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SUSTAINABILITY & ENERGY STATEMENT
FOR
RATHGOWAN, MULLINGAR

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1. INTRODUCTION

The purpose of this report is to outline and to confirm that the dwellings in the development will be built in compliance with NZEB requirements as per the Part L Dwellings (2021). The compliance is assessed using the upgraded Domestic Energy Assessment Procedure (DEAP Version 4.2.1)

DSPL Limited intends to apply to An Bord Pleanála for permission for a strategic housing development on a site area of 6.37Ha located at Rathgowan, Mullingar, Co. Westmeath. The site is located north and east of existing housing at Ardilaun Heights and Rathgowan Wood, north-west of the R394, which is known as the Mullingar Western Relief Road and south of the R393 Ashe Road, all in the townland of Rathgowan or Farranshock.

The proposed development will consist of 212 no. dwellings and a creche. The residential dwellings are comprised of 107 no. 2 & 3 storey houses, 86 no. 2 & 3 bed duplex units in 8 no. 3 storey blocks and 19 no. 1 & 2 bed apartments accommodated 1 no. 4 storey building which also accommodates a crèche at ground floor level (430sq.m), with associated outdoor play area. The proposed houses consist of 31 no. 2 bed, 70 no. 3 bed and 6 no. 4 bed detached, semi-detached and terraced houses.

The proposed development provides for all associated site development works, relocation of existing underground surface water attenuation tank, car parking, bin & bicycle storage, public and communal open spaces, hard & soft landscaping and boundary treatments, underground utilities, substation and public lighting. Vehicular access to the development will be off the R394, via Rathgowan Park with pedestrian & cyclist access also proposed onto the R393 Ashe Road to the north.

UNIT TYPES	UNIT TYPE DESCRIPTION	GROSS INTERNAL AREA (m ²) *		NUMBER OF UNITS	TOTAL AREA GIA (m ²)	BED SPACES	TOTAL BED SPACES
HOUSES							
A1	4 Bed -Terrace (2 storey)	134.1	(110)	1	134.1	7	7
B1	3 Bed -Terrace (2 storey)	116.6	(92)	6	699.6	5	30
C1	3 Bed - Terrace (2 storey)	110.0	(92)	38	4180.0	5	190
D1	3 Bed - Terrace (2 storey)	111.5	(92)	26	2899.0	5	130
E1	2 Bed - Terrace (2 storey)	91.3	(80)	31	2830.3	4	124
G1	4 Bed - Terrace (3 storey)	140.9	(120)	5	704.5	8	40
TOTAL HOUSES				107	11447.5		521
DUPLEX							
J	2 Bed Apartment (1 storey)	79.2	(73)	18	1425.6	4	72
K	3 Bed Duplex (2 storeys)	105.6	(90)	18	1900.8	5	90
L	2 Bed Duplex (1 storeys)	115.0	(73)	19	2185	4	76
M	3 Bed Duplex (2 storeys)	149.9	(90)	19	2848.1	5	76
N	3 Bed Apartment (2 storey)	105.8	(90)	4	423.2	5	20
O	3 Bed Apartment (2 storey)	112.8	(90)	4	451.2	5	20
P	2 Bed Apartment (1 storey)	122.0	(73)	4	488	4	16
TOTAL DUPLEX UNITS				86	9721.9		370
APARTMENTS							
APT.F	2 Bed Apartment	82.9	(73)	1	82.9	4	4
APT.G	2 Bed Apartment	85.9	(73)	3	257.7	4	12
APT.H	1 Bed Apartment	53.4	(45)	3	160.2	2	6
APT.J	2 Bed Apartment	80.2	(73)	3	240.6	4	6
APT.K	2 Bed Apartment	84.9	(73)	3	254.7	4	12
APT.L	1 Bed Apartment	54.6	(45)	3	163.8	2	6
APT.M	1Bed Apartment	54.8	(45)	3	164.4	2	6
TOTAL APARTMENTS				19	1324.3		52
OVERALL TOTAL				212		943	
				Units		Bedspaces	

2. EXECUTIVE SUMMARY

The residential units in the development shall be constructed to achieve a high level of thermal efficiency with highly insulated building fabric and optimising passive solar gains. Our design employs that all apartments will have a very high energy performance, while minimization of energy requirement will be covered by high efficiency heat pumps.

