



**MECHANICAL & ELECTRICAL  
ENERGY & SUSTAINABILITY REPORT  
DAVITT ROAD DEVELOPMENT**

**Durkan Davitt Road Ltd.**

**Davitt Road Development  
Dublin 12**

**Mechanical & Electrical  
Energy &  
Sustainability  
Report**

**Project: 1726  
Issue: Planning  
Rev: B  
Date: 14<sup>th</sup> December 2018**

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**Document Details:**

Version	Title	Author
Rev A	Energy Report	Mark Fallon – Fallon Design
Rev B	Energy Report & Building Fabric	Mark Fallon – Fallon Design

**Distribution Details:**

Name	Method	Issue Date	Revision
Brian M Durkan / JFA / Brock McClure	Email Copy	10.09.18	A
Brian M Durkan / JFA / Brock McClure	Hard Copy	27.09.18	B
Brian M Durkan / JFA / Brock McClure	Hard Copy	14.12.18	B

## 1. Introduction

The following report will set out Part L compliance for the proposed residential & mixed development on Davitt Road, Dublin 12. Compliance will be presented in terms of achieving compliance with either of two solutions in accordance with 2011 Part L: Conservation of Fuel & Energy – Dwellings. A central heating scheme with Combined Heat & Power (CHP) or an Exhaust Air Heat Pump (EAHP) in each unit to provide for the developments heating and hot water needs.

## 2. Exhaust Air Heat Pump (EAHP) or Central Plant with CHP (Combined Heat & Power)

### Element 51 – Heating Centre

#### Option A: Central Plant with CHP & Photovoltaic (PV)

The installation of a central boiler plant with CHP (Combined Heat & Power) distributing heat to each apartment will achieve BER of A2 and meet the Part L renewable requirements. This central heating system will distribute heat to a heat station / heat interface unit (HIU) in each apartment that measures the amount of heat being used for centralized billing. Radiators or under floor heating will then be used through the heat sub-stations to heat the apartments. Hot water for showers is generated instantaneously with a heat exchanger built into the HIU sub-station. Hot water is not stored in the apartment and demand is met with the energy of the central boiler plant.

Each apartment will have an individual time & temperature time clock for scheduling their individual heating requirements.

The energy consumed by each apartment is measured and billed individually based on electronically collected data. A standing charge for management / maintenance of the system also applies. In the event a unit is not paying the bill a set of valves located in the riser can be shut to stop heat going to the unit.

A third party operator of the central heating system is tendered out and based on a contract agreement with the management company. The measured energy consumption data from the sub-stations is exported to a third party operator company via a modem in the plantroom. Agreements are put in place for the protection of the management company and residents as to the range of heat charges per kWh. A sinking fund for replacement of plant is typically collected as part of the standing charge and ring fenced for the management company.

Photovoltaic (PV) will be utilized to meet the remainder of the Part L requirements in accordance with nearly zero energy buildings. This will be roof mounted across the development and integrated to the roof designs. The central plant & landlord electrical load shall have the associated PV directly connected to it's consumer board to reduce the running costs at source.

#### Option B: Exhaust Air Heat Pump & Photo Photovoltaic (PV)

The installation of an Exhaust Air Heat Pump (EAHP), within each apartment will achieve BER of A2 and meet the Part L renewable requirements.

An Exhaust Air Heat Pump (EAHP), is considered to be an energy recycling system. It extracts energy from the warm air as it leaves the home via the ventilation system and uses it to heat the 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 satisfy for the heating requirements of a well-insulated apartment in some of the coldest conditions. When working efficiently, it can reduce energy consumption of heating by up to 50% when compared to conventional heating systems.

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

The extracted air from the wet rooms is passed through the 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 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 meets the demands of the resident's hot water. An electric immersion shall be installed for boost and fast recovery of the cylinder if required.

Photovoltaic (PV) will be utilized to meet the remainder of the Part L requirements in accordance with Nearly Zero Energy Buildings (NZEB). This will be roof mounted across the development and integrated to the roof designs. Each dwelling shall have the associated PV directly connected to it's consumer board to reduce the EAHP running costs at source.

### **Element 56 – Space Heating**

The units will be heated with steel, horizontal panel radiators in each room of the apartments and designed for the operating temperature of the central plant or 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 will control the space temperature in all other bedrooms.

### **Element 57 – Ventilation**

The ventilation for the apartments shall be provided by a mechanical system with central extract and operating on the principle of Demand Control Ventilation (DCV). DCV monitors humidity and adjusts to control the movement and volume of air exchange in a building based on air quality. If humidity is not the best indicator, then DCV can use things like presence detection or manual boosts.

The system shall have a centrally located extract unit located within the unit c/w power supply and maintenance assess. All air inlets shall be with Ø100mm humidity controlled wall ventilators with fire rated grilles to maintain the fire integrity of the ceiling.

### **3. Electrical Services**

#### **Element 61– Mains Distribution**

The electrical power generated by CHP shall be distributed to the landlords main board for use in the developments electrical building load in accordance with Part L.

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 and specified in accordance with CIBSE lighting guide and Dun County Council public lighting standards.

#### 4. Proposed Building Fabric Summary:

##### 4.1 Construction Method:

The proposed construction method for the building shall be in accordance with the engineer's drawings with façade finishes as per the Architectural specification. The following shall outline the back-stop thermal performance achieved as part of the detailed design stage;

○ Floor	0.15 W/m <sup>2</sup> K
○ Wall	0.21 W/m <sup>2</sup> K
○ Roof:	
▪ Type No. 1	0.14 W/m <sup>2</sup> K
▪ Type No. 2	0.16 W/m <sup>2</sup> K
○ Main Door	1.2 W/m <sup>2</sup> K
○ Windows	1.4 W/m <sup>2</sup> K

##### 4.2 Air Tightness:

Air tightness Target: < 3m<sup>3</sup>/hr/m<sup>2</sup> at 50 Pascals

Air tightness Method: Air tight membrane with internal plaster

##### 4.3 Thermal Bridging:

Thermal Bridging Factor: 0.08 W/m<sup>2</sup>K

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