



**GREYFRIARS CHURCH – PHASE 2
M&E CONCEPT DESIGN REPORT
JBKS ARCHITECTS**

5th November 2019

Prepared for

JBKS Architects
Suite 1, Parkwood Stud
London Road
Aston Rowant
Oxfordshire
OX49 5SP

Prepared by

Ridge and Partners LLP
Beaumont House
59 High Street
Theale
Reading
RG7 5AL

Tel: 0118 932 3088

Contact

Dan Fisher
Team Manager
dfisher@ridge.co.uk
07825362023

Version Control

Project	5004328
Issue Date	05/11/2019
Originator	JD/AN/TM
Checked	DAF/AS/AK
Version	1.0
Notes	

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VERSION CONTROL

VERSION	DATE	DESCRIPTION	CREATED BY	REVIEWED BY
1.0	05.11.2019	Stage 3 Report for Planning	JD/AN/TM	DF/AS/AK

1. INTRODUCTION

Ridge and Partners LLP have been appointed by JBKS Architects to provide a RIBA Stage 3 report for phase 2 of the proposed Greyfriars Church project. This report has been issued for planning but also to set out a feasible and compliant design for future design stages and architectural design.

2. GENERAL

2.1. Site Location and Description

The proposed new building is located at;
Greyfriars Church
Friar Street
Reading
RG1 1EH

Planning permission has been granted for phase 1 of the project, which includes a refurbishment and connection of an existing building to the church, and a refurbishment of the carpark.

The second phase of the project to construct a new three storey community centre (The Greyfriars Centre) in place of the existing construction and the construction of a new connector from the community centre to the church. This phase of works is the subject of the report, with both phases shown in Figure 1.



Figure 1: Proposed stages of work (Drawing by JBKS Architects)

Phase One:

- **New Entrance Building** - Replace the existing entry to the sanctuary.
- **2 – 4 Sackville Street** - Refurbishment of two existing terraced buildings and connection to the church, providing additional church offices, counselling facilities a new toilet block and prayer rooms.
- **Car Park** - Rebuild the carpark plus additional groundworks.

Phase Two:

- **The Greyfriars Centre** - including a hall, community kitchen, toilet blocks, staff offices, meeting rooms, church gathering spaces as well as a community co-working space.
- **Link Building** - Connect the Greyfriars community centre to the church.

2.2. Standards

The design elements referred to later herein shall be in accordance with the following:

- British & European Standards & Codes of Practice.
- Building Regulations.
- 18th Edition of the IEE Wiring Regulations for Electrical Installations BS 7671
- CIBSE Energy Design Guides and Lighting Codes.
- CIBSE Commissioning Guides.
- The Electricity Safety, Quality and Continuity Regulations 2000 (as amended 2006).
- Health and Safety at Work Act 1974.
- The Electricity at Work Regulations 1989.
- HSE Engineering Information Sheet No. 36 – Safety in Electrical Testing.
- HSE INDG354 - Safety in Electrical Testing at Work (General Guidance).
- The Statutory Fire Officers and Building Control Requirements.
- CDM Regulations.
- Code of practice for distribution of electricity on construction and building sites (BS 7375).
- Sanitary Design - BS EN 12056.

Both electrical and mechanical services shall incorporate BREEAM requirements as detailed in this document.

2.3. Equipment, Workmanship and Materials

Workmanship shall be of the highest standard (as defined by the appropriate institute or trade body) and work shall be carried out by personnel skilled in the appropriate trade. Unskilled persons shall work only under the supervision of, or in conjunction with, appropriately skilled persons.

All equipment, materials and accessories shall be supplied new, unused and complete with a one year guarantee, be manufactured and tested to recognised quality control standards. The equipment provided shall be of the model in current production at the time of installation.

The Electrical Contractor shall be an NICEIC and ECA Approved/Registered Contractor.

The Mechanical Contractor shall be Gas Safe and F Gas Approved/Registered Contractor.

There is a BREEAM planning requirement for this project and targeted BREEAM points can be identified to achieve compliance, it is likely that the following would need to be targeted:

Wst 06 Functional adaptability - To recognise and encourage measures taken to accommodate future changes of use of the building over its lifespan.

2.4. Assumptions

- The Contractor will arrange for all telephone services to be procured. This will include the required number of voice lines, internet lines and direct lines to off-site monitoring stations, as required.
- BREEAM assessment must be carried out to comply with building regulations. Specific requirements have been highlighted within this report to illustrate which BREEAM credits will be targeted.

2.5. Technical Targets

The following criteria are proposed in the design of the M&E services for the new construction.

- LZC measures to achieve a further CO₂ reduction to achieve Part L2A 2013.
- Target fabric U-values.
- Avoiding overheating to CIBSE TM52.
- Low water usage.
- Efficient luminaires and lighting controls.
- Use of sustainable materials.
- Low or zero ozone depleting substances.

FABRIC ELEMENT	SUGGESTED (W/m2K)
External Walls	0.15
Ground Floors	0.15
Roofs	0.13
Glazing (Windows)	1.20
Glazing (Doors)	1.20
Glazing (Roof-lights)	1.20
Solid Doors	1.54
Air permeability m3*(hm2) @ 50Pa	3

Table 1: Greyfriars Centre Target Fabric Performance

GLAZING TYPE	U-Value (W/m²K)	G - Value
Glazing (Windows) on North East/West Facades	1.20	0.37
Glazing (Windows) on South East/West Facades	1.20	0.20
Glazing (Doors)	1.20	0.37
Glazing (Roof-lights)	1.20	0.37

Table 2: Greyfriars Centre Target Glazing Performance



Figure 2: Architectural 3D model (Model created by JBKS Architects)

2.6. Building Services Design Philosophy

The mechanical and electrical building services identified for the proposed development shall be designed in full recognition of the needs of the occupants and shall provide comfortable and light environments, whilst being simple, cost effective, efficient and environmentally friendly, utilising best practice sustainable design principles.

Maximum use is made of environmental systems, such as day lighting, which will be computer simulated to confirm that the design concepts are achievable. The benefits of these environmental systems are the reduction in sensory disruption to all building users and enhancing the working environment.

The building has been and will continue to be modelled using one of the UK Government’s approved energy modelling software packages, Integrated Environmental Solutions Virtual Environment (IES VE), throughout the design process. This will ensure internal environmental conditions comply with CIBSE TM52: The Limits of Thermal Comfort and Building Regulations Part L. The IES software utilises a full dynamic simulation and is approved by CIBSE AM11 Building energy and Environmental Modelling.

2.7. External Design Temperatures

- Winter : -5°C, saturated.
- Summer : 31°C db, 20°C wb.

2.8. Internal Design Temperatures

- Circulation Spaces 20°C Winter / N/A Summer
- Entrance Hall / Foyer 20°C Winter / 23°C Summer
- Kitchenettes 21°C Winter / N/A Summer
- Main Hall 21°C Winter / 23°C Summer
- Main Kitchen 17°C Winter / N/A Summer
- Offices / Meeting Rooms 22°C Winter / 23°C Summer
- Resources Room 22°C Winter / 23°C Summer
- Toilets 21°C Winter / N/A Summer

Stores, voids and plant space shall not be provided with heating or cooling equipment.

The performance standards for summer-time overheating are to be compliant with Building Regulations Part L2A 2013, CIBSE overheating benchmarks and CIBSE TM57 Adaptive Thermal Comfort guidance as follows:

- Internal operational temperatures in occupied spaces shall not exceed 28 °C for more than 1% of occupied hours.

