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CLIMATE CHANGE ADAPTATION & ENERGY EFFICIENCY STATEMENT

FOR

COOKSTOWN CASTLE DEVELOPMENT

AT

LANDS WEST OF OLD BELGARD ROAD AND NORTH, SOUTH AND WEST OF COOKSTOWN ROAD, COOKSTOWN INDUSTRIAL ESTATE, TALLAGHT, DUBLIN 24

FOR

JOSEPH COSTELLO, ABSOLUTE LIMOUSINES LTD AND BOHERKILL PROPERTY DEVELOPMENT LTD

JAK
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CONTENT

1. INTRODUCTION

Climate change presents a unique challenge for Ireland economy, environment and society. This document is intended to provide a statement for plan and adaptation for projected climate change and impacts. The overall design was developed based on Adaptation Wizard from Climate Ireland and ensures that the development is equipped for challenges anticipated from a changing climate.

The document outlines Climate Change Adaptation Design for the Development along with detailed energy efficiency design of the Development. The energy efficiency design considers the upcoming revisions in the Part L Building regulations document and is guided by I.S 399 (Energy Efficient Design Management).

The proposed development, by reason of its location on a brownfield site, together with its density and layout, will promote the efficient use of land and of energy, including in relation to transport, and thereby minimise greenhouse gas emissions.

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 will also address ways of influence the behaviour of the occupants which can help to reduce the energy consumption. Our design employs that all apartments will have a very high energy performance & amount of energy required will be covered to a very significant extent by energy from renewable sources.

Our in-depth analysis and design modelling of the development will show that the most suitable system to be compatible with possible connection to district heating scheme are high efficiency modulating gas boilers in cascade arrangement providing heat and hot water for each apartment via heat interface units in each apartments. The renewable targets will be met with the high efficiency heat pumps supplying renewable heat to the centralised system.

2. DEVELOPMENT DESCRIPTION

The Cookstown Castle is a mixed-use development will consist of residential use and employment uses all located on Cookstown road.

The proposed development consists of construction of a mixed-use development featuring 1104 no. 'build-to-rent' apartments in 4 no. blocks varying in height from four to eleven storeys. The development also includes 4 no. commercial units at ground floor level of Blocks B
and D, office space across first to seventh floor levels of Block D and a crèche at ground floor level of Block C. The development is served by parking spaces (including limited mobility parking spaces) and bicycle spaces.

The Cookstown Castle development provides high-quality architectural design which enhances the existing characteristics of this site.

3. CLIMATE CHANGE ADAPTATION STATEMENT

Climate Change Adaptation Statement aims to ensure that this project will be better prepared to respond to current and future climate change impacts by reducing our vulnerability to climate change. Adaptation actions aim to reduce the impacts of climate change and also to take advantage of any opportunities presented by climate change.

Local Authority Adaptation Wizard provided by Climate Ireland was used as a baseline to prepare this statement.

This document divides adaptation responses into 3 basic categories:

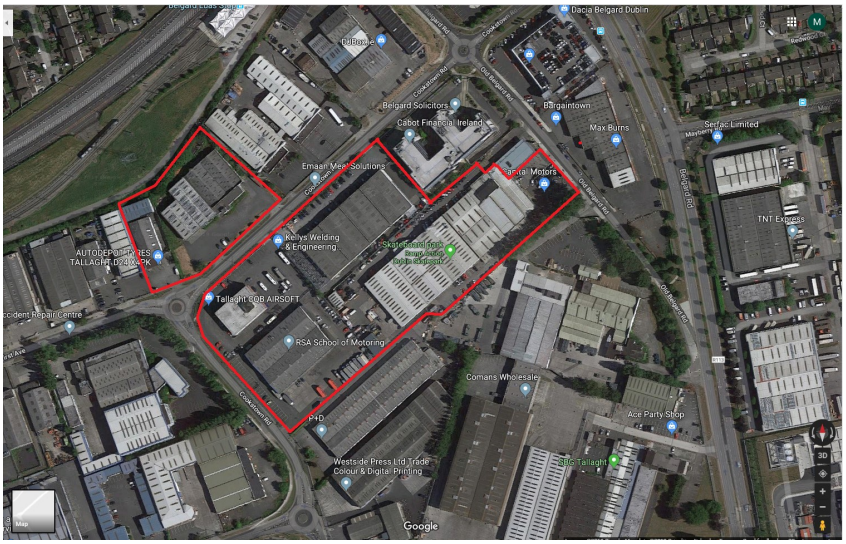
- Grey Actions - Technological and engineering solutions.
- Green Actions - Ecosystem based approaches that use the multiple services of nature
- Soft Actions - Managerial, legal and policy approaches that alter human behaviour and style of governance.

