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**Marland House Student Accommodation  
Southampton  
M&E Services Overview**

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May 18, 2015	V02	Page 4: Ventilation Page 5: Automatic Control system Page 9: Building fabric	IA
August 12, 2015	V03	Page 4: Underfloor heating added instead of electric heater at room	IA

## EXECUTIVE SUMMARY

To meet the Client's requirements as well as Building Regulations and certain Planning Condition requirements, the M&E design strategy has been reviewed for the new Student Accommodation at Civic Centre Road, Southampton SO14 7LT with following key element to consider.

- To keep the initial installation cost as minimum.
- To keep the annual running and maintenance cost as low as possible
- Practicality of the installation.

In order to reduce the environmental impact of the new development, the following technologies, controls and strategies will need to be utilised.

- Installation of high efficiency Heating and hot water system.
- Low Energy consumption ,ventilation systems.
- Calculation of building CO2 footprint pre & post project completion to ensure the CO2 impact is minimised and all requirements met.
- Installation of high efficiency lighting systems.
- Installation of lighting control system.
- Metering of all new heating, hot water and lighting energy consumption.
- Time, and temperature controls for the heating system.
- BMS controls to ensure that systems operate at the maximum efficiency.
- Economic insulation of all Engineering Services to minimise the energy wastage.

Based on the above conclusion, the following services have been suggested for the Student Accommodation.

### 1.0 Mechanical and Electrical Services Overview

#### 1.11 GENERAL

The site is located at Civic Centre Road, Southampton SO14 7LT and comprises:

Basement:	Plant areas.
Ground:	23m <sup>2</sup> - Entrance and 3rd party retail
First:	371m <sup>2</sup> - Student accommodation.
Second:	388m <sup>2</sup> - Student accommodation.
Third:	299m <sup>2</sup> - Student accommodation.
Fourth:	299m <sup>2</sup> - Student accommodation.
Fifth:	299m <sup>2</sup> - Student accommodation.
Sixth:	299m <sup>2</sup> - Student accommodation.
Seventh:	299m <sup>2</sup> - Student accommodation.
Eight:	125m <sup>2</sup> - Student accommodation.

All student accommodation units are one bedroom studios

## 2.0 MECHANICAL

### 2.1 GROUND FLOOR EXISTING RETAIL UNIT.

The services to the existing ground floor retail will be retained as it is except for some alternation – reconnection of the water and SVP connect to suits the new works .

## 2.2 HEATING

### 2.2.1 Geothermal Proposal

The Southampton Geothermal Heating Company (SGHC) – a wholly owned subsidiary of Cofely was requested to offer a proposal for a heating connection to Marlands House.

This proposal has been developed on the basis of the following assumptions for Marlands House;

Peak Heat Demand 300 kW

Estimated Annual Heat Consumption 300,000 kWh

In order to carry out the necessary upgrade works on the existing supply to Marlands House and securing the heat capacity of the building for the long term Cofely have asked a levy Connection Charge which as as follow:

Connection Charge: £18,000 excluding VAT.

Based on the COFley proposal the Geotherm ( Distric Heating ) will be expected to provide Marlands House with an ongoing annual energy cost saving of around £667 per year; equivalent to a saving of approximately 5%, when compared to a conventional gas fired boiler solution taking fuel, maintenance and life cycle replacement costs into account however this need to evaluate further as the critical point to maintained a return water temperature ( LTHW ) within the range of max 50°C is somhow challenging .

The Mechanical Services in the building will be designed to achieve the following environmental conditions:

External Design Conditions In accordance with requirements of CIBSE Guide A	Winter	-4°C
	Summer	28°C db/19°C wb
Internal Design Conditions (Winter) In accordance with requirements of CIBSE Guide	Student Room	22°C
	Bathroom	23°C
	Stores	16°C
	Stairs/Corridors	18°C
	Social Areas	21°C
	Offices	21°C

The student accommodation and the en-suites shall be provided with Underfloor heating with Common Manifold along with Digital wall mounted temperature controls in the living accommodation. The UFH manifold shall have A circulation pump with bypass facilities.

There are two finishing for UFH options:

- A) Pipes laid in 15mm of levelling compound
- B) Pipes set into a routed gypsum board

Floor Finishes then are applied over the top. This needs to be agreed and confirm from NC.