2.9. Environmental Services Strategy

Environmental responsibility is a core design issue. By designing building services with environmental responsibility in mind from the beginning, this will ensure there is not a legacy of problems regarding non-renewable resources and environmental pollution for future generations to solve.

The use of products, materials and services which meet or exceed environmental best practice for their relevant sector throughout the life cycle is critical to enable the achievement of: -

- Minimal use of non-renewable resources.
- Reduce the amount of energy required.
- Production of minimal pollutants.
- Maximise the use of recycled or recyclable materials.

2.10. M & E Commissioning

Seasonal and general commissioning shall be undertaken on the mechanical and electrical services installations in accordance with the relevant BSRIA and CIBSE Commissioning Guides and CIBSE Guide to Ownership, Operation and Maintenance of Buildings.

Seasonal commissioning will be implemented over a 12 month period following occupation.

There is a BREEAM planning requirement for this project and targeted BREEAM points can be identified to achieve compliance, it is likely that the following would need to be targeted:

Man 04 Commissioning and handover - To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants.

Man 05 Aftercare - To provide post-handover aftercare to the building owner/occupants during the first year of occupation to ensure the building operates and adapts, where relevant, in accordance with the design intent and operational demands.

2.11. Utility Services Diversions

There are a number of services which are routed through the existing site. This will require diversion or careful coordination of building works to avoid disruption to the Church, and as a minimum should include for diversion of existing telephone cabling on the wall of the existing Centre and behind the portacabin. Refer to the Appendix of this document for the existing underground services survey drawing.

2.12. Utility Connections

As part of the demolition and enabling works for the new community centre, the existing domestic gas supply and domestic water supply will need to be disconnected. A temporary water supply will be required during the construction phase before the permanent water and gas supplies are re-instated.

Gas, water and electricity services shall be provided with enough capacity to suit the proposed development and shall include an allowance of 25% for future expansion.

The existing 3 phase 100A supply serving the Church Centre shall be relocated and reused. The existing supply shall be isolated and stripped back by Scottish and Southern Electricity (SSE) as part of the enabling works and to allow for the demolition of the building. The supply will need to be re-instated by SSE in the new location indicated on the drawing and to suit the new building layout.

3. MECHANICAL SERVICES

3.1. Utility Services

A new Ø40 metered gas supply will be required in the new building to serve new gas fired boilers for heating and hot water.

Each separate service is to be individually sub-metered and monitored by the building management system to monitor building energy usage. Metering shall be provided to meet the requirements of Part L2A of the Building Regulations and CIBSE Technical Memorandum 39. The metering shall have pulsed outputs and Modbus communication protocol for future connection to a data logging system or other system to monitor energy consumption.

In the new gallery floor plant room, a gas safety system will be provided which is to consist of the following:

- Gas solenoid valve
- Fire alarm system interlink
- Rate of rise heat detectors
- Emergency gas knock off buttons
- Manual reset facility

Kitchens will not be provided with a natural gas supply, it is understood that all kitchen equipment is to be electric based.

A new Ø63 metered mains cold water supply will be required for the new building to serve the domestic hot and cold water services.

Each separate service is to be individually metered and monitored by the building management system to monitor building water usage, including the following:

- Incoming cold water service
- Hot water service cold feed
- Heating system pressurisation feed

3.2. Heating and Cooling

Heating throughout the Greyfriars Centre will generally be provided by a VRF (Variable Refrigerant Flow). Areas covered by VRF shall be all offices, meeting rooms, the main hall and the entrance foyer. This type of system involves external units which absorb heat from the outside air and direct this through refrigerant pipework to various fan coil units (FCU) within the building. The system is also capable of working in reverse (cooling the building and rejecting heat to the outside air) and also in a mixed mode where some rooms are heated, and some are cooled simultaneously.

The VRF system is an energy efficient form of heating coupled with the option to utilise cooling in some rooms and recovery of heat to areas where it is required.

The VRF FCUs shall generally be exposed wall mounted at high level, however, where ceiling voids are of adequate depths, concealed ducted units shall be considered. A VRF over door heater shall also be installed in the entrance foyer.

The external heat pumps shall be located in the dedicated roof top plant area. Refrigerant pipe work shall run from the heat pumps to the building through a dedicated services riser. Pipework shall generally distribute concealed within the ceiling void. Drops shall be concealed where possible within internal partition walls to avoid boxing in.

The remaining areas to the Greyfriars Centre shall be heated by Low Temperature Hot Water (LTHW) gas fired boilers located in the gallery plant room serving radiators.

Pipework shall generally distribute concealed within the ceiling void. Drops shall be concealed where possible within internal partition walls to avoid boxing in.

Heating pipework is to be installed in mild steel complete with screwed joints in communal spaces. All hidden pipework is to be fully insulated with foil faced phenolic foam insulation. In areas where there is an increased risk of damage this is to include Isogenopak covering to provide protection and ease of cleaning.

The boilers proposed for the heating system are to be mounted on a cascade frame complete with LTHW primary flow, return and gas headers.

3.3. Ventilation

Ventilation to the building will generally be provided by mechanical ventilation with heat recovery due to external noise and pollution and the high volume of occupants in the space making the use of opening windows both impractical and unsuitable. A thermal simulation model has been reviewed and this arrangement has been shown to provide suitable internal conditions.

Design ventilation rates shall be as follows:

• Bin Store	15 l/s (extract only)
• Entrance Foyer / Main Hall	10 l/s per occupant
• Kitchenettes / Tea Points	15 l/s
• Main Kitchen	60 l/s (extract only)
• Offices / Meeting Rooms	10 l/s per occupant
• Plant Room	60 l/s
• Resources Room	10 ACH (extract only)
• Toilets	10 ACH

Kitchenette and toilet ventilation shall be a continuous supply and extract system with heat recovery, provided by a dedicated roof mounted air handling unit (AHU). Extract air shall be taken directly from each toilet and kitchenette, with supply air provided back into the circulation spaces adjacent to the kitchenettes and toilets. Doors shall be undercut to allow make up air back into the kitchenettes and toilets. The AHU shall operate fully automatically via the BMS in order to maintain indoor air quality. The supply air temperature shall be

maintained at design conditions utilising the heat recovery, VRF system and LTHW heating as necessary. The ventilation system shall be interfaced with the fire alarm system such that it shuts down in a fire alarm situation.

The main kitchen on the ground floor shall have a dedicated local through wall extract fan to be manually operated. There shall be no cooker hood extraction from the main kitchen.

The bin store shall have a dedicated through wall extract fan to be manually operated.

The office spaces, meeting rooms, main hall and entrance foyer shall all have a continuous supply and extract system with heat recovery, provided by a dedicated roof mounted AHU. Supply and extract air shall be ducted directly into each space. The AHU shall operate fully automatically via the BMS in order to maintain indoor air quality. The supply air temperature shall be maintained at design conditions utilising the heat recovery, VRF system and LTHW heating as necessary. The ventilation system shall be interfaced with the fire alarm system such that it shuts down in a fire alarm situation.

Due to the internal location of the plant room, a dedicated ventilation system will be required. The plant room shall be provided with a ducted in-line extract fan to terminate through the roof, extract air shall be taken from low level in the plant room to prevent a build-up of fumes in the space. Supply air shall be passive to ensure negative pressure in the plant room, thus preventing fumes from dispersing throughout the building. Supply air shall be ducted from the roof back through the building and terminate at high level in the plant room.

