Planning Stage Sustainability Report

& Basis for Design

For the Mechanical & Electrical

Services installations at

UStoreit Liffey Valley

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1 Introduction

With consideration to the EU Energy Performance of Buildings Directive (EPBD), the Building Regulations Technical Guidance Document, Part L, 2019 edition (No.2) and South Dublin County Council's strategy for sustainable design and reductions in energy and carbon emissions, the building services design strategy for Ustoreit Liffey Valley is to utilise sustainable design options and energy efficient systems that are technically, environmentally feasible for the project to achieve a suitably sustainable status.

This report shall demonstrate that the design philosophy for the proposed U Store It Development will employ a holistic approach to the construction and integration of the building, the systems and its users. This philosophy is supported by the use of sustainable options and energy efficient systems.

2 Development Description

Our client intends to apply to South Dublin County Council for permission for a commercial storage development on lands at Liffey Valley Office Campus.

The proposed development is to be constructed on a greenfield site in between the existing Giraffe Childcare facility and Johnson & Johnson Building in Quarryvale, Liffey Valley. The commercial development will comprise a multi-floor development housing internal rental storage units, and small cafe element with a basement car parking facility.

The development will be served via the existing vehicular access point from Quarryvale road.
The associated site and infrastructural works include provision for water services; foul and surface water drainage and connections; all landscaping works; boundary treatment; and electrical services, with no ESB substation.

3 Overview

The approach to sustainable design and energy efficiency will lead to a development that will take advantage of highly efficient mechanical and electrical design solutions along with the possible improvement of building construction elements to reduce the requirements for energy.

'Nearly Zero Energy Buildings' means a building that has a very high energy performance. 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.

The NZEB standard will apply to all new buildings occupied after the 31st December 2020, and hence will apply in this project.
In line with the EPBD directive, Ireland carries out a cost optimal analysis to define NZEB requirements. Part L of the Building Regulations defines the requirements in legislation.

For all new builds, an equivalent to a 60% improvement in energy performance on the 2008 Building Regulations is required. This means an improved energy performance for the fabric, services and lighting specification. It also introduces a mandatory requirement for renewable sources. The renewable sources must in general provide 20% of the primary energy use, however there is flexibility where the building is more energy efficient than the regulations. This typically corresponds to an A3 Building Energy Rating.

The objective is to obtain an NZEB rating for the commercial unit so inclusion "Active and sustainable" measures have been considered to ensure minimal energy requirements, optimal operation and minimal life cycle costs are achieved.

The active energy measures considered include the following technologies:

1. Reasonable air-tight building construction to maintain low level heat loss from the building. The building will be pressure-tested in accordance with BSRIA standards to ensure that the leakage rate is not excessive.

2. Pressurised water services using variable-speed drive multi stage booster pump sets. Variable-speed drive technology can realise energy saving up to 50% compared to standard fixed-speed pumps, as the pump motors ramp up & down to accurately match the load requirements.

3. Water services will incorporate low-flow fittings (push-type percussion spray taps and aerated shower heads).

4. Use of LED and A rated light fittings externally, internally, in common areas and circulation spaces. LED technology results in 30-35% reduction in electrical energy usage over the compact fluorescent lamps equivalent.

5. Intelligent lighting controls in the form of motion sensor detection shall be used in common areas to ensure that lighting is not in operation when areas are not in use.

6. Power factor correction on main electrical boards, correcting the power factor to 0.95 (a 5% saving on total energy consumption).

7. General services and lighting sub metering on common areas sub distribution boards.

8. Future infra-structure (in-house only) facility for electric car charging. By 2020, it is projected that every tenth car on Irish roads will be fully powered by electricity. This reflects international commitments to the reduction of CO_2 emissions under the Kyoto Protocol.

9. PV panels or thermal tubes for electricity generation for water heating or lighting.

10. Machine-room-less gear-less electric traction passenger lifts complete with collective control and traffic prediction software.

11. The active measures have been designed to reduce the primary energy consumption through intelligent control and highly efficient plant and equipment.

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4 Conclusion for NZEB

The sustainable design elements of the proposed Ustoreit Unit contribute to a scheme that will exceed the Building Regulations in terms of primary energy consumption and carbon dioxide emissions. A provisional BER and NZEB study will be carried out to determine that the building is rated at A3 and is NZEB compliant with regard to CPC and EPC. However, based on a preliminary academic study the minimum renewable energy rating (RER) of 0.1 is not yet met. **(So this will need be supplemented with either solar or a Heat pump).**

5 Basis for Design for Mechanical & Electrical Services

The purpose of this section of the report is to outline the basis of design for the main building services systems associated with development.

This "basis for design" contains technical details which have been segregated by discipline into sections Mechanical, Electrical and Vertical Transportation.

6 Mechanical Services

6.1 Soils & waste services

A fully ventilated single pipe system of uPVC pipework, in compliance with BS EN 12056 will be provided in the building, for the removal of soils & waste from all sanitary fittings, sinks and appliances.

Rodding points for maintaining and cleaning the soils & waste systems will be provided throughout. Access doors will be installed on the vertical stacks at low level on all levels, located above flood level of the lowest sanitary fitment.

Vent pipes will pass up through the building to terminate above the roof in locations agreed with the Architect. Vent pipes will be complete with weathering sleeve and vermin guard.

Overflows from water storage tanks will discharge over an adjacent floor drain or channel terminating a minimum of 300 mm above finished floor level.