Areas such tank room etc, shall be provided with wall mounted time controller panel heaters set to a predetermined temperature for frost protection.

Transient spaces such as corridors, lift lobbies etc, shall also have a UFH, and this may be from the free heating through pipes laid for accommodation.

The server room shall be provided with a wall mounted DX cooling unit.

## 2.3 VENTILATION

The student accommodations toilets and kitchens shall be provided with extract systems which shall operate continuously. Fresh air shall be provided to each bedroom by means of acoustic trickle vents (If required) installed within the glazing system.

Mechanical Ventilation Rates	Living Accommodation (fresh air supply)	
In accordance with requirements of CIBSE Guide F	13 l/s/person	
	Bathroom extracts	8 l/s
	Kitchen extracts	13 l/s

The areas at basement level shall be ventilated via supplying fresh air in line with the Approved Document Part F.

Ventilation of each room are dependent on room size, trickle vents in line with AD Part F, Occupiable rooms up to 10m<sup>2</sup> - 2500 mm<sup>2</sup> equivalent area, above this 250 mm<sup>2</sup> / m<sup>2</sup> of floor area.

Acoustic trickle vents are selected to satisfy requirements, this will be part of window schedule.

## 2.4 DOMESTIC HOT AND COLD WATER

Mains cold water shall enter the building in the basement plant room where it shall serve a potable cold water storage tank. The water storage tank shall serve a packaged cold water booster set sized at 100% of the maximum simultaneous demand to provide adequate pressure for all hot and cold water outlets. The pumps shall be variable speed, inverter driven. The booster shall be provided with an expansion vessel and controls designed to allow maintenance without loss of supply to the building.

Hot Water Storage: In accordance with requirements of CIBSE Guides, Institute of Plumbing Guide & BS 6700

Domestic hot water generation shall be by means calorifier or direct from heat exchanger to be located in the basement plant room. The hot water system shall be provided by means of an existing geothermal district heating scheme, the Contractor must investigate the viability for integration with this system. The hot water distribution system shall serve all sanitary items, showers, basins and sinks. The system shall be provided with a pumped return sized to achieve a minimum return temperature of 50°C; dead legs shall be kept to a minimum.

All hot water outlets in accessible toilets shall be provided with TMV3 blending valves limited to 43°C.

## 2.5 NATURAL GAS

There will be no gas fired equipment, hence no gas required.

## 2.6 ABOVE GROUND DRAINAGE

The existing UGD system to be investigated and ascertain that the new load can be taken without any additional requirement, the contractor need to investigate with the relevant authority to have a confirmation.

M&E Contractor needs to ascertain the existing underground drain pump storage tank and upgrade according to the new requirement.

The above ground foul drainage installations shall be provided as a primary ventilated system incorporating multiple vent pipes which shall terminate directly to atmosphere.

## 2.7 AUTOMATIC CONTROLS

All plants shall be provided with the Standalone control system.

The following operational functions will be included for all the main equipment:

- Time schedule operation of Hydronic heating system, including heat exchanger pumps etc.
- Fully controls the heating flow and return temperature, both primary and secondary systems.
- optimised Hot water controls
- Integration with the FA system.
- Integration and monitoring of ventilation system.
- Operation of the Booster cold water system.
- External Lighting controls if required.

## 2.8 EXTERNAL SERVICES

### 2.8.1 External Mains Water

The contractor needs to investigate with the relevant authority the new requirement according to the building load.

### 2.8.2 External Gas

The contractor needs to investigate with the relevant authority the new requirement according to the building load. If required.

### 2.8.3 Incoming Electrical Services

The contractor needs to investigate with the relevant authority the new requirement according to the building load if required

### 3.0 ELECTRICAL

#### 3.0.1 GROUND FLOOR RETAIL | EXISTING

The services to the existing ground floor retail will be retained ,except for some alternation and modifications including DNO Metering arrangement.

#### 3.0.2 EXISTING INCOMING OR NEW DNO SUPPLIES

The existing demand will be taken as a benchmark, however the new facility will be ascertained by the contractor based on the building load .

### 3.2 NEW LV DISTRBUTION

Individual MCCB/MCB distribution boards shall be installed within the basement electrical switchgear room, the final location to be agreed. All boards to have a minimum 25% spare capacity.

The switchgear will include distribution to the 3rd party premises on the ground floor

Metering to be included as per Building Regulations requirements.