The resources room shall be provided with a dedicated in-line extract fan to be manually operated. Extract air shall be ducted from the resources room and terminate through the roof. Doors shall be undercut to allow make up air back into the resources room.

The AHUs shall utilise heat recovery, VRF system and LTHW heating to maintain the desired supply air temperature.

Ventilation shall be provided in accordance with Building Regulations Approved Document Part F.

3.4. Domestic Water Services

Domestic mains cold water shall be taken from a new metered cold water supply that shall enter the building as outlined in Section 3.1.

The entire building shall be fed directly off the mains water supply. This shall be distributed in copper pipework around the building to all required outlets.

Domestic hot water is to be generated in the gallery plant room by the gas fired boilers and dedicated indirect calorifier. This service is to be generated at mains water pressure and provided with a secondary recirculation system to ensure hot water delivery temperatures are maintained in accordance with HSE ACoP L8.

Where the incoming mains cold water is buried externally, an additional internal water meter shall be installed in order to provide a method of leak detection.

Generally, domestic water services shall rise through the building within the dedicated M&E service riser and distribute within the ceiling void. Drops shall be concealed where possible within internal partition walls to avoid boxing in.

3.5. Above Ground Drainage

Above ground drainage shall be designed and installed in accordance with BS EN 12056. Sanitary ware wastes shall be connected by a series of MuPVC pipework into soil vent pipes. SVP Stacks are to be ventilated to atmosphere through the roof.

3.6. Building Management System

An automatic controls system and mechanical control panel shall be installed within the gallery plant room in order to dictate the timed operation of the following items:

- Gas fired LTHW boilers
- LTHW pump sets
- VRF system
- Air handling equipment
- Domestic hot water calorifier
- Domestic hot water pump sets

The services shall be zoned on a floor by floor basis (Ground, First and Second) or room by room basis. This will allow partial use of the Greyfriars Centre without the need to condition the whole building. For example; if the main hall is to be used on a day when the building is otherwise unoccupied then it would be possible to enable the ground floor, or just the main hall, such that all heating/cooling, ventilation and domestic hot water is available on that floor.

The control panel will be accessible over the local network. Password access to the systems web server shall allow remote interrogation and adjustment of control variable. Adjustable variables and monitoring include:

- Timers for plant operation
 - Ventilation
 - Heating / Cooling
 - Domestic Hot Water
- Internal temperature set points
 - Each Room conditioned by VRF system
 - Ground, First, Second Floor
- Override of Heating / Cooling / Hot Water and Ventilation plant
- Enable / Disable Ground, First, Second Floor Services
- Main incoming water meter
- Main incoming gas meter
- All sub-meters
- Room temperatures
- External air temperature

- Weather compensation
- Night set back controls and optimised start and finish
- Mains water leakage detection system
- Fault alarms

Rooms conditioned by the VRF heat pump system shall be complete with local controllers to allow adjustment by the room occupants. The BMS shall revert the controllers back to pre-set values at a given time at the end of the day.

When the air handling unit is enabled the carbon dioxide level within key areas shall be monitored. There shall be sensors positioned such that all areas being used are monitored. When the minimum threshold CO2 level is reached the AHU will enable at a low speed and utilise heat recovery if beneficial at that time with air tempering as necessary. If the CO2 concentration continues to rise, then the fan speed will increase proportionally until maximum design flow is reached.

In correlation with the M&E services installation, seasonal and general commissioning shall be undertaken on the BMS system in compliance with relevant BSRIA and CIBSE Commissioning Guides and CIBSE Guide to Ownership, Operation and Maintenance of Buildings. Seasonal commissioning will be implemented over a 12 month period following occupation.

3.7. BREEAM

In addition to the BREEAM points detailed elsewhere in this document, the following points will also be targeted:

- HEA 04 Thermal Comfort
- POL 02 NOx Emissions
- MAT 04 Insulation
- HEA 02 Indoor Air Quality
- WAT 02 Water Monitoring
- WAT 03 Water Leak Detection
- WAT 04 Water Efficient Equipment

For full BREEAM requirements, refer to the BREEAM report.

4. ELECTRICAL SERVICES

4.1. Incoming Electrical Services

The existing 3 phase 100A incoming electrical supply serving the Church Centre shall be disconnected by Scottish & Southern Electrical Power Distribution (SSE PD). A new 200A TP&N supply shall be installed and terminated in a Hall Store, inside the Centre, as indicated on the drawing. The incoming supply shall be extended, via fused switch disconnecter to the mezzanine plant room where a new 3 phase main switch panel board shall be installed.

From the main switch panel, new XLPE/SWA/LSZH armoured cables shall supply distribution boards and large electrical loads throughout the building.

4.2. Electrical Distribution

A new wall mounted switch panel board, as Schneider Powerpact 4 type or equivalent, shall be installed in the store adjacent to the Hall. The switchgear shall include MCCBs for supplies to distribution boards that will be located throughout the building, generally within risers.

The electrical distribution shall be within the risers and ceiling voids, as indicated on the drawings.

Multi-core armoured sub-mains cables, with thermosetting insulation, shall distribute power from the main switch panel to the distribution boards and shall be supported by galvanised steel cable trays routed within risers and ceiling voids.

Metering shall be provided as required by Part L2A of the building regulations to monitor energy consumption within the building. The metering system shall be compliant with CIBSE Technical Memorandum 39. Split metered distribution boards shall be included for lighting and power with each section separately metered. Mechanical services and other fixed loads shall be monitored via power quality meters at the main switch panel board. All sub-metering shall have a Modbus communication protocol output, with all meters linked via suitable cable to a central data logging system, which in turn shall be linked to the BMS system to monitor energy consumption.

4.3. Wiring Systems and Containment

Final circuit wiring will generally be single-core, low smoke zero halogen (LSZH) cables, installed within steel conduits and trunking concealed behind the building fabric.

The primary containment routes will generally be at high level within ceiling voids & risers.

In offices, power cable distribution will be contained within the multi-compartment dado trunking.

4.4. Small Power

Small power final circuit accessories shall be presented in the form of 13A switched socket outlets for general use and switched fused connection units to control fixed items of equipment such as mechanical plant, etc.

These items may be surface fixed, recessed with cast-in conduit to walls or within floor boxes dependant on their application and areas to be served.

Socket outlets shall be installed throughout the building to suit the layout of accommodation and furniture. Quantities shall be as indicated on the drawings. Socket outlets to be in white plastic finish, as the MK Logic Plus range.

Switched fused connection units shall be provided to suit items of fixed electrical equipment, such as fixed appliances, disabled alarm, power assisted door, etc. Where under counter appliances are fitted, a single un-switched socket outlet shall be provided adjacent / behind the appliance and controlled by a switched fused connection unit or 20A double pole switch mounted above the counter top.

Larger equipment such as mechanical plant and the lifts shall be supplied via local isolators with a suitable rating.

All final circuits for the small power installation shall be MCB/RCBO protected.

Accessory plates shall be white plastic, as MK Logic Plus range.

Within plant rooms, final circuit accessories shall be surface mounted with an aluminium finish, from the MK metalclad plus range.

4.5. Lighting, Controls and External Lighting

Lighting shall be installed throughout the buildings in accordance with BS EN 12464 Part 1: 2011 Light and Lighting – Lighting of Work Places, requirements of CIBSE and Part L of Building Regulations.

