of 297m^3 of storage will be provided for the 1 in 100 year event (including 20% for climate change). This storage will be provided within the permeable paving subbase layers, the detention basin and the blue/green roofs. The permeable paving for the footpaths and parking bays and blue/green roofs for the buildings will attenuate the associated runoff from these areas at source. The runoff associated with the access road will be attenuated in the detention basin. The rate of surface

water discharge shall be restricted to QBAR (2.13 l/s/ha) for the 1 in 100 year rainfall event in accordance with GDSDS Volume 2 New Development. This equates to a total permitted discharge of approximately 0.8 l/s from the site.

The provision of SuDS measures to convey, store and manage the discharge of surface water to the receiving surface water network will aid in managing flood risk.

7. Proposed Solutions and Conclusions

To address Policy CAP 12 and DMSO261 of the Fingal Development Plan 2023-2029 a comprehensive evaluation of the building fabric and the energy systems has been carried out on the development at Church Fields.

This evaluation considered several different energy systems evaluating both central and individual plant for both heating and renewable energy systems. The recommendations produced from this evaluation are shown below. All of which provide low carbon, low energy heating solutions.

The preceding sections of this report set out the regulatory requirements with which the scheme will have to comply while identifying a number of technologies and design approaches that may be utilised to achieve compliance.

The building fabric standards and the technology solutions discussed will all be assessed in greater detail during the detailed design stage of the project. A cost benefit analysis of all these available solutions will be carried out to determine the correct balance between an efficient building envelope and the most appropriate combination of technology and renewable energy systems.

The proposed approach to achieving Part L Compliance will be based on a combination of the solutions below once a detailed analysis has been completed at detailed design stage. A final decision will be made once capital costs, renewable targets and regulation compliance have all been compared to find the most appropriate solution.

The most likely solutions that will be implemented for each building typology are set out below, each of which demonstrates the preferred method of compliance with DMSO261

7.1 Apartments

- Meet or exceed minimum U-Value standards identified in Part L 2022 Dwellings
- Achieve air tightness standards of 3m3 /m2/hr ó Ensure thermal bridging details are designed to achieve thermal bridging factors of 0.15W/m2 K.
- Provide an appropriate combination of technologies to ensure energy consumption is in line with Part L 2022 Dwellings requirements. This will include individual plant in each apartment (exhaust air heat pumps or electric heaters and hot water heat pumps).
- Install centralised mechanical ventilation systems to ensure adequate ventilation rates are achieved in the dwelling which maximising the benefits of the airtight construction.
- To comply with DMSO258 and DMSO259 district heating has been evaluated and has been deemed not suitable for the development.

7.3 Landlord Areas

- The most likely overall solution that will be implemented will include the following measures:
- Meet or exceed minimum U-Value standards ó Achieve air tightness standards of 5 m3/m2 /hr
- Provide PV panels to meet Part L renewable contribution requirements (no. of panels will depend on size and if corridor is heated or unheated corridor) (unheated corridor typically 10-15 PV panels)