Climate Change Adaptation Statement provides effective strategies to lower Greenhouse Gases for the development, with respect to:

- Construction stage – waste management & recycling
- Services - lighting, space heating and hot water,
- Climate-dependent envelope changes – high levels of insulation, air-tightness
- Human behaviour - using fewer resources, efficient appliances, efficient transport
- Renewable energy sources - solar photo-voltaics

2.1 Project Location

The location of the proposed development close to public transport routes will ensure good connectivity. Its location in adjacent to the Belgard Luas stop and Bus Routes serving Belgard Road.



2.2 Climate Impact Screening

Building sector has high energy demand which includes the energy used during construction, embodied energy of materials used and in addition there is energy demand of the buildings once occupied.

During the construction process waste is generated and efforts to reduce and recycle waste need to be incorporated.

Changes in climate are being observed and these impacts are expected to continue and intensify into the future. Risk of flooding would be assessed as part of the adaptation design.

2.3 Assess Climate Risk

Energy Demand & Waste Materials – Construction
Energy demand of the construction process includes production and removal of waste generated on site.

Energy Demand – Occupied Building
Energy demand of the occupied apartments can contribute to the climate change as at present majority of generated energy comes from carbon-based fuels. Carbon footprint of the occupiers can be based on the commuting and consumption patterns.

Flood Risk
Extreme weather patterns can pose higher risk of flooding which can cause high economical damage and disruption to the community. Review of the flood risk is included in the Engineering services report and it is deemed to be outside the 1000 year flood events (Zone C)

2.4 Impact Statement - Adaptation Options

Reduce Energy Demand – Grey Actions for the Occupied Building
The development design includes measures to reduce carbon footprint of the building. High level of insulation and high performance glazing will reduce the heating demand on the plant and on site produced renewable energy will further decrease the energy demand. Chapter 3 provides description of Energy Conservation & Renewable Energy which serve as the Grey actions to reduce the energy requirements of the building.
As part of the design process IS 399 was used to review the energy efficient design and to include the energy design. The provision for a connection to the future district heating network will aid the adaptability of building and enable the building to be retrofitted or refurbished to meet higher energy efficiency standards into the future.

Behavioural Measures – Soft Actions for the Occupied Building
The way people use energy in the home, at work and in commuting between the two places, has the potential to save up to 20% of total energy consumption.
Many Irish households are unaware of the large ecological footprint that they have on the environment and how to easily save resources and prevent waste. Soft actions will aim to inform the building occupants on effective strategies to use less resources, efficient appliances, efficient use of their heating/hot water controls and efficient transport/ commuting.

Reduce Energy Demand – Grey & Soft Actions during Construction
This is covered by the document 'DRAFT CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN' which will accompany the formal planning application. This document is intended to set a clear path and philosophy for the future nominated contractor in drawing up their own final strategy for Construction and Demolition Waste Management Plan.

Flood Risk
The subject site is located more than 1km from the Whitestown Stream and therefore has not been included in the Draft ECFRAMS study currently under public consultation. The site is therefore deemed to be within Flood Zone C, i.e. outside the 1000 year flood events. Additionally, the site is also located more than 12km from the coast. The sequential approach recommended by "The Planning System and Flood Risk Management Guidelines for Planning Authorities" has been complied with for the subject site as it is within Flood Zone C.

2.5 Implement, Evaluate & Review

The adaptation options outlined above should be implemented by the main contractor and after building handover by future management company. The management company will be responsible to develop a final implementation plan, a monitoring routine and a schedule of evaluation and review.

