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TABLE OF CONTENTS

EXECUTIVE SUMMARY

This document is an outline proposal of the M&E scope for the proposed Creamfields Development and the Primary Care Centre on Tramore Road/Kinsale Road in Cork City.

The intention is to provide the client WATFORE DEVELOPMENTS with a scope of the M&E services for broad agreement to form the basis of design.

The proposals below are subject to detail design, and compliance with building regulations.

1 RENEWABLES/ NZEB (NEARLY ZERO-ENERGY BUILDINGS)

The methods to be used in the energy assessing of the building will be focused on improving the energy ratings and to reduce the carbon emissions throughout.

All building areas are to adhere to the relevant Technical Guidance Documents Part L for domestic and non-domestic applications.

The hierarchy of design considerations for reducing energy use and increasing efficiency in buildings should be as follows:

1	Building envelope design	Maximise energy conservation through optimal u-values, avoidance of thermal bridging, analysis of thermal capacity, and improved air tightness levels
2	Mechanical, electrical and plumbing strategy	Optimise MEP strategy to provide efficient energy transfer, distribution and control
3	Low to zero carbon technologies	Employ practical energy systems to supplement energy demand

The energy performance objectives for this development will be achieved primarily through a combination of fabric first ‘’passive measures’’, for example, high insulation and air tightness standards. The MEP systems will then be designed to ensure maximum efficiency, consistent with the lowest possible capital, operating and maintenance costs.

2 COMMUNITY HUB/ CRECHE/ GYM/ CAFÉ/ RETAIL

These commercial areas are to be designed as shell and core. It is intended that the tenant will fitout the unit upon purchase/ renting.

2.1 Gas

A new incoming gas supply will be required to serve the units at ground floor level. A connection will be brought to each of the units for future meter installation. It will be the tenant's responsibility to connect to the meter as part of the shell and core fitout.

It is assumed that the creche will not require a connection to the gas mains. Please advise should a connection be required to either of these units.

2.2 Incoming Water

Metered incoming mains water connections will be provided for each of the commercial properties (Community Hub/ Creche/ Gym/ Café/ Retail areas). These connections will be capped as part of the shell and core fitout.

2.3 Commercial Sprinkler System

A connection to the mains water is also required for the commercial and carpark sprinkler tank. It is intended to locate the sprinkler tank within the carpark (TBC by design team). The size of the tank and if it will be installed at S&C stage or just allowance for sprinkler if they require it will be determined by the fire consultant.

2.4 Incoming Power

A number of ESB substations will serve the Residential blocks. Two metered connections will be provided from the switch room located on the ground floor at block F to serve a distribution board within the Creche and Community Hub for shell and core fitout. Two metered connections will be provided from the switch room located on the ground floor at block E to serve a distribution board within the Gym and Café for shell and core fitout.

They are existing 38kV power lines running through the site. ESB have advised that these lines will be diverted. This diversion is being carried out directly by the ESB as part of a standalone ESB upgrade project.

2.5 Minimum Shell & Core Service Provisions

Fire alarm and emergency lighting will be provided the shell and core areas. No allowance will be made for intruder alarm or security to the shell and core spaces.

3 CARPARK

Housed within the carpark, will be:

- Electrical Rooms
- Tank Rooms
- Plantroom
- Bin and Bicycle Store

It is intended to naturally ventilate these areas where possible.

The carpark itself will need to be ventilated also, this can be achieved by natural ventilation should there be sufficient openings in the façade. In order to achieve a natural ventilation solution, the criteria in TGD Part B and Part F must be meet.

Part B requires permanent openings at each level having an aggregate area not less than 2.5% of the floor area at that level, of which at least half should be in two opposing walls.

Part F requires permanent openings at each level having an aggregate area not less than 5% of the floor area at that level, of which at least half should be in two opposing walls.

If these above openings are not able to be met, then a mixed mode system or a fully mechanical system may be required. This is to be determined by the Fire consultant and other design team members.

3.1 Commercial Sprinkler System

Sprinkler protection will be provided to the car park, and the fire consultant is to advise on the relevant systems to be designed.