Our in-depth analysis and design modelling of the development will show that the most suitable system employs high efficiency heat pumps for each apartment serving both heating and hot water.

3. BUILDING REGULATIONS

PART L & NEARLY ZERO-ENERGY BUILDING

Ireland's new building regulations, Part L 2021, are now in effect. The Part L 2021 set building fabric and energy performance to achieve Nearly Zero-Energy Building.

Nearly Zero-Energy Building (NZEB): means a building that has a very high energy performance as determined in accordance with Annex I of the EU Energy Performance of Buildings Directive Recast (EPBD Recast). The "nearly zero" or very low amount of energy required should be covered to a very significant extent through renewables, including energy from renewable sources produced on-site or nearby.

The Part L 2021 introduces Renewable Energy Ratio (RER) as the ratio of the primary energy from renewable energy sources to total primary energy as defined and calculated in DEAP. This has replaced Part L 2011 Renewable contribution.

EPC & CPC

In order to achieve the acceptable primary energy consumption rate for a nearly zero energy dwelling, the calculated energy performance coefficient (EPC) of the dwelling being assessed should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). The MPEPC for a nearly zero energy dwelling is 0.30.

To demonstrate that an acceptable CO₂ emission rate has been achieved for a nearly zero energy dwelling, the calculated carbon performance coefficient (CPC) of the dwelling being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC). The MPCPC for a nearly zero energy dwelling is 0.35.

RENEWABLE ENERGY RATIO FOR COMMON AREAS

Where there are both common areas and individual dwellings in a building, reasonable provision would be to show that the average contribution of renewable technologies to all areas meets the minimum level of renewable provision to the individual dwellings and common areas combined. In case of apartment block, a proportion of the renewables should be provided to each area and individual dwelling in the building. This proportion shall be covered by an array of PV panels.

CRECHE COMPLIANCE

Technical Guidance Document L 2021 Conservation of Fuel and Energy – Buildings other than Dwellings applies to the creche located on the ground floor of the apartment block. The Energy Performance Coefficient (EPC), Carbon Performance Coefficient (CPC) and Renewable Energy

Ratio (RER) calculations use the NEAP activities database for occupancy, heating, cooling, ventilation, air conditioning, lighting, equipment parameters and profiles.

EPC of the building being assessed should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). The MPEPC is 1.0.

To demonstrate that an acceptable CO₂ emission rate has been achieved, the calculated CPC of the building being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC). The MPCPC is 1.15.

Where the MPEPC of 1.0 and MPCPC of 1.15 is achieved an RER of 0.20 represents a very significant level of energy provision from renewable energy technologies.

In our design we will aim for improved EPC of 0.9 and a CPC of 1.04. In this case an RER of 0.10 represents a very significant level of energy provision from renewable energy technologies.

ELECTRIC VEHICLE RECHARGING INFRASTRUCTURE

Part L 2021 Dwellings 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.

In the design the guidance outlined in Paragraph 1.1.5(k) of TGD M 2010 will be followed. Also in relation to compliance with the Westmeath County Development Plan 2021-2027 in Section 11.1 of 'Traffic and Transportation Assessment' prepared by PUNCH Consulting:

30 no. Electric Vehicle Charging Points (EVCP) (10% total no. of spaces) will be provided for as per section 16.4.1 of the WCC Development Plan (2021-2027) which requires providing facilities for the charging of battery-operated cars at a rate of up to 10% of the total car parking spaces.

4. SUSTAINABILITY & ENERGY STATEMENT

The proposed location of the development is located within walking distance of Bus Routes serving the area.

To reduce energy demand, the dwellings will be constructed with a high standard of insulation & air tightness. Additional energy demand reduction will be achieved by applying passive design techniques. The design of the fabric and proposed equipment will satisfy the requirements of new Part L Building Regulations and NZEB, giving a BER rating of A3 or better.

The specifications of individual building elements, building services, and items linked to energy efficiency were reviewed in detail for the typical dwelling types occurring throughout the development to ensure compliance with the building regulations and requirements of the local council.

