BUILDING SERVICES DESIGN BRIEF

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ELECTRIC YOUTH STORM PROJECT
LANCING
WEST SUSSEX

—

PREPARED FOR
ELECTRIC STORM YOUTH PROJECT

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20 APRIL 2015
REVISION 0

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ISSUE SCHEDULE

PREPARED BY:	CHECKED BY:	AUTHORISED BY:
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DATE: **6 MAY 2015**	DATE: **6 MAY 2015**	DATE: **6 MAY 2015**

REVISION	DATE	BY	STATUS	DETAILS
	06.05.2015		**SUBMISSION**	ISSUED IN DRAFT TO CPL ARCHITECTS FOR COMMENT

1. INTRODUCTION

1.1 This Building Services Design Brief has been prepared by MCA Consulting Engineers Limited on behalf of the Electric Storm Youth Project, in co-ordination with CPL Architects plan and elevation drawings series ESY.10 dated May 2011, to support both planning and building regulations submissions.

1.2 This document will present an outline proposal for mechanical and electrical services for the proposed development, on the basis of utilising energy efficient systems and best practice design to suit the specific use of the building and the available budget resources.

2. DEVELOPMENT OVERVIEW

2.1 This report has been prepared based on our understanding of the Client's requirements and expectations; it aims to translate those requirements and expectations into a Design Brief for the mechanical and electrical building services installations.

2.2 To achieve an integrated design that meets all of the Client's objectives and operational requirements, it is essential that this report is jointly authored and developed into an agreed Design Brief.

2.3 Once the Design Brief is agreed, it will provide an accurate outline Scope of Works for the building services, and will be used to prepare the outline designs for the scheme.

3. GENERAL CONSIDERATIONS

3.1 BUSINESS CONTEXT FOR THE PROPOSED PROJECT

To offer a brand new facility for young people of Lancing and surrounding areas in order to embrace youth culture and offer them a home from home experience. The building will be both high quality and energy efficient and will provide a suitable environment for staff who are deeply passionate about seeing young people learn from themselves.

3.2 OBJECTIVES, REQUIREMENTS, PRIORITIES AND CRITERIA FOR SUCCESS

.1 The design is to provide the most cost effective use of space and maintain the maximum useable floor area.

.2 Two alternative options for providing heating to the complex will be considered. The following options will be reviewed as part of the detailed design process:

- Natural gas Fired Boiler
- Air Source Heat Pump

Both options would each provide heat to an under-floor heating system and domestic hot water services.

3.3 A LIST OF THE KEY STAKEHOLDERS IN THE PROJECT

The sole stakeholder is:

Electric Storm Youth Ltd
34 Seaside Avenue
Lancing
West Sussex
BN15 8BY

3.4 PROJECT PROGRAMME, INCLUDING PHASING AND TIMETABLE OF CRITICAL EVENTS

Not known at this stage.

3.5 STATUTORY REQUIREMENTS

Not known at this stage.

3.6 PLANS FOR FUTURE EXPANSION, ADAPTATION OR MODIFICATION

It is not anticipated that the new building requires capacity or allowance for future expansion, adaptation or modification.

3.7 PLANNING ISSUES

There are no known planning issues to be considered. However, the Environmental Health Officer has raised a number of points that require further input. These include the following:

- Details of Proposed Ventilation – See Section 4.6.4 below

- Details of External Plant & Attenuation – See Section 4.8 below
- Details of External Lighting – Subject to design detail
- Details of Extract Systems (Kitchen and WC's) – See Section 4.6.4 below
- Maintenance and access regime for Extract System filtration – Subject to design detail.

3.8 OTHER INTERESTED PARTIES

MCA is not aware of any other parties who have expressed an interest in the project. However, it is understood that other local community groups will be using the facility outside the hours specified for the Youth Centre.

3.9 SPECIFIC EXCLUSIONS

MCA does not offer in-house design of below-ground public health services. The design of the below-ground drainage services is excluded from our Scope of Work and is therefore excluded from this Design Brief. The above-ground drainage design will be carried out by the Architect.

3.10 CLIENT DECISIONS AND RESPONSES

MCA will require input from the Client in jointly authoring and agreeing the content of this report and formal confirmation that the proposals contained within this report accurately represent the Client's requirements will be sought prior to commencing the outline design of the building services.

3.11 PROFESSIONAL APPOINTMENT

Not applicable at this stage and subject to formal fee offer and instruction.

3.12 PARTNERING

There are no other known organisations, partners, suppliers or manufacturers with whom MCA are required to consult or coordinate with, or incorporate as part of the design development.