4 APARTMENTS & TOWNHOUSE MECHANICAL SERVICES

4.1 Cold Water Services

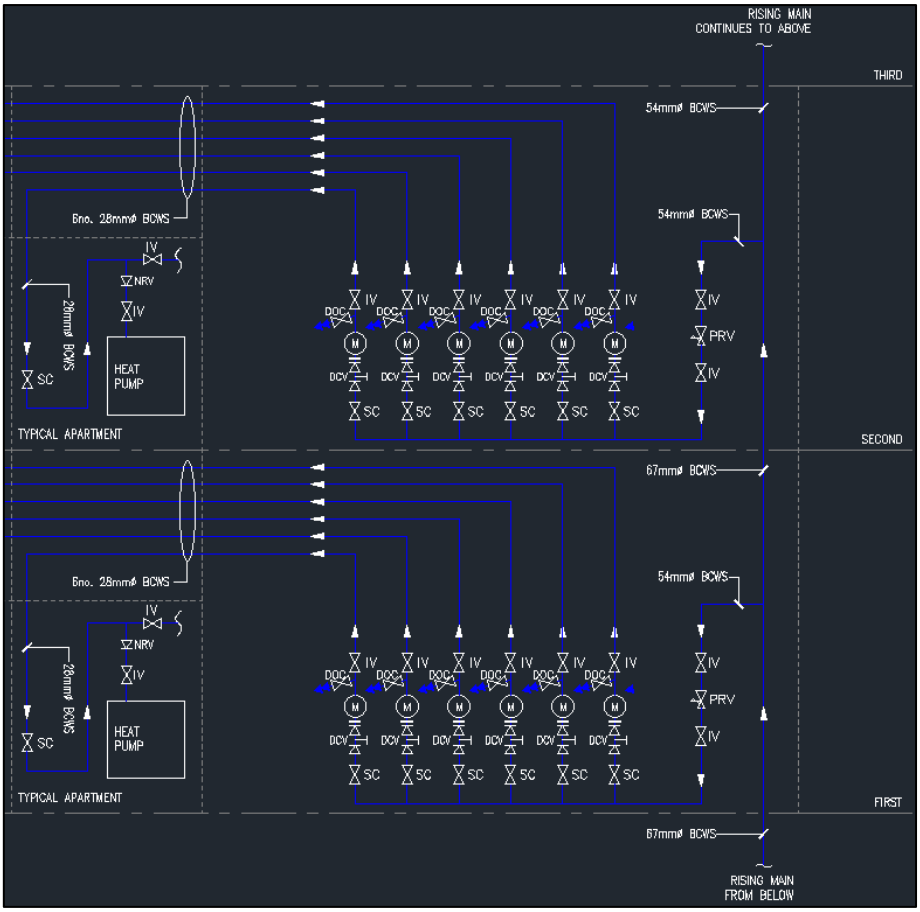
There will be a number of tank rooms located throughout the site. There will be tank rooms located in a basement area with a booster pump to supply water to each apartment. The pipework will be routed from the tank room at high level and distributed within the ground floor level to each of the block's.

Each block will then have a smaller break tank room and booster pump to boost water to each apartment. The pipework will be routed below ground from the larger tank room to the smaller break tank from. The pipework will be routed from the break tank room at high level and distributed within the ground floor level to each of the block's risers.

A mains connection will enter the ground floor tank rooms and will serve the mains potable water tank, and a landlord break tank.

Within each riser there will be a rising main water pipe from ground floor up to the top level of that area of the building, from which a header pipe will be connected at each floor. This header will have an individual pipe feed to each apartment or townhouse within the floor the riser is serving. Figure below is a schematic detail of the cold/mains water services riser.

For the townhouses we will have a mains water connection into each and pop up to a meter. This will then fill a small water tank within each townhouse.