All sub-main cables shall be XLPE/SWA/LSZH. or main copper Bus bar at risers. All new outgoing circuits from the MCB boards running in the services risers shall be wired in XLPE insulated and LSZH sheathed twin and earth cable running in cable basket

New containment shall be installed, generally:

- LV cables in a services risers – Cable basket
- Data cabling in a services risers – Cable basket
- Sub-mains in a services risers – Cable tray
- Fire alarms in a services risers – Cable tray
- ELV in a services risers – Cable basket
- Where in all communal ceiling and corridor area, – Cable tray
- Fire stopping to be included where required.

### 3.3 SMALL POWER

Small power will be provided as necessary to accommodate the requirements of the building. All accessories including dado Trunking will typically be white plastic, accessories in risers, plant rooms, ceiling voids etc shall be metal clad.

Small power and lighting in the communal areas will be distributed via MCB distribution boards which will be fed from the main switchboard.

The small power in the apartments will be fed via a flush mounted consumer unit. Each apartment shall contain a dedicated split load consumer unit.

Small power to each apartment will be through each Individual switch. Fridges and freezer will be provided with a permanent feed.

The quantity of 13A sockets will be as per the room data matrix  
All general accessories will be flush mounted and finished white.

RCBO, KHW meters shall be provided in each consumer unit to comply with the latest Wiring Regulations BS 7671. Suitable power provision will be allowed in all areas. Within the office space/manager's office, wall mounted dado Trunking will be utilised.

### 3.4 LIGHTING

New LED lighting is proposed throughout the building. Luminaries will be recessed in suspended ceiling tiles or plasterboard ceilings as per space available wherever possible. Corridors, circulation spaces, Toilets and Stores shall utilise LED luminaries and be controlled automatically with PIR presence detectors. LED down lighting with switch control shall be provided within each Bedroom room area. Lighting design to meet Building Regulations/SBEM Calculations in terms of W/m<sup>2</sup> and parasitic power (for PIR's/PD's) where applicable.

Self-testing Emergency lighting will be provided, above all exit doors the pathways and court yard and feature lighting as per regulation. External lighting will be supplied from the new MCB board located in the electrical room and controlled via an external photocell and time clock with override 'on' switch or through BMS system.

External lighting on entrance area shall be provided.

Emergency lighting will be provided in accordance with the latest requirements of BS 5266 Parts 1, 7 and 10.

All new lighting will be designed in accordance with CIBSE lighting guides and Building Regulations.

### 3.5 EMERGENCY LIGHTING

The emergency lighting will consist of separate, LED self-contained fittings with illuminated exit signs.

The emergency luminaries will be self-testing.

### 3.6 INTERCOM

Intercoms will be provided between:

- The main entrance and the site manager's office
- The main entrance and each apartment.
- The main entrance door shall not be opened by individual student apartments; each student shall visit the main entrance doors to allow visitors to enter for security reasons.
- At ramp to Manager room

### 3.7 DATA- Cat 6 or CAT5e

Data points will be provided in all apartments & communal rooms, quantities will be as per the room data matrix

### 3.8 WI-FI System

Wi-Fi coverage will be provided



### 3.9 TV

TV points will be provided to all apartments and communal rooms .

### 3.10 FIRE ALARM

A fully addressable analogue fire alarm system will be provided to L2 coverage. The fire alarm panel will be located in the site manager's office ( or location TBA) with a repeater located on the ground floor or location TBA, The contractor is responsible to provide the Complete Fire strategy document duly approved by the local Fire authority.

### 3.11 DISABLED REFUGE CALL POINTS

Disabled refuge call points will be provided as required. Each call point will provide two way communications back to a panel located on the ground floor or location TBA.

### 3.12 DISABLED PERSON TOILET ALARM

Disabled person toilet alarms will be provided as required, these will trigger a local alarm and a remote alarm located in the ground floor site managers office or location TBA.

### 3.13 CCTV

CCTV coverage will be provided as per the outline specification and will be a true IP system. A DVR will be located in the site manager's office and store all images for 30days. Network monitoring shall be provided.

### 3.14 DOOR ACCESS

Door access will be provided to all communal areas and the entrance to the student accommodation. Tenants will not have the facility to release the main entrance door from the apartments for security reasons.

### 3.15 DRY RISERS

The Contractor is responsible to design and install dry risers and associated works i-e water connection as required by the local Fire authority.

