FALLON DESIGN
M&E ENGINEERING

MECHANICAL & ELECTRICAL SUSTAINABILITY & ENERGY REPORT DOLCAIN HOUSE RE-DEVELOPMENT

Dolcain House,
Monastery Road,
Clondalkin,
Dublin 22.

Sustainability &
Energy Report

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Project Details

Project:	Dolcain House Development
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1. Introduction

The following report will set out the proposed mechanical & electrical strategy for the residential development at Dolcain House, Monastery Road, Clondalkin, Dublin 22. The solution shall be compliant with the latest edition pf Part L: Conservation of Fuel & Energy – Dwellings and meet the heating and hot water needs of the occupants.

2. Project Description

The development will consist of: - (i) Demolition of existing single storey shed (15.7sq.m), esb sub-station (29.5sq.m) and oil tank (12.1sq.m) located in the north-eastern section of the subject site; (ii) Change of use of the existing Blocks A, B and C at Dolcain House from office use to residential use which range in height from 4-5 storeys over basement, together with modifications to the existing blocks; (iii) alterations to the existing Blocks A, B and C will include the removal of the existing fourth floor level and replacement with a new fourth floor level at Block A only, the provision of an additional floor level to all blocks with 2 no. setback floors proposed to the atrium to now provide for a height of 4-5-6 storeys to Blocks A, B and C and upgrading of the existing external fabric of the building as well as internal modifications to layouts to accommodate the proposed residential apartments; (iv) alterations to Block A to include a 5 storey extension to northern elevation; (v) alterations to Block B include the demolition of the existing single storey element on the eastern façade (73.2sq.m) which comprises a kitchen area, office and storage space, the demolition of the existing three-storey connection between Blocks B and C (23sq.m) and the relocation of the existing telecommunications mast equipment at roof level; (vi) construction of a new 6-storey Block D to the east of Block B to accommodate 29 no. apartment units. The proposed alterations and modifications to the existing Blocks A, B and C and the proposed Block D will accommodate a total of 130 no. apartment units (comprising 61 no. one-bedroom apartments, 59 no. two-bedroom apartments and 10 no. three-bedroom apartments, as follows:-

- Block A (including atrium) will comprise 50 no. apartments (consisting of 22 no. one-bedroom apartments, 22 no. two-bedroom apartments and 6 no. three-bedroom apartments) and will range in height from 4-5 to 6 storeys over basement level;
- Block B will comprise 22 no. apartments (consisting of 9 no. one-bedroom apartments, 9 no. two-bedroom apartments and 4 no. three-bedroom apartments) and will be 5 storeys in height;
- Block C will comprise 29 no. apartments (consisting of 13 no. one-bedroom apartments, and 16 no. two-bedroom apartments) and will be 6 storeys in height; and,
- Block D will comprise 29 no. apartments (consisting of 17 no. one-bedroom apartments, and 12 no. two-bedroom apartments and will be 6 storeys in height.

The proposed development will be served by communal residential amenities/facilities at surface and basement level, including communal open space and outdoor areas at surface level; 310 no. bicycle parking spaces (254 no. at basement level and 56 no. at surface level); 78 no. car-parking spaces (62 no. at basement level and 16 no. surface level) including 5 no. car-club spaces and 3 no. accessible parking spaces and; 4 no. motorcycle parking spaces at basement level. The basement level also comprises a proposed bin storage area and plant room. The proposed development also includes landscaping, a pedestrian and cyclist access onto the adjacent Monastery Road to the north; and internal pedestrian and shared surfaces. (vii) Vehicular access to the development is proposed through the existing access/entrance to Dolcain House to the east. The application is accompanied by 2 no. site layout options, Option A and B. Option A includes a new public pedestrian footpath along the southern side of Monastery Road which extends east to the north-eastern application site boundary to facilitate a connection to future footpath. Option B provides for the omission of this footpath. (viii) Associated site and infrastructural works are also proposed which include; foul and surface water drainage; plant areas; ESB substation; and all associated site development works necessary to facilitate the proposed development.

3. Mechanical Solution:

Exhaust Air Heat Pump (EAHP) & Mechanical Extract Ventilation (MEV)

The heating and hot water strategy for the apartment development shall be a localized individual solution contained within each apartment. The system shall be in accordance with Part L of the building regulations and compliance demonstrated with the latest edition of the DEAP software. The solution shall be

3.1 Element 51 – Heating Centre

The installation of an Exhaust Air Heat Pump (EAHP), within each apartment will provide the heating and hot water needs of the occupants. This system will achieve a BER of A2 and meet the latest Part L renewable requirements.

An Exhaust Air Heat Pump (EAHP), can be considered to be an energy recycling system. It collects energy from the warm inside air as it leaves your home via the ventilation system and re-uses it to heat your radiators and Domestic Hot Water (DHW).