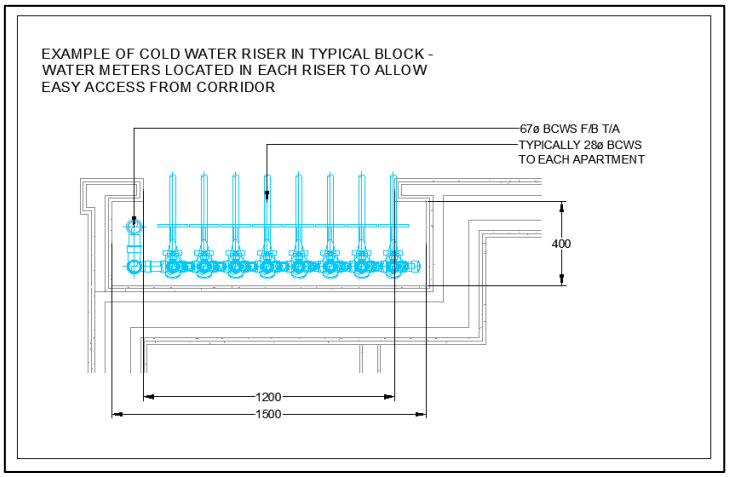


Typical Schematic Detail of Distribution

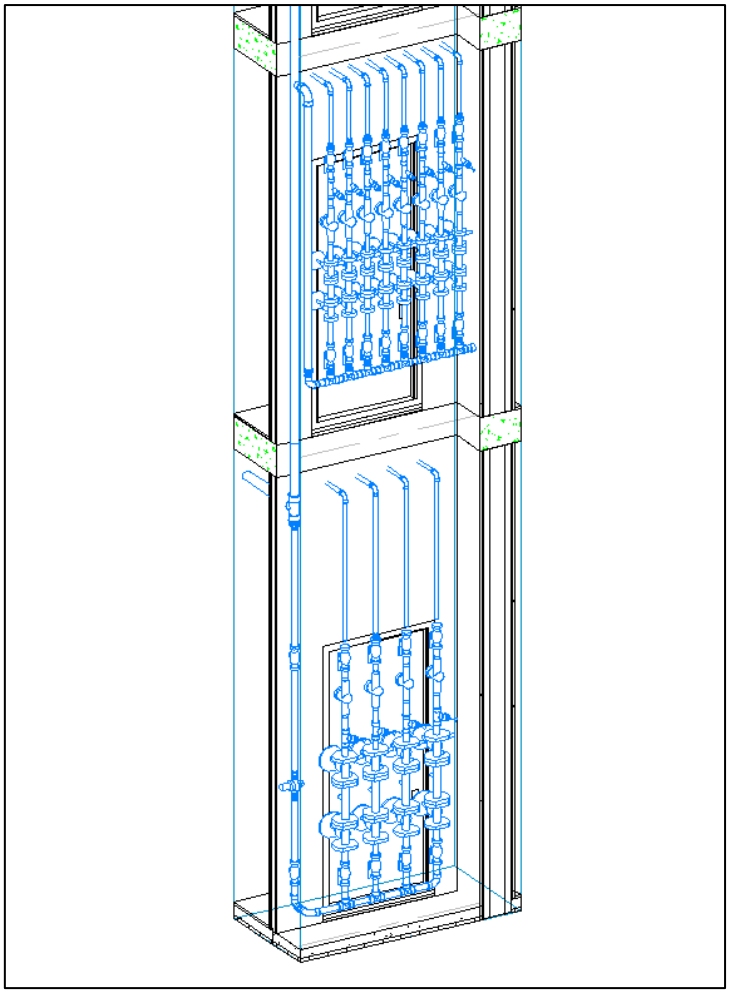
This cold/mains water distribution and metering detail is a considerably more practical route than installing all apartment meters in a single location at ground level for example, as in doing so the quantity of pipes and spatial requirements in risers would increase significantly.

Meters in the corridors are easily accessible through a set of riser doors should they need to be accessed physically to take readings or carry out maintenance.

Having the meters accessible in corridors eliminates the need for personnel to enter tenants' apartments or gain access to high level meters above the ceiling.



Riser Plan Detail



Typical 3D Riser Detail

4.2 Domestic Hot Water Services

Hot water outlets shall be served from an Exhaust Air Heat Pump (EAHP) local to each apartment or townhouse. The EAHPs shall be fed from the pressurised water system. An alternative source of hot water from the exhaust air heat pump is the use of an electric hot water heat pump as mentioned in 4.4. The hot water temperature shall be set at 60°C. Hot water outlets at WHBs and showers will be fitted with TMV2's set to 43°C.

Water flow reducers shall be utilised on all wash hand basins providing a saving on water consumption for hand washing compared with flows from conventional taps. These shall also provide an energy saving by reducing the hot water consumption.

4.3 Ventilation Services

Each apartment or townhouse ventilation requirements will be met through the installation of an Exhaust Air Heat Pump (EAHP). The air within the wet rooms; kitchen, bathrooms, ensuites, and utilities cupboards, is drawn in through the extract ductwork back to the EAHP unit and is passed through a heat exchanger to provide space heating and hot water for the apartment or townhouse.