4. BUILDING REGULATIONS

PART L & NEARLY ZERO-ENERGY BUILDING

The new Part L - Dwelling (2019) of building regulations was put in place and this document is the new standard for dwelling constructed after October 2019.

The Part L – Dwelling 2019 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 by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

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

The Part L 2019 introduces Renewable Energy Ratio (RER) is the ratio of the primary energy from renewable energy sources to total primary energy as defined and calculated in DEAP. Minimum RER is 0.2 and this index is replacing Part L 2011 Renewable contribution.

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.

5. ENERGY CONSERVATION & RENEWABLE ENERGY

The apartments will be constructed with high standard of insulation & air tightness which aim to satisfy the requirements of new Part L Building Regulations and NZEB. Energy demand minimization will be achieved by best practise in heat recovery ventilation and energy efficient building design. All windows will come with high performance glazing.

The specification of individual building elements, building services and items linked to energy efficiency was reviewed in detail for the typical apartment types occurring throughout the development to ensure compliance with the building regulations and requirements of the SDCC.

Key Sustainable Design Elements:

- High performance glazing in the windows.
- High levels of insulation
- Low energy lighting throughout the development.
- High levels of air-tightness of the apartments.
- High efficiency centralised plant serving heating & hot water requirements
- Behavioural Measures

The building shall be designed in such a way so that central core risers are all collectable & link to rooftop plantroom area as indicated in the drawing J590(6-)03.

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 2019 U-values.

Table 1. Building Elements U-values

Building Fabric Element	Target U values	Part L 2019 Target Elemental U-value
Exposed & Ground floor	0.18 W/m²K	0.18 W/m²K
External Wall	0.18 W/m²K	0.18 W/m²K
Flat Roof	0.2 W/m²K	0.2 W/m²K
External Windows & Doors	1.2 W/m²K	1.4 W/m²K

AIR PERMEABILITY

Part L (2019) specify 5 m3/m2/hr @ 50Pa as upper limit for air permeability. 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 '

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 a value of y = 0.08 W/m2K 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.

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 Demand controlled ventilation (DCV) 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 has to be listed on the SAP Appendix Q database.

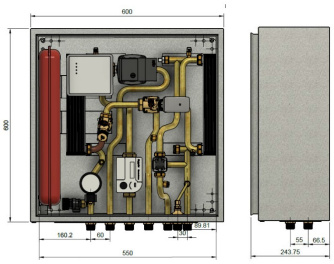
The design of dwellings shall provide required area of background ventilators via wall vents/trickle vents & undercut doors to wet rooms to provide fresh air in place of extracted air from the wet rooms. Systems should be installed, balanced, and commissioned by competent installers e.g. Quality and 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

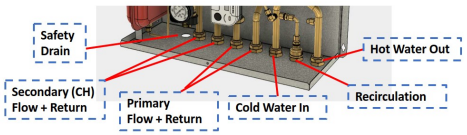
The new DEAP requires a detailed design of lighting for each dwelling. For this project the calculation of lighting use shall based on the installed fixed lighting, and on the contribution of daylight. The calculation will include low-energy lighting provided by fixed outlets based on lighting design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

HEAT INTERFACE UNIT

Each apartment will be fitted with a Heat Interface Unit (HIU) which shall be wall mounted and designed to provide indirect space heating and Instantaneous DHW. Each unit contains an ultrasonic heat meter to fitted with MBUS communications which will be linked back to plantroom and provide a record of heat and hot water used by the occupier for purpose of billing.



Height mm	Width mm	Depth mm
600	600	250



Hydraulic Connections	Safety Drain
¾" BSP	½" BSP

CENTRALISED PLANT

Part L renewable energy compliance shall be achieved by implementing of high efficiency centralised heating system. The Part L renewable contribution shall be covered by the proposed high efficiency heat pumps. High efficiency gas boilers will be part of the system. A space allowance analysis has been carried out to ensure adequate plant space is provided to facilitate Plant & Equipment and sufficiently sized services risers are provided.

The design of the centralised heating system will take account of the output rating of the equipment and the design thermal profile for the development to ensure the system is suitable for the building application and not oversized. The Diversity will be applied on Danish/Swedish centralised heating standards to ensure optimum system sizing for the operation.