The design shall maximise the use of daylight within each space and shall be provided with LED luminaires throughout the building and externally. The proposed luminaires shall achieve 100 Lumens / circuit watt. Colour temperature of the lamps to be 3000K.

Various types of luminaires shall be used to suit the type of the ceiling and the use of each space, as indicated on the drawings.

Lighting controls shall be as described on the drawings, and generally as follows:

- Circulation Areas/Stores/WCs – PIR presence detectors, with daylight hold off function where daylight is available.
- Foyer, Meeting rooms and Offices – manual switches with PIRs in absence mode complete with daylight dimming.
- Hall – scene setting with manual dimming. A minimum of 2 scenes to be provided – one for functions at 300lux and one for sports at 500 lux.

- Kitchen – Manual Switch.
- Plantrooms – Manual Switches.

Wiring will generally be single-core LSZH insulated copper cables, installed within conduits and trunking. The lighting scheme shall be developed with the design team and client.

External lighting shall provide illumination to the building perimeter to allow safe movement, but also to the front and side building elevation as feature lighting. This shall be achieved using building mounted luminaires, as indicated on the drawing. All external luminaires shall be fitted with LED light sources. External lighting to the perimeter and façades of the building shall be dimmable and controlled using astronomical clock to ensure operating only occurs under low light conditions.

For luminaire specifications please refer to the Internal and External Lighting Layouts.

4.6. Emergency Lighting

Emergency lighting shall be provided by non-maintained self-contained emergency LED recessed luminaires. The installation will comply with BS 5266 and BS EN 1838 Emergency Lighting Standards.

Local test key switches shall be located adjacent to the relevant distribution board.

Appropriate illuminated signage will be provided along the emergency escape routes and above the final exits.

Emergency lighting comprising integral emergency fittings will be provided externally above the final exits.

4.7. Fire Alarm

A new fire alarm system will be provided to the Centre comprising smoke detectors, heat detectors, manual call points, sounders, xenon beacons and interface units as required under BS 5839-1:2017 with detection coverage to Category L1.

Interface relays shall also be provided as applicable to control the operation of lifts, gas valves, and ventilation systems.

All associated fire alarm cabling to be fire rated (FP) type run on trays within the secondary and tertiary distribution systems and ceiling / floor voids wherever practicable. Fire alarm cabling shall be kept separate from all other services in order to comply with BS 5839-1: 2017.

The fire alarm system within the Greyfriars Centre shall be interfaced with the new fire alarm system that is to be installed within Phase 1 of the project. Provision shall be made in the Phase 1 design to allow a single fire alarm interface unit within the ceiling void adjacent to the site boundary with phase 2 for future connection during the phase 2 works.

4.8. Data / Telecoms System / TV Systems

A new data and telecoms systems shall be installed to accommodate the proposed works. A fibre optic backbone link shall be provided to the Greyfriars Centre from the main distribution cabinet in Phase 1 of the works. The fibre backbone shall terminate in a new cabinet in the Resources Room on the First Floor.

The phase 1 design shall provide a ducted underfloor cable route from the main distribution cabinet through the boundary with phase 2. This will allow the retrospective installation of the new fibre backbone cable without disturbing the phase 1 building fabric.

Data / telephone RJ45 outlets shall be provided as identified on the drawings and shall be wired in Cat 6A cables back to the new data cabinet. All cable terminations shall be carried out by the Contractor and the system fully tested prior to completion. All active equipment shall be supplied and installed by the Contractor, to Client’s specification.

Wi-Fi will be provided to the rooms identified on the drawings.

All final CAT 6A run outs to RJ45 outlets in the Centre will be installed on cable baskets within the service voids and risers. Telephony will be by voice over IP technology. Direct phone lines to equipment requiring connection to off-site monitoring agency, including lifts, fire and security alarms and security systems, shall be provided.

A TV Specialist shall be appointed to provide terrestrial TV within the Hall. Power supplies shall be provided as required by the specialist installer to accommodate the installation.

4.9. CCTV System

External PTZ (pan, tilt and zoom) CCTV cameras shall be installed to provide coverage to the car park and the main entrances into the Centre.

Viewing & control of the CCTV cameras shall be from one of the Greyfriars Centre Offices. The fibre backbone connection shall allow the CCTV system installed within phase 1 to be controlled and viewed from the Greyfriars Centre.

4.10. Access Control System

An access control system shall be provided to all external doorways and some internal doors. Access shall be via RFID key fobs and wall mounted readers, with the capability to set different permission levels for individual users. The system shall be compatible with the system installed within phase 1 of the works to form a sitewide access control network.

Power supplies, software, peripherals & data outlets shall be provided as required by the specialist installer to accommodate the installation.

Access controlled doors shall be provided with interfaces to the fire alarm system to release door in the event of a fire, when on the escape route.

4.11. Intruder Alarms

A new intruder alarm system shall be provided to cover Phase 2 of the works, comprising:

- Security panels
- Keypads
- External sounders/beacons
- PIR detection
- Door contacts

The system shall be compatible with the system installed within phase 1 of the works to form a sitewide intruder alarm network. Off-site monitoring, via BT Redcare line shall be included as part of the Phase 1 design.

4.12. Communication/Alarms for the Disabled

Disabled alarms shall be provided in each disabled toilet. The disabled alarm shall comprise a simple pullcord switch located inside each disabled toilet, which, when operated, will activate an overdoor warning light / buzzer outside the toilet. The alarm will stay activated until re-set by reset button within the WC.

A dedicated disable refuge intercom system shall be provided to all disabled refuges to BS 5839-9: 2011. Each disabled refuge will be equipped with an intercom outstation to communicate with a panel at the base of the stair and back to the central panel located in the Centre Entrance lobby.

All new wiring shall be as required by the specialist installer and generally contained within steel cable baskets within risers and ceiling voids. Disabled refuge wiring shall be of a suitable fire resistance and shall be kept separate from all other services in accordance with BS 5839-9: 2011.

Power supplies shall be provided as required by the specialist installer to accommodate the installation.

4.13. Lightning Protection

A lightning protection specialist shall be employed to complete a full risk assessment to BS EN 62305.

A lightning protection system to cover phase 2 shall consist of an air termination network, down conductors and earth termination network in accordance with BS 7671 and BS EN 62305 and shall be bonded to the main earthing terminal.

The air termination network shall comprise 25mm x 3mm PVC sheathed copper tapes, colour matched to the structure to which they will be fixed.

Where possible and approved by the structural engineer the structural steel works shall be utilised for the down conductors. Where this is not possible down conductors shall be 25mm x 3mm PVC sheathed copper tape fixed at not more than 20m intervals around the building perimeter with fixings to each being made via non-metallic clips at intervals not exceeding 1 metre.

Each down conductor shall have a test / disconnection point at 300mm above finished ground level. Label connection point as required by BS 7671 and BS 6651.

Disconnection points shall be adequately protected against interference from vandals.

The earth termination network shall comprise driven copper earth rods of sufficient length / quantity to achieve the required resistance readings. The Contractor shall take the necessary earth resistivity readings to establish the exact quantity and length of rods required at each down conductor location to ensure the combined resistance of all installed earth electrodes shall not exceed 10 ohms.

Earth rods shall be housed within concrete inspection chambers co-ordinated with the Landscape Designer and Architects requirements.

4.14. Earthing and Bonding

The electrical systems shall be earthed in accordance with BS 7671: 2018 (IEE wiring regulations 18th Edition).