6.2 Water services

The design of the water services and storage tank for cold water will be in accordance with BS 6700: 1997. The design will conform to the Water Authority's Bylaws. A total of 24-hours water storage will be provided for the building. This will be stored in a suitable interstitial space.

The Cold water storage tank will be a sectional or single piece construction complete with N.W.C. Format 30 finish, sealed lid and vent.

Cold water will be taken to the sanitary fittings, equipment and appliances from the Cold water storage tank, by means of a variable-speed drive booster pump set. Branch connections will pass through to valved cold water distribution services, to serve all sanitary fittings and appliances.

A total of 24-hours drinking water storage will be also provided for the building. This will be located at ground floor level.

Hot water will be provided to the wash hand basins, sinks & equipment from an electrical water heater as there is a very small hot water requirement on site. The hot water system will be pressurised via the cold water service variable-speed drive booster pump-set.

6.3 Heating & Cooling Services

The heating for main reception/staff areas in the unit will be by electric heating only since there are very low levels of staff and accommodation in the development.

6.4 Ventilation Services

As staff and occupancy levels are extremely low the building there is no requirement for mechanical ventilation other than for extract systems for:

- Toilets
- Staff changing areas (if any)
- Staff kitchenette

The associated extract ventilation systems will comprise of variable-speed drive fans.

All ductwork throughout the building will be galvanised sheet metal ductwork manufactured and installed in accordance with DW144.

6.5 Fire Services

Wall mounted general-purpose portable fire extinguishers in compliance with IS 291: 1986 will be provided throughout. Wall mounted CO2 portable fire extinguishers will be provided adjacent to each main electrical distribution board & MCC panel.

Where directed by the Fire Safety Certificate a dry riser pipework will be provided in the stair core lobbies.

7 Electrical Services

7.1 Electrical Intake Supply

The electrical power supply for the development will be sourced from a Utility Medium Voltage supply. Provision for utility metering will be included within the Medium Voltage Switch room.

7.2 Main & Sub-Main Distribution

A Main LV Distribution Board, located on ground floor will serve a network of small sub- distribution boards throughout the building.

Lighting and general services sub-distribution boards will be located where required at each level. Sub-main distribution will be by means of XLPE insulated, steel wire armoured, LSF cables on cable tray. The lighting and general power services within each bedroom will be fed via a dedicated consumer unit.

Power factor correction will be installed on the main LV electrical switchgear.

Provision is being made for a PV cells to be included to increase energy efficiency of the building. These PV cells will have the ability to generate electricity for use by the building.

7.3 General Services

Power will be provided to mechanical equipment as required from the main-distribution board/MCC panel supplies.

Cleaners' socket outlets will be provided in common areas where needed.

Warm Air Hand Driers (blade-type surface-mounted) will be provided in all toilets.

A disabled call system (for Building Regulation Part M compliance) will be provided in all disabled toilets (if required by the Fire Safety Certificate). A disabled refuge system will be installed in all emergency escape stair cores (if required).

7.4 Lighting & Emergency Lighting Services

The lighting installation will be designed in compliance with the Chartered Institute of Building Services Engineers (CIBSE) and BS 12464: 2011 "Light & Lighting. Lighting of Workplaces".

Within toilets, all circulation areas and lift area, all lighting will be provided by means of LED bulkhead fittings or down lighters which will all be switched by PIR movement detectors.

An emergency lighting installation to provide escape lighting on all exit routes in the event of a power outage will be provided, incorporating self-contained, nickel cadmium, rechargeable battery units.

The system will be in accordance with current IS 3217 and the Fire Safety Certificate requirements and will be installed for easy accessibility and low maintenance.

The sub-distribution boards will be fitted with relays and an emergency lighting test unit from which the emergency lighting circuits are wired.

Site lighting to cover carpark areas and to light the building, loading bays, and entrance areas will be provided to comply with CIBSE lux levels for Health & Safety minimum standards.

7.5 Communication & IT Services

Containment for structured cabling will be provided where required.

An incoming telecom(s) provision will be provided to ensure that building's fire alarm and passenger lifts can be adequately monitored.

Integrated door intercom system will be provided at the staff entry points to the building with a desk intercom point at the ground floor reception complete with door opener.

Integrated door intercom system will be provided at the vehicle entry/exit points to the basement car park barrier system with gate activation button in the reception.

Magnetic lock Door access control will be provided at staff entry point into the facility as required by the client.

CCTV cameras will be provided in common areas and security zones.

7.6 Fire Alarm

A fully addressable fire alarm system with voice alarm sounders in full accordance with current I.S. 3218 and the Fire Safety Certificate, will be provided throughout the building, including automatic detection in plant rooms and stairways.

The system will comprise manual break glass units situated at all exit routes, alarm voice sounders, analogue addressable automatic smoke and heat detectors in all areas as required, and will be complete with an independent battery and charger unit.

The fire alarm systems will have sufficient capacity to permit extension of the system if required in the future.

A central control panel will be provided at the main reception area of the building.

Cabling will be by means of fire resistant copper conductor cables throughout in accordance with the current Regulations.

8 Vertical Transportation

The facility will be serviced by 2 No. passenger lifts. All lifts will be provided with the following:

- Landing Indicator in all floors
- Alarm System with 24 h communication with an Auto-dialler sounder situated on top of car. Car top control station to BS: 7255
- Full height car operating panel with Braille and tactile floor destinations with red LED visual and audible call acceptance indication, alarm door open and door close buttons, key operated car preference switch and emergency light unit
- Single push button to terminal floors and up and down buttons to intermediate floor with red LED visual and audible call acceptance indication