Key Sustainable Design Elements:

- High performance double glass in the windows.
- High levels of insulation
- A+ Low energy LED lighting throughout the development.
- High levels of airtightness of the dwellings.
- Demand controlled ventilation for each dwelling.
- High efficiency heat pump for each unit serving heating & hot water requirements.

WINDOWS AND BUILDING FABRIC

All windows shall be double glazed windows with a combined thermal transmittance not greater than 1.2W/m²K. All windows shall comply with BS EN ISO 10077-1: 2006 – “Thermal performance of windows, doors and shutters - Calculation of thermal transmittance”.

Building fabric will include insulation levels sufficient to meet the Part L 2021 U-values.

Table 1. Building Elements U-values

Building Fabric Element	Target U values	Part L 2021 Maximum Elemental U-value
Exposed & Ground floor	0.12 W/m ² K	0.18 W/m ² K
External Wall	0.18 W/m ² K	0.18 W/m ² K
Pitched Roof	0.14 W/m ² K	0.16 W/m ² K
Flat Roof	0.2 W/m ² K	0.2 W/m ² K
External Windows & Doors	1.2 W/m ² K	1.4 W/m ² K

THERMAL BRIDGING ACCEPTABLE CONSTRUCTION DETAILS

Building Regulations TGD L Appendix D is defining thermal bridges that occur at junctions between building elements and are included in the calculation of transmission heat losses. The DEAP calculation includes thermal bridging, at junctions between elements and around openings.

For purpose of this statement and preliminary BER results for the houses and duplex units a value of $\gamma = 0.08 \text{ W/m}^2\text{K}$ was used. Value 0.08 W/m²K may be used for new dwellings whose details conform with “Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details” as referenced in Building Regulations 2011 TGD L. This requires that the details described in the above document are adhered to and relevant drawings be signed off by the site engineer or architect.

AIR PERMEABILITY

Part L (2019) specify 5 m³/m²/hr @ 50Pa as upper limit for air permeability and that every house needs to be tested. To reduce heat loss by infiltration the target air permeability will be 3.0 m³/m²/hr @ 50Pa

Air permeability shall be measured by means of pressure testing of a building prior to completion in accordance with BS EN ISO 9972:2015 “Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method”.

HEATING & HOT WATER

Use of low carbon technology includes High Efficiency Exhaust Air Heat Pumps and Air source split system heat pumps. These units and key sustainable measures will satisfy the Renewable Energy Ratio.

The heat pump type should be an All-in-One Combination type Exhaust Air Heat Pump for the apartment and duplex units. This is a air ventilation recovery type system which is a single unit comprising of an internal fan with an integrated stainless steel domestic hot water cylinder. The heat pump should be fully compliant with Eco-Design Labelling Directives, both EN14825 and EN16147. Split system heat pumps will be serving the houses.

High level of controls and multiple zones will also aid in achieving more efficient use of the system, and will further reduce the energy demand. The new DEAP assessment detailed design for hot water fittings will be carried out.

Booster pumps and all heating pumps shall have energy rating class A.

DEMAND CONTROLLED VENTILATION

Part F of building regulations requires adequate and effective means of ventilation shall be provided for people in buildings. This shall be achieved by:

- (a) limiting the moisture content of the air within the building so that it does not contribute to condensation and mould growth, and
- (b) limiting the concentration of harmful pollutants in the air within the building.

It is proposed that the EAHP ventilation system will serve each unit to provide high indoor air quality for the occupants. Max SPF of the fan should not be higher than 0.25 W/l/s and must be listed on the SAP Appendix Q database.

The design of dwellings shall provide required area of background ventilators via wall vents/trickle vents & undercut doors to wet rooms to provide fresh air in place of extracted air from the wet rooms. Systems should be installed, balanced, and commissioned by competent installers e.g Quality and Qualifications Ireland accredited or Education Training Board or equivalent. Systems when commissioned and balanced should then be validated to ensure that they achieve the design flow rates by an independent competent person e.g NSAI certified or equivalent.

ENERGY SAVING LIGHTING

The new DEAP requires a detailed design of lighting for each dwelling. For this project the calculation of lighting use shall be based on the installed fixed lighting, and on the contribution of daylight. The calculation will include low-energy lighting provided by fixed outlets based on lighting design details (e.g., lamp power and efficacy), lamp type, and number of lamps.