4. DESIGN CONSIDERATIONS

4.1 FUELS AND INCOMING UTILITIES

.1 New gas, water, electrical and BT services will be required for this site.

.2 The site is located in the midst of established residential and retail/light commercial developments. It is therefore likely that local networks for each of the above services exist to serve this development.

.3 MCA will undertake the application for new incoming services as part of the preliminary design process to establish the availability of supplies, any local area network upgrade necessary and associated budget costs.

4.2 SUSTAINABILITY ISSUES

.1 It is understood that there is no specific requirement for the use of renewable technology other than to achieve compliance with Approved Document L2A – Conservation of fuel and power – New Buildings other than Dwellings.

.2 It is understood that a curved green roof is proposed for the Main Hall and 2 Storey Flat Roof which could accommodate solar photovoltaics panels (PV) and solar thermal panels (hot water) if the SBEM calculation for the development determines the need for renewable technology.

4.3 OCCUPANT COMFORT AND CONTROL

.1 It is essential that consideration be given to the level of control provided to occupants, and the response required from occupant input.

.2 It is thought that building occupants should be able to monitor and adjust temperatures locally within each part of the building to suit individual requirements.

4.4 DESIGN STANDARDS

The detailed design and installation of the building services will be in accordance with the following codes and standards:

- CIBSE Guide A Design data
- CIBSE Guide B Installation and equipment data
- CIBSE Guide C Reference data
- BS7671:2008(2011) 'Requirements for Electrical Installations' IEE Wiring Regulations 17th Edition
- BS5839-1:2013 'Fire detection and alarm systems for buildings'
- BS5266-1:2011 'Emergency lighting'
- Construction, Design and Management (CDM) Regulations 2015
- Electricity at Work Regulations
- Building Regulations
- Health and Safety at Work Act
- British Standards for all building services applications

4.5 DESIGN CRITERIA

.1 The summer outdoor air temperature design criteria establishes the dry-bulb and wet-bulb temperatures used in predicting the risk of overheating in naturally ventilated areas, and in calculating the design cooling load for conditioned spaces. The dry-bulb temperature is a measure of the 'shaded' air temperature; wet-bulb is a measure of the moisture content of the air - both are expressed in degrees Celsius (°C). Humidity control is not thought to be required.

- The summer design criteria proposed for this site is 29°C dry-bulb and 20°C wet-bulb
- The winter design criteria proposed for this site is -4°C dry-bulb and -4°C wet-bulb.

.2 The winter indoor design temperature will be 20°C ± 2°C; for summer conditions the temperature will be uncontrolled.

.3 A base indoor design temperature will be 13°C ± 2°C, which will be maintained by the under-floor heating.

.4 The toilets will be ventilated at a rate of 6 air changes/hour, and the kitchen will have a ventilation system capable of extracting 30 litres per second. The design criteria will generally be to allow 8l/s of fresh air per person.

.5 The design criteria will generally be to allow 10l/s of fresh air per person to all areas of the building.

4.6 SPECIFIC FUNCTIONAL REQUIREMENTS

4.6.1 DOMESTIC COLD WATER SERVICE

.1 A new internal cold water supply distribution system to the building shall be installed to deliver wholesome (potable) cold water at an acceptable flow, temperature and pressure to serve all cold water outlets and equipment.

.2 The system shall generally include the supply and installation of the following:

- Provision for new internal cold water distribution pipework utilizing Class 'X' Copper pipework and fittings
- Provision for a new external MDPE water main
- Provision for all pipework to be thermally insulated c/w vapour barrier
- Provision for protection devices/equipment, where required, to comply with Water Regulations
- Provision for isolating valves to all groups of fittings, as well as local and individual means of isolation to all cold water outlets and equipment
- Provision for chlorinating the complete cold water service installation.

4.6.2 DOMESTIC HOT WATER SERVICE

.1 A new internal domestic hot water service flow and return distribution system shall be installed to deliver hot water at an acceptable flow, temperature and pressure to serve all hot water outlets within the building. Allowance shall be made for simultaneous demand throughout, with short recovery times for stored domestic hot water; the flow and return distribution system is proposed to ensure that draw-off times are kept to an absolute minimum.

.2 The domestic hot water supply shall be derived from a single cylinder proposed to be located within the plant room or local store.

.3 It is understood that development proposals include shower facilities, therefore the storage capacity of the cylinder will allow for the use of showers and light commercial use of the kitchen. This arrangement minimises the peak electrical demand that would be required for a series of electric showers, and ensures that sufficient supplies of hot water are always available for use in the kitchen.