The installation shall be earthed in accordance with BS7671 for all ring, lighting and radial circuits. All elements of the installation shall be earthed to ensure compliance with BS 7671. Ring circuits intended for use with IT equipment shall be earthed as required by BS 7671 to consider high earth leakage currents.

All main services shall be bonded in accordance with BS7671 including the new Gas and Water connections.

4.15. Solar Photovoltaic

A solar photovoltaic system shall be provided at roof level to meet the requirements of the energy report. The system shall be linked with the main LV distribution within the building to offset grid energy usage during daylight hours. Battery storage and feed-in (Engineering Recommendation G59) connections to the grid are being considered to ensure that surplus energy generated by the PV array can be utilised out of daylight hours or sold back to the grid.

The PV system shall be metered, with the metering equipment incorporated into the building wide ModBus metering system to provide real time performance data for the PV array on the computer based monitoring / BMS system.

The system shall be installed in accordance with BS7671: 2018 and best practice industry guidance. The system shall comprise 26Nr. High-efficiency

photovoltaic panel mounted on the flat roof space adjacent plant areas on the roof of the building giving a peak generation capacity of 9.62kW. The PV array shall be mounted on a steel racking system elevated from the rooftop to overcome the pitched sections of the flat roof.

4.16. BREEAM

In addition to the BREEAM points detailed elsewhere in this document, the following points will also be targeted:

- ENE 01 Reduction in energy use and carbon emissions
- ENE 02 Energy monitoring
- ENE 03 External Lighting
- ENE 04 Low Carbon design
- MAT 01 Building Life Cycle Assessment
- MAT 02 Environmental Product Declarations
- MAT 03 Responsible Sourcing
- MAN 03 Responsible Construction Practices
- MAN 04 Commissioning and handover
- MAN 05 Aftercare
- HEA 01 Visual Comfort
- WST 01 Construction Waste Management
- POL 04 Reduction of night time pollution

For full BREEAM requirements, refer to the BREEAM report.

5. ENERGY STRATEGY

5.1. Introduction

General

Ridge and Partners LLP have been appointed by JBKS Architects to provide a RIBA Stage 3 report for phase 2 of the proposed Greyfriars Church project. This report has been issued for planning but also to set out a feasible and compliant design for future design stages and architectural design.

Modelling

The building has been modelled using one of the UK Government’s approved energy modelling software, Integrated Environmental Solutions Virtual Environment (IES VE) 2017, in order to assess the proposed development in accordance with the National Calculation Methodology (NCM) and Part L (2013) of the Building Regulations calculations procedures.

Part L2A targets

The proposed development is required to achieve compliance with Part L2A of the Building Regulations where the Building Emission Rate (BER) is less than or equal to the Target Emission Rate (TER). Compliance should be demonstrated through an approved SBEM output document (BRUKL).

Local Planning Policy

Reading Borough Local Development Framework: Core Strategy Adopted 2008 (altered and adopted 2015).

Core Strategy (CS 1) – Sustainable Construction and Design

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

To meet these requirements:

- *On larger developments of more than 10 dwellings or 1,000 m2 of floor space, ensure that 50% of the provision meets the most up to date Eco-Homes and BREEAM ‘Excellent’ standards;*
- *All new developments maximise the use of energy efficiency and energy conservation measures in their design, layout and orientation to reduce overall energy demand;*
- *All developments reduce mains water use and demonstrate that water conservation measures are incorporated so that predicted per capita consumption does not exceed the appropriate levels set out in the Code for Sustainable Homes or BREEAM Standards*
- *Developments incorporate sustainable urban drainage facilities and techniques as part of the layout of a development as appropriate and as*

advised by the Environment Agency, including minimising the size of impermeable areas so that peak run-off and annual water run-off is reduced where possible and in any case is no greater than the original conditions of the site. ...

The Council’s Community Strategy has highlighted that building materials and other non-renewable resources are being taken up at a rapid rate and that increased re-use and recycling is essential in order to reduce waste and to manage future extraction and its impact on the environment. In light of this, and the Community Strategy’s aims to reduce the amount of waste generated and to increase the proportion of waste that is reused or recycled through better waste management, it is considered necessary that a policy is in place that will achieve these aims. As a consequence, the beneficial restoration and reuse of existing buildings should always be considered before demolition and redevelopment.¹

The proposed Greyfriars development is considered a larger development and therefore needs to meet BREEAM score of 62.5. This number is taken from 50% of the BREEAM ‘Excellent’ standard.²

Building regulations part L2A methodology

Under the terms of the European Union’s Energy Performance of Building Directive (EPBD) (2002/91/EC) member states are required to access the predicted energy performance of all new buildings.

The objective is to improve the energy performance of buildings by requiring:

- a methodology to calculate integrated energy performance of buildings
- minimum energy requirements for new buildings
- minimum energy requirements for large existing buildings
- regular inspections of boilers and of A/C systems

Compliance Assessment

Part L2A “Conservation of fuel and Power” is one part of the Governments four Part L Building Regulations dealing with the energy use in buildings (Part L2A - Conservation of Fuel and Power in new buildings other than dwellings). The specific regulations and compliance procedures are part of the Approved Document (ADL2A). This document covers the legal requirements of the revisions published in April 2014. There are two regulations under Part L:

17C - Where a building is erected, it shall not exceed the target CO2 emission rate for the building that has been approved pursuant to regulation 17B.

17 E - Energy Performance Certificates – to what buildings do they apply, who shall provide them, when they must be produced, and what they must contain.

Specific requirements of Part L:

Reasonable provision shall be made for the Conservation of Fuel and Power in buildings by:

“Limiting heat losses and gains, providing fixed building services which are Energy efficient, have effective controls that are commissioned and tested, provide the owner with sufficient information about the building and the fixed services so that the building can be operated to use no more fuel and power than is reasonable”.

To show compliance with the above regulations and specific requirements under Part L2A of the Building Regulations, Simplified Building Energy Model (SBEM) and Energy Performance Certificate (EPC) calculations are required for any new building. As some of the Greyfriars Church development are places of worship and adjoining spaces whose function is directly linked to that use, these spaces were omitted from the SBEM analysis.

SBEM calculations are used to benchmark the predicted building annual performance in terms of carbon emissions and compares these with a notional building which applies current standards set by the UK Building Regulations. The notional building has the same geometry, location and orientation as the actual building. The activities of individual zones in the building are also identical to the actual building. Specific aspects of the building design are allowed for by selection of the most appropriate NCM (National Calculation Methodology) templates for systems as follows:

- percentage glazing used
- heating
- cooling
- ventilation
- domestic hot water generation
- lighting

Note that the energy predictions above are for regulated loads only. Unregulated loads (such as small power usage for computers) do no form part of the Part L calculation. It should also be noted that the NCM templates do not accurately reflect the energy use of the space – they are an approximation so that all spaces of an equivalent use in different buildings can be compared.

The SBEM assessment for evaluates the actual building in terms of the following five criteria:

Criterion 1 – *The predicted rate of carbon dioxide emissions from the building (BER – Building Carbon Dioxide Emission Rate) is not greater than the target rate (TER – Target Carbon Dioxide Emission Rate).*

Criterion 2 – *Reasonable provision has been made to limit heat gains and losses through the fabric of the building, and energy efficient fixed building services and appropriate controls have been specified.*

¹ Reading Borough Core Strategy (CS 1) – Sustainable Design and Construction

² BREEAM ‘Very Good’ requires a score of 55% and BREEAM ‘Excellent’ a score of 70%, a difference of 15%. 15% * 0.5 = 7.5%. 50% of the BREEAM ‘Excellent’ provision is therefore 70% - 7.5% = a BREEAM score of 62.5%

Criterion 3 – The building has appropriate passive control measures to limit solar gains and limit or eliminate the need for air conditioning.