The installation of an EAHP is self-contained within each apartment and only requires an ESB connection and standard mains water connection. (i.e. no central boiler house and distribution flow & return pipework)

An exhaust air heat pump can provide for the heating requirements of a well-insulated apartment in some of the coldest conditions. When working efficiently, it can reduce consumption for heating by up to 50% when compared to conventional heating systems.

If there is an extended period of cold weather the heat pump can call on a suitably sized back up heater to assist in meeting the apartments requirement.

The extracted, old air from the wet rooms are passed through the selected ducting into the heat pump. At this point, if there is a heat or hot water demand, the air passes through the heat pumps evaporator, which transfers the heat into the heat pump's refrigerant circuit.

The cooled air is then discharged from the unit and exhausted outside. Meanwhile, the vapour compression cycle of the heat pump raises the temperature of the refrigerant and transfers the extracted heat into a water-based system that can either heat the domestic hot water via a coil in an indirect cylinder or heat the building via heating radiators.

The EAHP is controlled with a touchscreen wall controller in each apartment with a phone app function as standard.

A local 200 litre hot water storage cylinder shall be located in a hot press of each apartment and meet the demands of the resident's hot water. An electric immersion shall be installed for boost and fast recovery of the cylinder if required.

3.2 Element 53 – Water Services

The apartments will be serviced from a central cold-water storage tank and associated booster set. This shall met the requirements set out in Irish Waters guidelines and meet the needs of the development.

3.3 Element 56 – Space Heating

The apartments will be heated with steel, horizontal panel radiators in each room and designed for the operating temperature of the exhaust air heat pump.

Each unit shall have two heating zones, the first zone will be the main open plan kitchen / living room and the second zone will be the bedrooms.

Heating control in the kitchen / living room will be with a 2-port valve and the room thermostat. Heating control in the master bedroom will be with a 2-port valve and thermostat. TRV's (Thermostatic Radiator Valves) will control the space temperature in all other bedrooms.

3.4 Element 57 – Ventilation

The ventilation for the apartments shall be provided by the EAHP and be classed as mechanically ventilated. The central extract shall operate on the principle of mechanical extract ventilation (MEV).

MEV will be commissioned with two dedicated extract flow rates for the unit, one for background ventilation and one for boost ventilation.

- The background ventilation rate will be maintained 24/7 in order to ventilate the unit and maintain the heat pump operation volume flow rate.

- The boost ventilation will be activated by a drop in air or water temperature and raise the volume flow rate to a maximum pre-set value.

- Passive wall inlet vents are required in all habitual rooms to make-up the air extracted by the EAHP.

4. Electrical Services

Element 61- Mains Distribution

A new ESB electrical supply will be brought to each apartment in accordance with ETCI and ESB standards. A centrally located meter enclosure shall be provided with direct access from the public road.

Element 63 – Lighting Services

Low energy LED lighting shall be designed and specified in accordance the BER requirements in each unit and in the landlord areas in accordance with Part L.

Low energy LED public lighting shall be designed in accordance with CIBSE lighting guide and South Dublin County Council public lighting standards.

5. Electric Vehicle (EV):

Element 62- General Services

With introduction of new guidelines from the Irish government and the growing demand for alternative sources of fuel, the publics need for EV charging options is ever increasing in popularity. The following allowance will be included in the development for EV charging.

Apartments:

The basement shall have electrical EV points enabled and shall allow the residents of the apartments charge their electric cars. The supply will be designed for the EV points that they can be extended as required in the future.

Public Spaces:

The development shall have an amount of designated EV public access charging points in selected visitor car spaces. The EV points are peppered around the development and ducted to ESB mini-pillars in accordance with ESB guidelines.

6. Proposed Building Fabric Summary:

6.1 Construction Method:

The proposed construction method for the building shall be in accordance with the engineer's drawings and building fabric as detailed by at construction stage. The following shall outline the minimum thermal performance achieved as part of the detailed design stage in accordance with the current Part L requirements;

- Floor 0.16 W/m^{2}K
- Wall 0.18 W/m^{2}K
- Roof:
  - Type No. 1 0.14 W/m^{2}K
  - Type No. 2 0.16 W/m^{2}K
- Main Door 1.2 W/m^{2}K
- Windows 1.2 W/m^{2}K

6.2 Air Tightness:

Air Tightness Target: < 3m^3/hr/m^2 at 50 Pascals

Air Tightness Method: Air tight membrane with internal plaster

6.3 Thermal Bridging:

Thermal Bridging Factor: 0.15 W/m^{2}K

Key junction details will meet ACD standards. The relevant construction drawings will be signed off by the developer, builder, site engineer & project architect in compliance with the requirements of B(C)AR.

6.4 Energy Efficient Design:

The design development and construction detailing shall adopt an Energy Efficient Design Management strategy to ensure compliance with Part L and achieve high levels of performance in the dwellings.

6.5 Part L: Compliance

All provisional BER's to demonstrate Part L compliance will be completed using the excel DEAP 4.0 issued September 2019 by the department at the time of planning lodgement.