The exhaust air is expelled through a vent located above the windows to outside. In some cases, an additional duct is required to supply air directly from external in order to increase the water heating capacity of the EAHP, this is to be determined at detailed design.

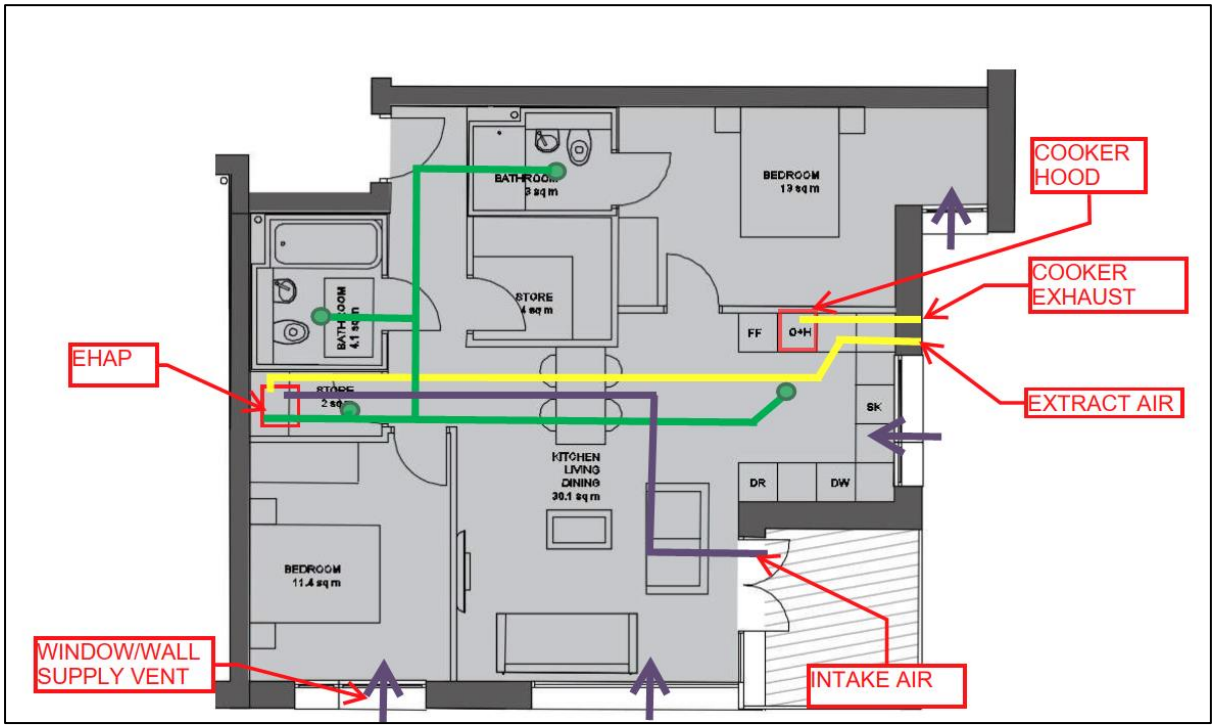
Fresh air is to be drawn into the apartment's or townhouses habitable rooms via wall and/ or window vents. This acts as the supply to the apartment or townhouse. The ventilation system is a continuous extract system and will adhere to the minimum requirements set down in Technical Guidance Document Part F.

The exhaust air heat pump will be located within the utility's cupboard in each apartment or townhouse from where ductwork will be distributed and concealed within the ceiling void, to each air valve. The windows shall be fully openable and will be sized by the architect in accordance with Part F to allow purge of the habitable room naturally.

An alternative source of ventilation is the use of a Mechanical Ventilation Heat Recovery (MVHR) Unit. This would be used in line with the electrical Dimplex system mentioned in section 4.4.

All internal doors shall be undercut to facilitate the transfer of air from habitable rooms to the air extraction points. The trickle vents should be permanently openable with a line written into the O&M's for the occupant to be notified.

A ducted system will be provided from the cooker hood to external.