Criterion 4 – The performance of the building, as built, is consistent with the prediction made in the BER. (As designed performance is based on the systems and equipment specified. Changes of manufacturer or equipment and value engineering changes may affect as built performance.)

Criterion 5 – The necessary provisions for enabling energy efficient operation of the building are put in place.

5.2. Energy Demand Assessment

Design principles

To achieve a truly low-carbon building the most effective approach to reduce operational energy use should follow the low carbon design principles as described in Chartered Institution of Building Services Engineers (CIBSE) Guide L Sustainability 2007 and the Greater London Authority (GLA) “Energy Hierarchy”. The following steps describe CIBSEs principles:

- 1. Focus on understating the energy use of the building
- 2. Evaluate the buildings location, orientation, fabric thermal performance and operation to determine measures to reduce the energy requirements of the building (“Passive” design measures: (GLA: Lean).
- 3. Improve the efficiency of fixed building services (Boiler plant, light fittings etc.) to meet the energy demand in the most effective way possible (“Active” design measures: GLA: Clean).
- 4. Study the feasibility of implementing Low Zero Carbon (LZC) technologies to further reduce the CO2 emissions associated with the energy use of the building studied (GLA “Green” measures).

The Energy Hierarchy diagram in Figure 3 below illustrates the “Lean, Clean and Green” methodology. This framework was used to assess the energy efficiency of the proposed Greyfriars Church project in Reading.

The IES VE thermal model built for the proposed building considers the following:

- 1. Building geometry, location and orientation
- 2. Buildings fabric thermal performance
- 3. Building services strategy
- 4. Environmental conditions (this includes solar irradiation, wind, and external temperatures)
- 5. Internal heat gains (occupants, computers, lighting and miscellaneous small power (National Calculation Method - NCM templates used)

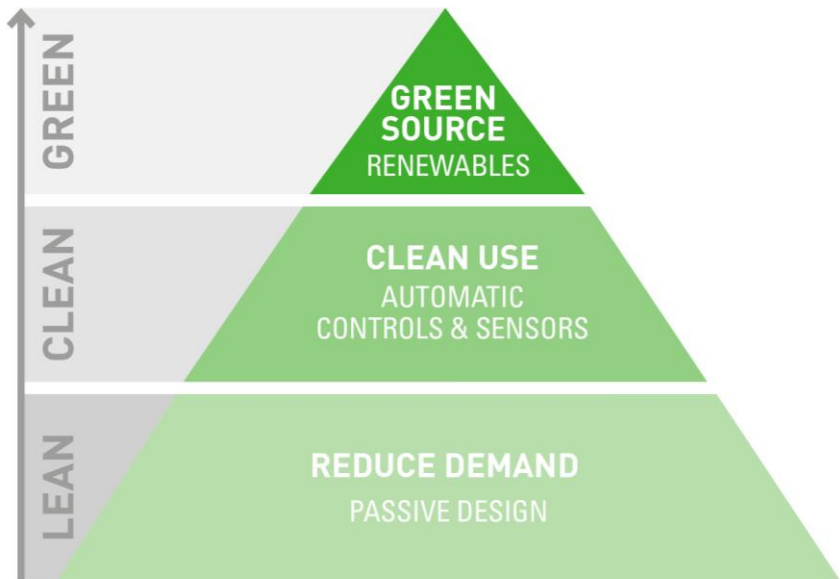


Figure 3 – GLA “Energy Hierarchy”

5.3. Methodology

The following steps describes the method used to assess the energy reduction potential the “Lean, Clean and Green” methodology offer and evaluated the potential contribution LZC technologies could offer to the energy strategy for the proposed building.

- Construction of a base case IES thermal model to determine a base point from which to assess potential energy efficiency measures.
- Construction of an IES thermal model implementing “Passive (Lean)” measures to quantify the energy reduction potential of these measures and estimate the site overall energy requirement (In terms of heating, cooling, auxiliary, lighting, DHW and equipment).
- Assessment of the technical suitability of LZC technologies.
- Complete energy iterations to investigate which strategies offer the best suitable possible solution to meet the targets set in Local Planning Policy Section above.
- Complete SBEM calculation to determine compliance with Part L2A of the Building Regulations.

5.4. Modelled data

To complete the Part L2A compliance assessment a 3D model was built in IES VE 2017 software. The following design parameters where used, and compliance simulations were carried out using SBEM Part L2A Compliance software package (VE Compliance).

This section covers the principal building form, mechanical and electrical services design parameters and system efficiencies used to conduct the Part L compliance check.

Building Information

Please refer to section 2.5 Technical Targets for the information used in the building modelling.

General NCM Information

SBEM Location:	Swindon
SBEM Building type:	D1: Community/day centre
SBEM Building Category:	Place of assembly, office or shop
Power factor correction:	<0.9
Stage of analysis:	As Designed

Space Heating

Air Source Heat Pump (Combi Gas DHW)

SBEM System Type:	Fan Coil System
Heat source:	VRF Air Source Heat Pump
Fuel type:	Electricity
COP:	3.60
SEER:	2.50
EER:	3.50
Pump type:	Variable speed differential sensor in system
System controls:	Central time control, Optimum start/stop control, Local time control, Local temperature control, Weather compensation control.
DHW Generator Type:	Standalone water heater
Storage volume:	300 l
Storage losses:	0.0047 kwh/(l*day)
Fuel type:	Natural Gas
Efficiency:	91%
Secondary Circ. losses:	5 W/m
Loop length:	100 m
Pump power:	0.2 kW
Pump type:	Variable Speed

Gas Boiler Radiators – Circulation and WC

SBEM System Type:	Central heating using water: Radiators
Heat source:	LTHW boiler
Fuel type:	Natural Gas
Efficiency:	91%
Pump type:	Constant Speed
System controls:	Central time control, Local time control, Local temperature control



Figure 4: Proposed Greyfriars Centre heating strategy

Ventilation

System 01 – 10 l/s/person Fresh air allowance from main AHU and FCU

System description: Zonal supply where fan is remote from zone
 Efficiency of AHU fan: 1.4 W/ (l/s)
 Efficiency of FCU fans: 0.3 W/ (l/s)
 Control type: Enhanced ventilation
 Heat Recovery: Plate Heat Exchanger @ 80% efficiency

System 02 – 10 ACH Extract only to serve bathrooms

System description: Zonal extract system where fan is remote from zone
 Efficiency of fan: 0.4 W/ (l/s)
 Control type: Enhanced ventilation
 Heat Recovery: Plate Heat Exchanger @ 80% efficiency

System 03 – 15 l/s Extract only to serve Kitchenettes and Bin Store

System description: Zonal extract system where the fan remote from zone (Bin store fan is within the zone)
 Efficiency of fan: 0.3 W/ (l/s)
 Control type: Enhanced ventilation
 Heat Recovery: Plate Heat Exchanger @ 80% efficiency

System 04 – 60 l/s Extract only with grease filter to serve kitchen

System description: Zonal extract system, fan is remote from the zone
 Efficiency of fan: 0.4 W/ (l/s)
 Control type: Enhanced ventilation