The Building Management system will comprise of distributed networked Outstations to collect the various data points via Hard wired Sensors, Instruments & outputs are given to enable and control all items connected to the BMS.

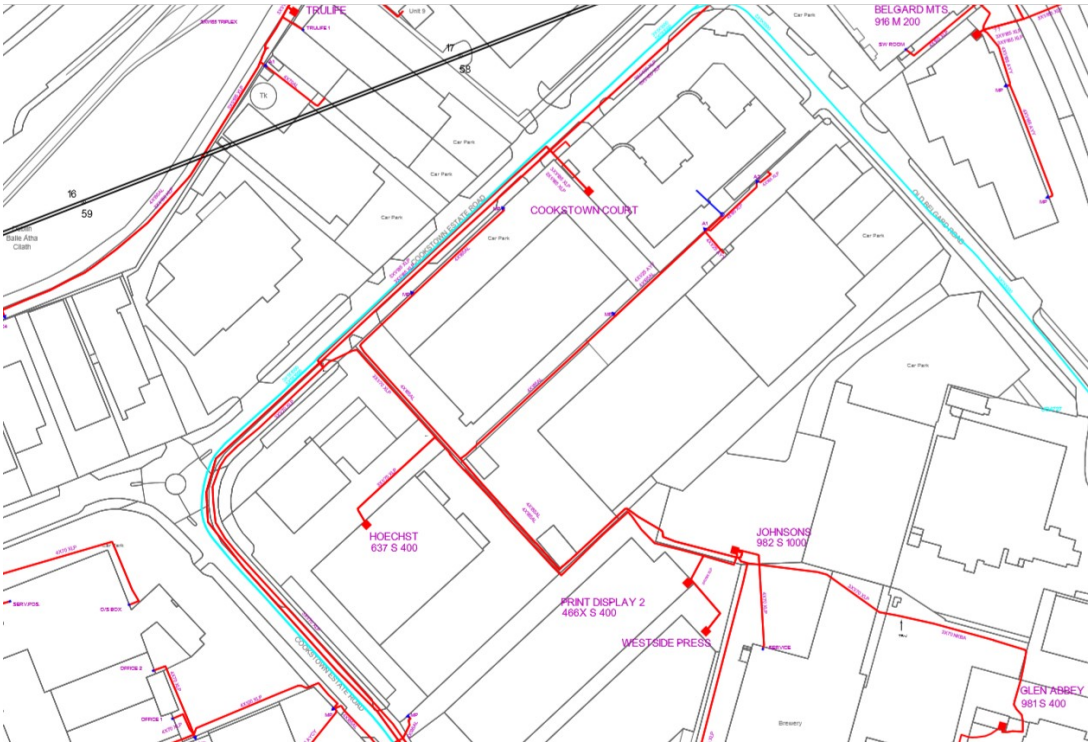
All pumps serving the plant to be A rated energy efficiency. Advanced Building Energy Management system will control the plant to ensure its operation to maximum efficiency.

We have liaised with Gas Networks representative and they have confirmed there is 63 PE 4 BAR Gas Main available adjacent to the site.

6. 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 blocks & dwellings it is envisaged that 8 no. ESB substation shall serve the development.

We have explored utilities which are in immediate close proximity to the site & reviewed specific service diversions, service routes and capacities to the site. The appended drawing J590(6-)02 indicates current and future infrastructure.



Existing ESB Networks Infrastructure

Existing EIR Infrastructure

Existing Gas Networks Infrastructure

We have liaised with Gas Networks representative and they have confirmed there is 125 PE 4 BAR Gas Main available adjacent to the site.

7. REFERENCES

- TGD Part L (2019)
- South Dublin County Council Development Plan 2016 - 2022
- Tallaght Town Centre Local Area Plan (South Dublin County Council)
- A Strategy Towards Climate Change Action Plans for The Dublin Local Authorities
- Dublin City Sustainable Energy Action Plan 2010 - 2020 – v2
- South Dublin County Council - Pre-Planning Guidance
- EUROCITIES Declaration on Climate Change
- National Climate Change Adaptation Framework Building Resilience to Climate Change, DECLG (2012)
- The EU Strategy on adaptation to climate change