PV PANEL ARRAY

We have calculated that 12 no. PV panels will be required to cover RER of 0.2 for the common areas of the apartments (8no. PV panels) and the creche (4no. PV panels). Low profile mounting system shall be used to conceal the installation below parapet level.

NOTE:

Calculations are based on Eco-design data for Comfort zone EX35 Exhaust air heat pump.

All apartments shall have natural ventilation provided by wall/window vents with centralized mechanical extract in areas as per Building Regulation - Part F 2019.

Thermal Bridging Factor - thermal bridging modelling to be carried out to demonstrate factor used in DEAP where non default is used.

(NZEB) Nearly Zero Energy Efficient Building - means a building that has a very high energy performance as specified in the 2017 issue of Building Regulations TGD Part L. All new dwellings will be nearly zero energy dwellings as of 31 December 2020 (MPEPC=0.3 & MPCPC=0.35).

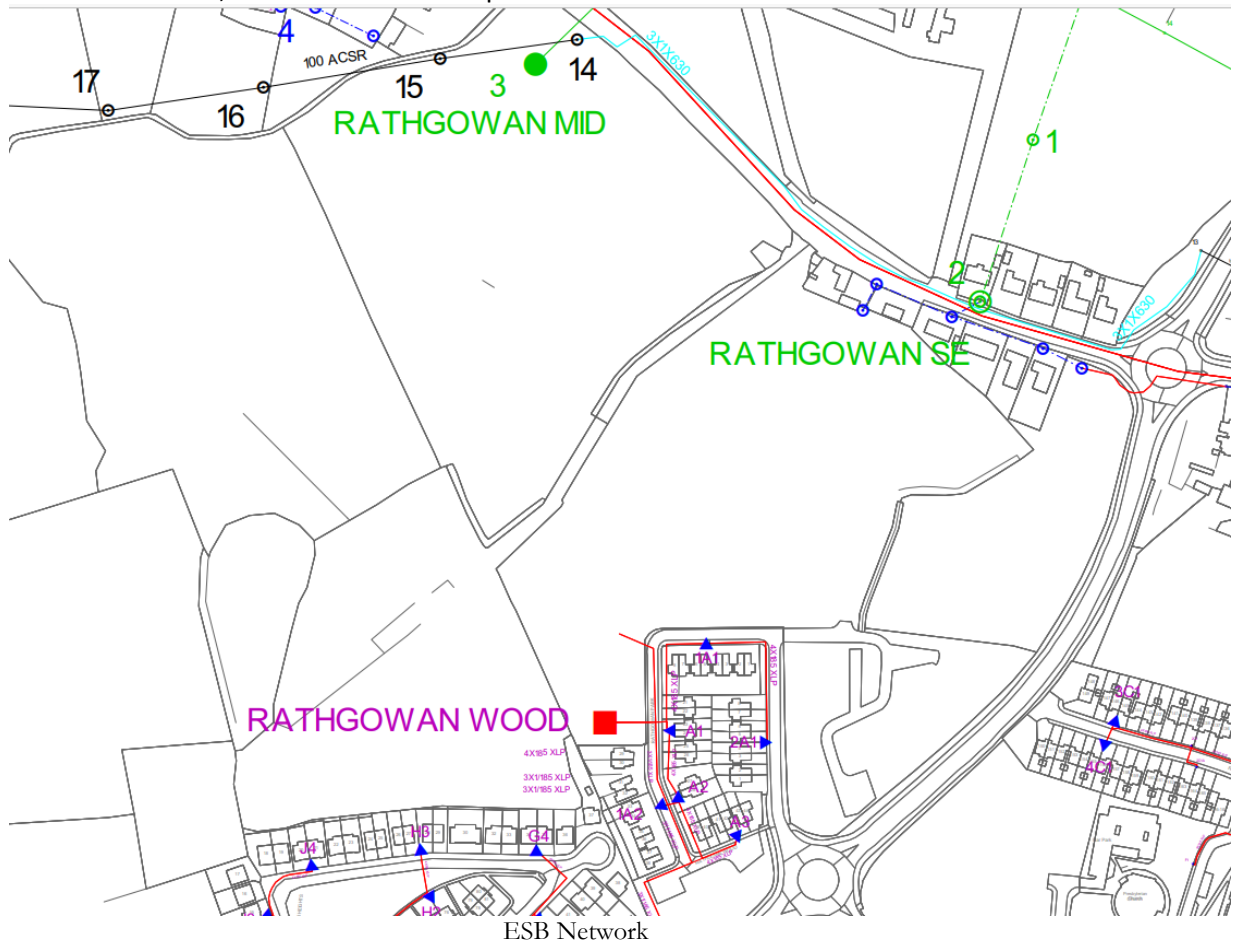
CPC - Carbon Performance Coefficient / MPCPC - Maximum Permitted CPC.