.4 The system shall include the supply and installation of the following:

- Provision for a direct unvented cylinder with necessary expansion and safety kits
- Provision for all necessary new internal hot water distribution flow and return pipework utilising Class 'X' Copper pipework and fittings
- Generally, all pipework shall be concealed and thermally insulated c/w vapour barrier
- Provision for thermostatic mixing valves to wash hand basins
- Provision for isolating valves to all groups of fittings and local and individual means of isolation to all hot water outlets and equipment
- Provision for thermostatic regulating valves on the hot water service return pipework
- Provision for chlorinating the complete hot water service installation.

4.6.3 SPACE HEATING OPTIONS

.1 MCA to consider two options for providing hot water heating to the complex. The following options will be reviewed:

- Natural Gas Fired Boiler
- Air Source Heat Pump

Both options would provide low temperature heat suitable for under-floor heating systems.

.2 The most appropriate solution for heating the building would be an under-floor LTHW system. This would lend itself suitably to either of the heat source options discussed further in this section.

The under-floor system would comprise an insulated solid floor with plastic 19mm diameter pipework encased in a screed. Each room/area would be fed from a manifold with individual wall-mounted tamperproof thermostats and central control override and setting.

LTHW at 55/45°C would be supplied by the preferred heat source to the under-floor system and would be scheduled against outside air temperature to provide further control.

This provides a more efficient method of heating open spaces without visual intrusion, and without leaving areas that are poorly heated due to their distance from radiators. In addition, it frees up all wall space, giving greater flexibility in the layout of furniture and provides a low surface temperature environment.

.3 ***Option 1: Natural Gas Fired Boiler***

Option 1 would be the natural selection for heating plant for this project on the basis that mains gas is available at the site, which is subject to verification. The gas fired boiler plant would be wall hung high efficiency condensing boilers with low NOx emissions for single or multiple configuration, subject to design requirement.

The boiler plant is ideally suited to low temperature heating systems such as underfloor heating and has good control ability to modulate between 20% - 100% output whilst maintaining good efficiency and economic performance.

.4 ***Option 2: Air Source Heat Pump (ASHP)***

Option 2 proposes that the heating for the whole building is by means of an air to water air source heat pump, operating at a seasonal COP (Coefficient of Performance) of at least 3.5, providing low temperature hot water in association with an LPHW under floor heating system throughout and a controls system with monitoring, targeting and alarm for out-of-range values.

The domestic hot water system will also be served from the same system ASHP plant in parallel with a solar thermal input to a hot water storage tank.

.5 Temperature control will vary, depending upon the room/area served. In smaller individual rooms, individual room sensors will be used to control motorised valves on the under floor heating manifolds. In larger spaces with several heating circuits, motorised valves will be controlled by averaging room thermostats. Frost protection will be provided to override the time switch settings to prevent the boilers and pipework from freezing.

.6 The system pipework will be insulated from the heat source to the heating manifold.

4.6.4 VENTILATION

.1 The methods proposed for the provision of ventilation are as follows:

- Natural/Passive ventilation for Multi Gym, Meeting Rooms and Offices
- Mechanical extract ventilation for the kitchen and all sanitary accommodation
- Mixed mode (Mechanical and Passive) ventilation for the Main Hall and Club Areas.

.2 Extract ventilation will be provided to the WC's, and Kitchen area. The ventilation will be provided from multi vent extract fans with trickle and boosted settings, which will discharge through the roof or walls, as appropriate.

.3 Ventilation to the Multi Gym, Meeting Rooms and Offices will be by natural means utilising trickle ventilation and openable windows incorporated within the glazing provision for each area.

To increase the ventilation rate for the Multi Gym it is likely that a small internal heat recovery supply/extract air system will be required, which will be internally mounted.

.4 Ventilation to the Main Hall and Club Area where there are likely to be high occupancy levels would ideally be passive ventilation, relying on natural stack effects, although mechanical ventilation may be required to achieve adequate air movement and will be subject to further design and acoustic considerations.

The routing of mechanical ventilation ductwork will be carefully considered to ensure that the appearance is not detrimental to the environment.

.5 Design and specification information for the ventilation of the kitchen will be subject to the final selection of kitchen equipment and it is anticipated that the requirements are likely to be for an extract system, either independently ducted or via a canopy hood with the provision of makeup air.

.6 The mechanical ventilation systems shall include the supply and installation of the following:

- Provision for mechanical ventilation plant with trickle/boost facility, as appropriate
- Provision for all necessary ductwork, grilles and accessories
- Provision of attenuators
- Provision for fire/smoke dampers
- Automatic control with local manual override.

.7 It is understood that there will be acoustic constraints to consider for each of the mechanical ventilation systems to reduce noise breakout and to limit noise from external plant.