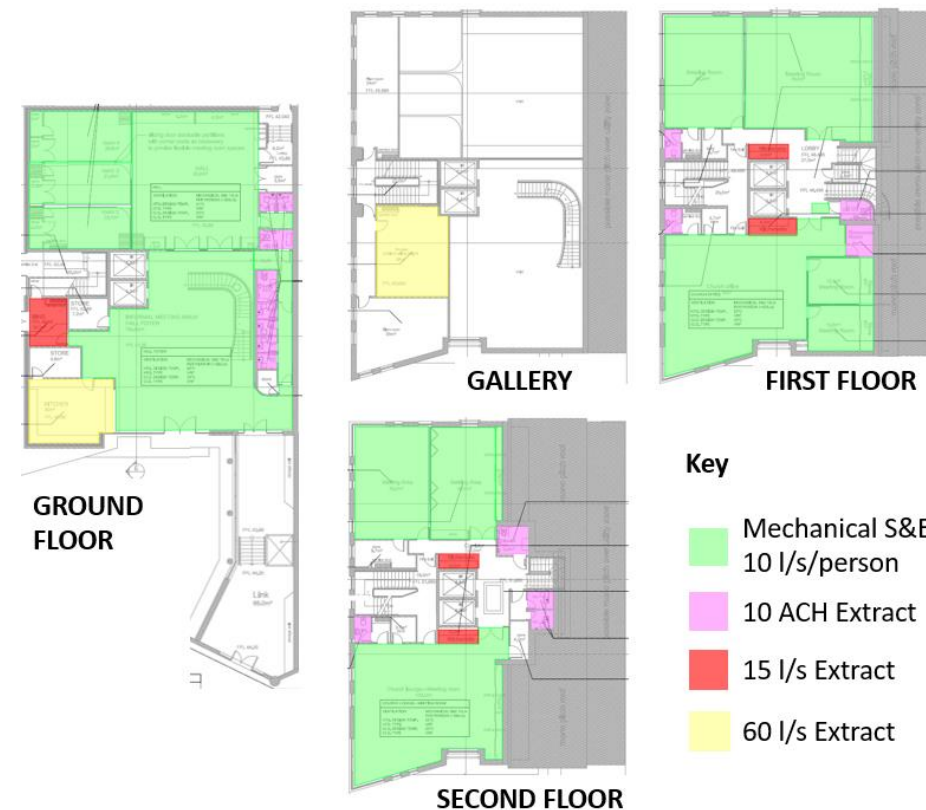


Figure 5: Proposed Greyfriars Centre ventilation strategy

Lighting

All WC accommodation, circulation and plant rooms as well as the Foyer, Main Hall: Minimum Luminaire Efficacy 90 Lm/CW.

All meeting rooms, kitchenettes, church rooms, offices, kitchen, storage areas and tea points: Minimum Luminaire Efficacy 100 Lm/CW.

Lighting Controls

Lighting controls are shown in the strategy drawings following and have been based on the lighting design developed at this stage:



Figure 6: Proposed Greyfriars Centre Switching Strategy



Figure 7: Proposed Greyfriars Centre Daylight Sensing Controls Strategy

Low and zero carbon technologies

In line with the EPBD Recast of 2013 the following section presents a technical feasibility assessment of “alternative energy systems or low and zero carbon technologies” for the proposed Greyfriars Church project.

LZC TECHNOLOGY	APPLICABILITY	FEASIBILITY
Solar Technologies		
Solar Photovoltaics (PV) Panels	There is sufficient flat roof space on the proposed building	Suitable
Solar Thermal DHW heating panels	Benefit of roof space taken does not outweigh potential gains from PV panels paired with a heat pump	Not Feasible
Wind Technologies		
Wind Turbines	Too much turbulence is predicted on site	Not Feasible
Bio-fuel technology		
Biomass Boilers	Space requirements, fuel delivery and fire risk decrease feasibility	Not Feasible
Low Carbon technologies		
Community / District Heating	No local networks	Not Feasible
Combined Heat and Power	Not enough heat demand for large CHP, micro CHP possible.	Feasible
Fuel Cells	Undeveloped technology with relatively untested infrastructure for fuel delivery	Not Feasible
Air to air heat pumps (Electric/Gas)	Good coefficient of performance and excellent applicability for mixed heating and cooling systems.	Suitable
Ground to air/water heat pumps (Electric)	The capital cost made this unfeasible and with additional ground loops to those proposed in the building piles the cost may be significantly more.	Feasible
Water to air/water heat pumps (Electric)	No water source nearby	Not Feasible

Table 3 – LZC technology feasibility assessment.

Eleven Feasibility LZC technologies (as shown above in Table 3) were investigated as part of this exercise. From the remaining technologies Solar Photovoltaics and Air Source Heat Pumps were determined to be the best suited for the site based on cost, efficiency and the requirement for both heating and cooling.

5.5. Simulation results

SBEM Results

With the proposed systems and low carbon technologies sufficient energy and carbon savings were achieved for the building to pass the building regulations (as seen below in Table 4 – Part L2A Building Regulations UK Criterion 1.

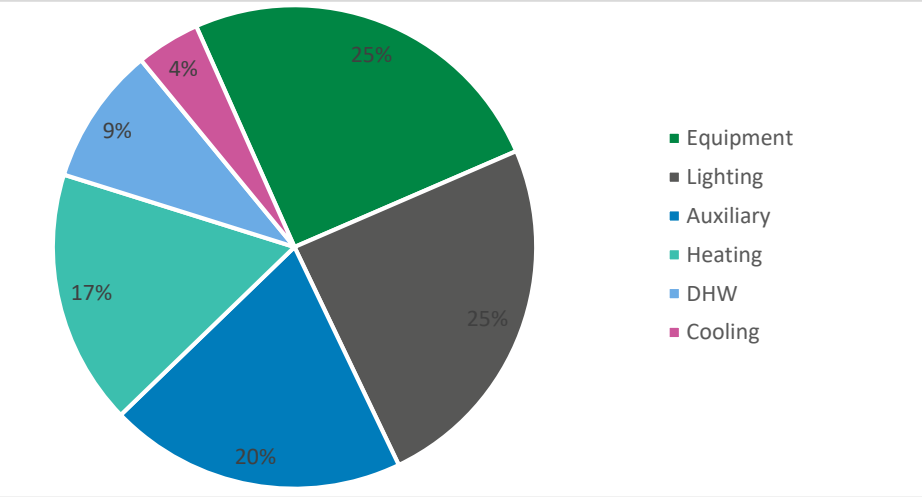
CO ₂ emissions rate from the notional building, kgCO ₂ /m ² . annum	22.8
Target CO ₂ emission rate (TER), kgCO ₂ /m ² . annum	22.8
Building CO ₂ emissions rate (BER), kgCO ₂ /m ² . annum	22.7
Are emissions from the building less than or equal to the target?	BER =< TER

Table 4 – Part L2A Building Regulations UK Criterion 1

The full L2A compliance document can be found in Appendix D: RIBA Stage 3 Design BRUKL.

Energy and Carbon Results

The site energy demand has been broken down by end use. This information can also be seen in Appendix 0 and was calculated using the VE Compliance application in IES VE.



Graph 1 – Annual energy consumption

Result above show that the proposed design is compliant with Part L2A of the Building Regulations.