EPC - Energy Performance Coefficient / MPEPC - Maximum Permitted EPC.

5. INFRASTRUCTURE

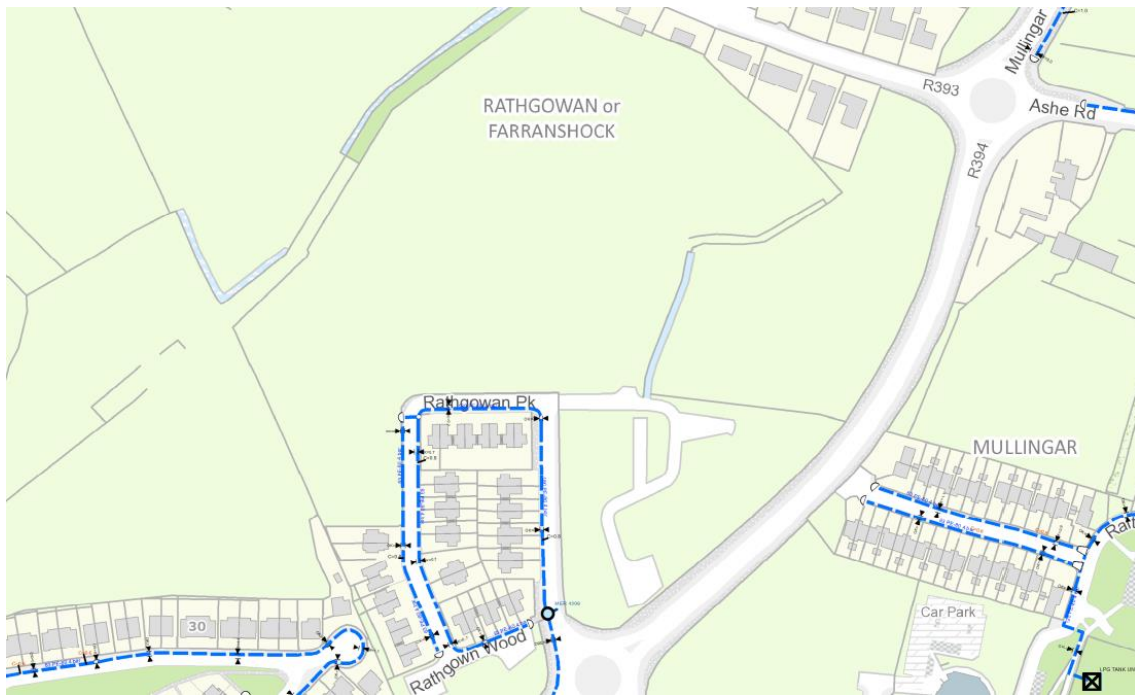
The proposed site location is very well serviced by all major utilities. Major spine services for Gas, Electricity, Water and Communications have local network sufficient to meet the needs of the new development. Based on the number of dwellings it is envisaged that an ESB mini pillar shall serve the development.

We have explored utilities which are in immediate proximity to the site & reviewed specific service diversions, service routes and capacities to the site.





EIR Network



Gas Network

PUBLIC LIGHTING

The surrounding area is currently being supplied with pre-existing public lighting. Further lighting serving the new development will be designed and supplied to the standards of Westmeath County Council and the standard for road lighting (BS 5489-1: 2020 Class P4 and BS EN 13201).