### 3.16 LIFT

The existing lift can be maintained and reuse, the contractor shall ensure that all remedial works shall be carried out and make these lifts perfectly safe for the purpose. The Contractor must provide a 24 month warranty from the lift Manufacture after remedial works that the lifts are safe to operate according to the requirement of building usage.

### 3.17 LIGHTNING PROTECTION

Lightning protection shall be required; risk assessment calculations need be carried out.

#### 4. BRUKL OUTPUT DOCUMENTS CALC

The Contractor is responsible to carry out an initial SBEM Calculations for the Student Accommodation to investigate the best possible and applicable system to providing heating and hot water that will achieve with Southampton City Council Sustainable Development Guidance ( if applicable on this works ).The calculation to be verified by Hurstwood Environmental Consulting.

The calculations shall be carried out by approved software compliance with the Building Regulations Approved Document Part L2A 2013, (England and Wales) Conservation of Fuel and Power (Under Refurbishment works)

#### 5. BUILDING FABRIC

As the works will be deemed as refurbishment works so the following U-values shall be taken as a guideline:

##### Upgrading Retained Thermal Elements\*

Wall – cavity insulation - Threshold 0.70 - Improved 0.55

Wall – external or internal insulation - Threshold 0.70 - Improved 0.30

Floors - Threshold 0.70 - Improved 0.25

Pitched roof – insulation at ceiling level - Threshold 0.35 - Improved 0.16

Pitched roof – insulation at rafter level - Threshold 0.35 - Improved 0.18

Flat roof or roof with integral insulation - Threshold 0.35 - Improved 0.18

#### 6. REMOVAL OF SPECIALIST EQUIPMENT WHICH IS NOT PART OF THE GENERAL BUILDING SERVICES

Within the building there are services that will require removal by others that are not part of the general building services and maybe “owned” by a third party.

These are:

- Roof Array of Aerials which could be Telephone / Data /Highways / Radio Systems
- Weather Station located on the 8th Floor
- External CCTV systems that are located on the 7th Floor and roof levels
- Telephone DP Equipment in the basement that may be linked to the Aerial system
- Highways control cabling located in the basement ,which connects to the traffic control systems, traffic lights etc.

In addition to the removal or relocation of the equipment consideration should be given that isolating any power within the building could also isolate the supplies to the equipment.

Also,any communications/controls cabling during the strip out of the building could affect the operation of the systems.

The contract can re-use (Subject to approval of Nordic Construction) any existing services –i-e cable tray etc ,

## 7. BREEAM REQUIREMENTS ( if applicable )

### 7.01 ENE 02 – Energy Monitoring

The following major energy consuming systems are monitored using separate accessible energy sub-meters with a pulsed output to enable future connection to a BEMS:

- Domestic Hot Water at plant room location.
- Lighting on LV panel.
- Small Power (lighting and small power can be on the same sub-meter where supplies are taken at each floor/department)
- Heating load | electrical heaters for each room, KWH meter at each consumer unit .

### 7.02 ENE 03 - External Lighting

1. All external fittings meet the lighting requirements as given in Table - 11 of BREEAM UK NC 2011 Manual. External lighting requirements by location.
2. External light fittings are controlled through a time switch, or daylight sensor, to prevent operation during daylight hours. Daylight sensor overrides on a manually switched lighting circuit is acceptable.
- 3.

### 7.03 WAT 02 - Water Monitoring

Water meters specified on the mains water | incoming mains only.

The Meter will have a pulsed output to enable future connection to a Building Management s system (BMS) for the overall monitoring of water consumption.

### 7.04 POL 02 - NOx Emissions from Hot water Source

The proposed Hot water generating plant shall under normal operating conditions, achieve a dry NOx emission level (measured at 0% excessO2) of 40 mg/kWh.

### 7.05 POL 04 - Reduction of the External Light Pollution

1. The external lighting strategy has been designed in compliance with BS EN 12464-2 of the ILP Guidance notes for the reduction of obtrusive light, 2011.
2. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 hr and 07:00 hr. This can be achieved by providing a timer for all external lighting set to the appropriate hours.
3. If safety or security lighting is provided and will be used between 23:00 hr and 07:00 hr, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP's Guidance notes, for example by using an automatic switch to reduce the lighting levels at 23:00 hr or earlier.

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