.8 All room acoustics matters, including acoustics associated with the building fabric and enclosures around services, will be dealt with by the Architect.

4.6.5 BUILDING SERVICES CONTROLS

.1 The systems proposed are relatively simple and self-contained; it is thought that a complex Building Management System (BMS) is therefore unnecessary for this project.

.2 Each of the building services systems will therefore incorporate the necessary controls for efficient operation.

4.6.6 LOW VOLTAGE DISTRIBUTION

The low voltage distribution system will consist of a sheet steel distribution board with hinged cover and removable gland plates. The board will contain separate miniature circuit breakers and residual current devices, or a combination thereof; a separate protective device will be provided for each outgoing final circuit.

4.6.7 CABLES AND CONTAINMENT

.1 Cables will be BASEC approved general purpose solid core flat twin cables with integral protective conductors.

.2 Arterial cable routes, those routes which contain the cables for more than one final or distribution circuit, will be provided with a suitable means of cable containment for the group of cables.

4.6.8 LIGHTING INSTALLATION

.1 Luminaires utilising an LED light source will be specified, wherever possible, throughout the development.

.2 The Main Hall lighting will be suitable to meet the recommendations outlined in CIBSE LG4 (Sports) and be appropriate to provide even illumination of playing surfaces with good vertical distribution. Light fittings will be linear high output fluorescent with hinged grill protection suitable for multi activity hall purposes.

.3 The meeting rooms and cellular offices will be provided with automatic controls with manual override to allow for the use of multimedia devices and equipment such as projectors.

.4 Emergency lighting will be provided throughout; wherever possible this function will be integrated into the general purpose lighting room lighting. Where it is advantageous, the emergency lighting will be provided by miniature recessed downlights mounted either within ceilings or within walls; these will serve only as emergency luminaires, and will provide no functional light.

.5 Consideration will be given to the provision of some simple external lighting coordinated with the landscaping scheme. A simple means of automatic control will be provided.

4.6.9 USER CONTROLS, OUTLETS AND ACCESSORIES

.1 It is thought that simple user controls should be provided with a high quality solid metal finish to suit the interior design.

.2 The location of controls is to be given careful consideration, avoiding the grouping of multiple controls in close proximity. Where it is unavoidable, consideration will be given to the relationship between the various controls, outlets and accessories to ensure that they are carefully coordinated.

4.6.10 SMALL POWER

Small power will be provided throughout the development to suit the end user specific requirements and also for general maintenance purposes.

4.6.11 FIRE DETECTION AND ALARM SYSTEM

A Category L3 fire detection and alarm system will be provided comprising manual call points, smoke and heat detectors detection, with electronic base sounders being provided throughout the building.

Operation and monitoring of the system will be provided by a control panel located within the main entrance area.

4.6.12 DATA AND COMMUNICATIONS

Provision will be made for an incoming BT service and structured cabling to serve offices and meeting rooms. The provision of telephones and IT hardware will be provided by the Building User.

4.6.13 TELEVISION AND MEDIA

No allowance for the reception of TV, satellite or cable, will be made. This is on the understanding that multimedia services will be accessed and streamed via the broadband service.

4.6.14 SECURITY

.1 A grade 3 intruder alarm system will be provided with a single control panel and exit keypad. The control keypad will be sited in the same location as the fire alarm control panel.

.2 No other security installations, e.g. access control, CCTV etc., are understood to be required.

4.7 SPACE REQUIREMENTS FOR THE BUILDING SERVICES

.1 Internal plant space has been identified on CPL Architects proposed ground and first floor layout plan ESY.10/10. The plant area indicated on the east corner of the Main Hall Store will essentially house gas fired boiler plant, if selected, and associated pumps and fixed control equipment.

.2 It will be necessary for MCA and the Architect to identify the primary services routes to be used throughout the building, as and when preliminary design work gets underway.

4.8 REQUIREMENTS FOR EXTERNAL AREAS

.1 The requirement for utilising external areas for building services plant is subject to detailed design considerations.

.2 On the basis that mechanical ventilation, possibly cooling, will be required for the Main Hall, then air handling units and associated duct work would be located on the single storey flat roof section of the Main Hall Store with discretionary screening.

.3 If the option of an air source heat pump is selected for hot water heating and cooling is required for the Main Hall ventilation, then an external plant area will be required at ground level on the south east elevation of the Main Hall Store.

4.9 BUILDERS WORK IN CONNECTION (BWIC)

The builder's work envisaged includes holes, apertures, chases and below-ground trenches to accommodate and conceal the building services; all substantial (>100mm) BWIC will be detailed on the drawing produced by MCA.