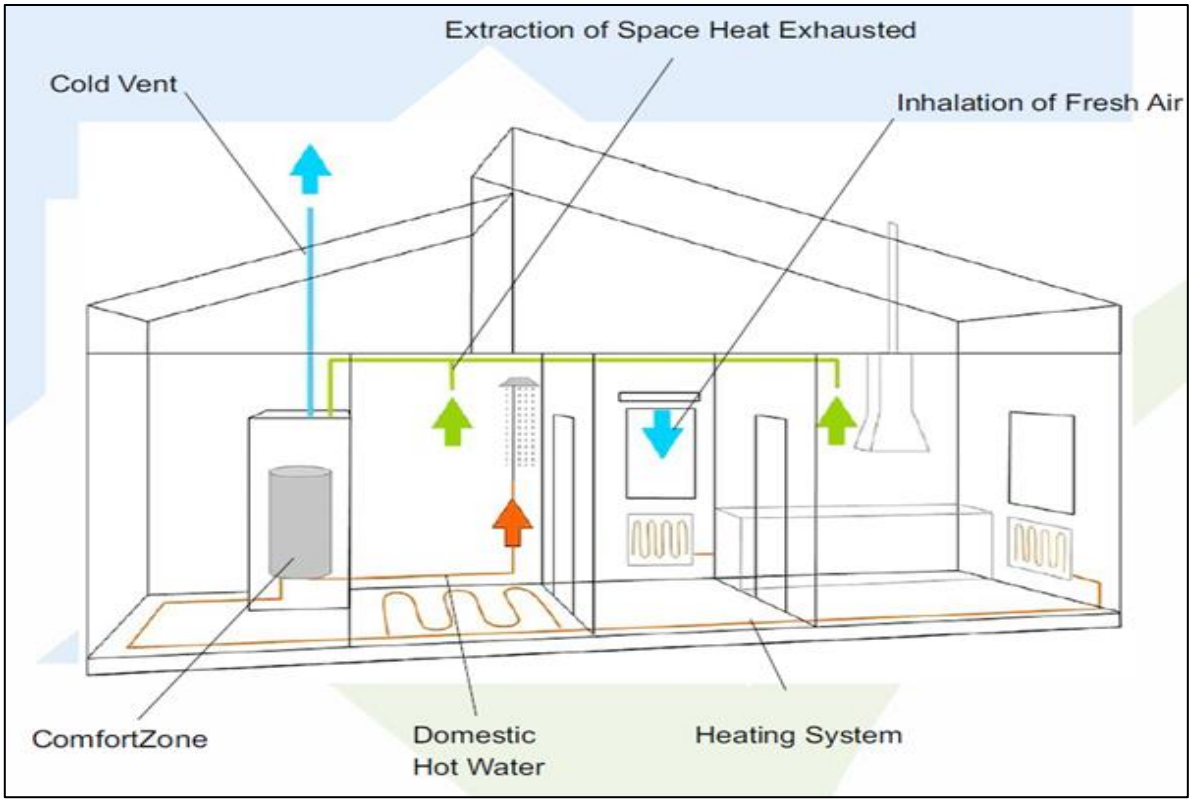


Typical Apartment/Townhouse Ventilation Layout with EAHP

4.4 Heating Services

The heating source for each apartment or townhouse will be by an Exhaust Air Heat Pump (EAHP) system. The EAHP system is an all-in-one system; the unit provides space and domestic hot water, as well as ventilation.

The proposed exhaust air heat pump supplies low temperature hot water to the apartment or townhouse radiators. The heat pump will also provide hot water to a built-in water tank. The hot water is produced by a heat exchange with the extracted warm air from the apartment or townhouse wet rooms.



Typical EAHP installation.

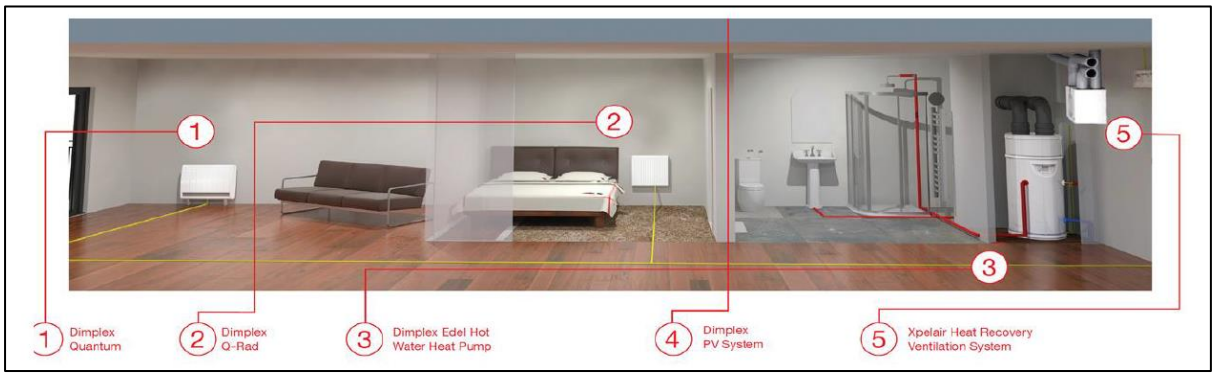
Features of the EAHP unit:

- Integrated hot water cylinder encased in a square enclosure with insulation to minimise heat loss.
- Colour display with simple control that allows scheduling and operation of the unit easy.
- App compatible via PC or smartphone
- Energy efficient unit boasting a domestic hot water and space heating efficiency above 250% and 450% respectively.
- Pre-assembled unit with all ancillary equipment built into the unit. (expansion vessels, pumps, PRVs, etc.)

Radiators shall be provided to deliver heat to the apartments or townhouses. Each radiator shall be provided with a thermostatic radiator valve and a lockshield valve. The sizing of the radiators will be adjusted to suit the lower flow temperature of the space heating.

Towel rails will be installed in the toilets and ensuites. There are options to provide a fully electrical rail, a rail heated by the space heating system, or a mixture of both.

An alternative heat source is an all electrical Dimplex eHeat Solution. This provides space heating and domestic hot water as well as ventilation from the MVHR unit. This system uses electrical radiators to each room.



Typical Dimplex eHeat installation.

Features of the Dimplex eHeat Solution:

- Fully nZEB compliant
- The system allows for individual apartment/townhouse heating solution
- The system comprises of smart electric radiators providing space heating
- Internal domestic hot water heat pumps
- Limited photovoltaic panels mainly common areas
- Fully remote access for landlord controls

4.5 Above Ground Drainage Services

The soils and wastes installation throughout shall be required to comply with Part H of the Building Regulations and EN12056:2 based on a system type III with unvented branch connections.

Risers are required to route soil vent pipes for kitchen, bathroom, ensuite, and utility cupboards within each apartment or townhouse, which will need to be accessible for rodding within each riser. All waste stacks to be terminated at roof level where possible.

4.6 Smoke Ventilation

Openable vents are required to achieve the required smoke clearance on protected corridors allowing means of escape. In the event the necessary openable area is not achievable, and depending on the project fire strategy, a smoke vent shaft may be required. This can be mechanical or natural. A vertical shaft of minimum cross-sectional area of 1.5m² is required for natural vent, and as low as 0.65m² for a mechanical solution, manufacturer depending. Where a mechanical solution is adopted, then a standby power supply is normally required.

The smoke ventilation solution will also be adapted to provide background ventilation of communal corridors to help mitigate risk of overheating.

4.7 Fire Protection

Dry Risers are required to be located within dedicated firefighting risers with landing valves located at each floor level.

Sprinkler protection will be provided throughout, and the fire consultant is to advise on the relevant systems to be designed.

5 APARMENTS & TOWNHOUSE ELECTRICAL SERVICES

5.1 Incoming Power

A number of ESB substations shall be required. In some cases, we have combined 1 sub station for 2 blocks. The LV switch/metering room adjacent to each ESB substation shall house the ESB metering panel. This shall supply LV power supplies to the commercial units and each apartment or townhouse. These supplies shall have separate ESB meters for individual billings.

From each of the metering rooms an electrical supply will be routed through the riser to each apartment's or townhouses distribution board.

Landlord areas, etc. shall also have a separate sub distribution board offering local isolation and protection of the power and lighting circuits.

5.2 Incoming Comms

A comms room shall be provided for each block. It is intended to have an incoming supply from Eir and Virgin Media into each comms room at ground floor level. From the comms room a supply will be provided to each of the apartments or townhouses.

5.3 Back Up Power

A back-up generator shall be supplied to provide a secondary power supply to the life safety equipment within the building. This shall back up the firefighting passenger lifts, the sprinkler system, the smoke extract system and the lighting system within the firefighting cores.

The generator shall be located within the generator room. This room shall have louvres on the wall and an extract flue.

5.4 Photovoltaic Panels (PV)

In order to achieve Part L and NZEB compliance, supplementation from PV panels will be required. The PV array will be located on the roof of the building and feed back into the main panel for distribution. The total number of PV panels is to be confirmed during detailed design. The use of the PV can also be used to supply energy back to the grid.