END USE	ESTIMATED ANNUAL ENERGY USE (KWH)
Heating	17,249
Cooling	4,326
Auxiliary	20,107
Lighting	24,736
Hot Water	9,326
Equipment	25,464
Total	101,207

Table 5 – Estimated annual energy consumption by end use.

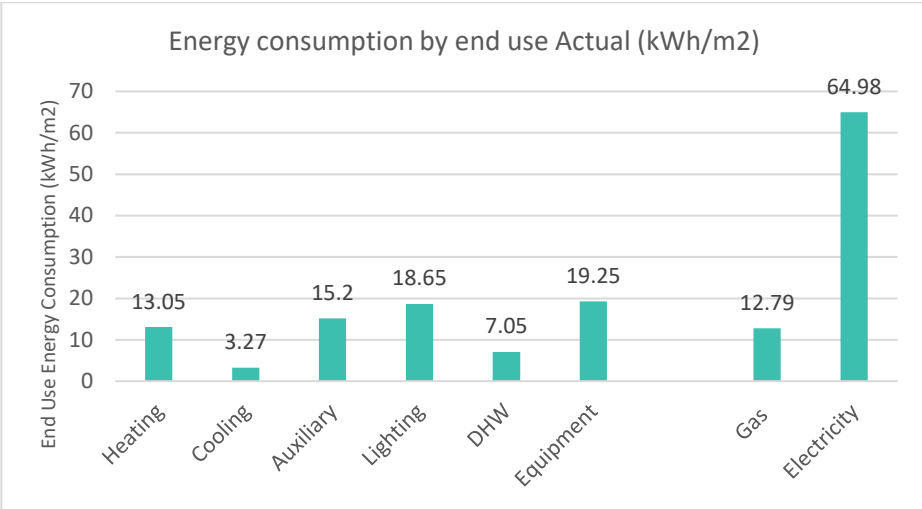


Figure 8 - Energy consumption by end use Actual (kWh/m²)

Note: Part L2A calculations require the use of NCM templates. These set a large proportion of the design criteria (Occupancy profiles, heating and cooling set points and mechanical ventilation rates). Therefore, the predicted annual energy consumption and carbon dioxide emissions in these calculations may vary from the actual energy consumption of the proposed building.

Site CO₂ emissions

The passive, active and green measures discussed in this report successfully reduced carbon dioxide emissions at the proposed Greyfriars Church. A summary of these reductions by intervention can be seen below.

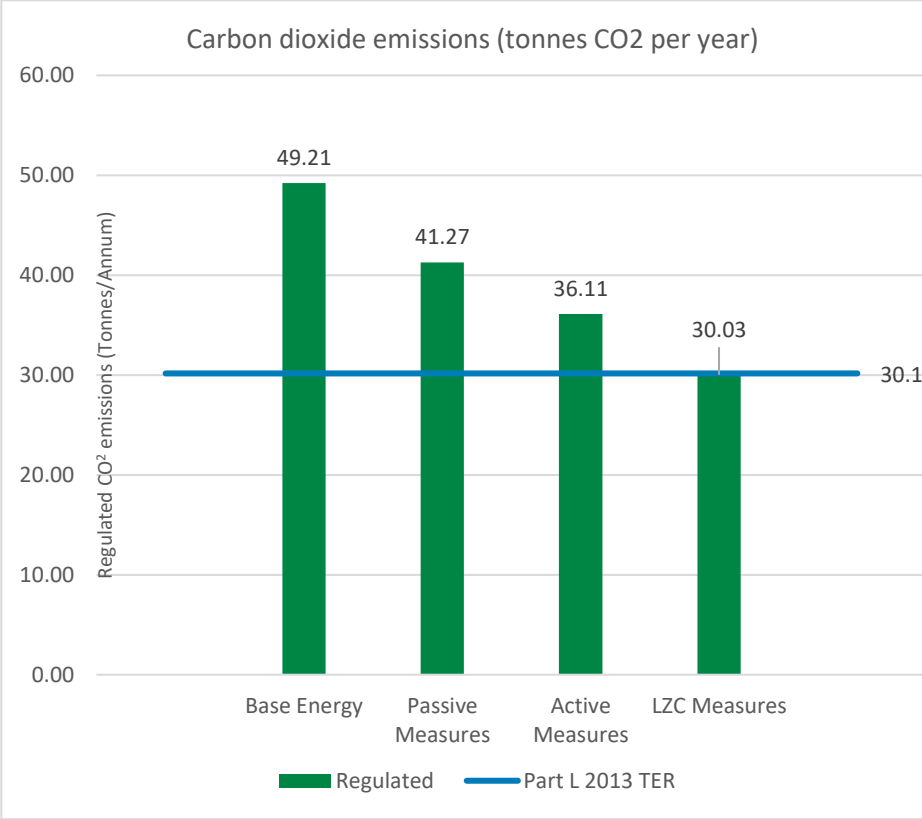


Figure 9 - Carbon reduction by energy saving measure

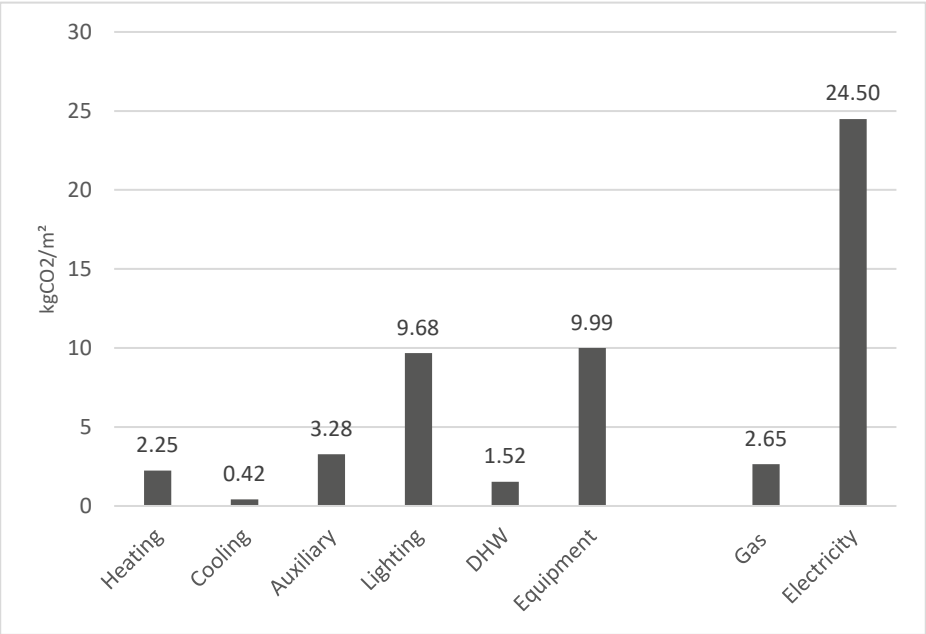


Figure 10 - Carbon emissions by end user

CARBON DIOXIDE EMISSIONS (TONNES CO ₂ PER YEAR)		
	Regulated	Unregulated
Base Energy	49.21	13.22
Passive Measures	41.27	13.22
Active Measures	36.11	13.22
LZC Measures	30.03	13.22

Table 6 - CO₂ emissions reductions

REGULATED CARBON DIOXIDE SAVINGS		
	Tonnes CO ₂ per annum	(%)
Savings from Passive Measures	7.94	16.13
Savings from Active Measures	5.16	10.48
Savings from LZC Measures	6.08	12.37

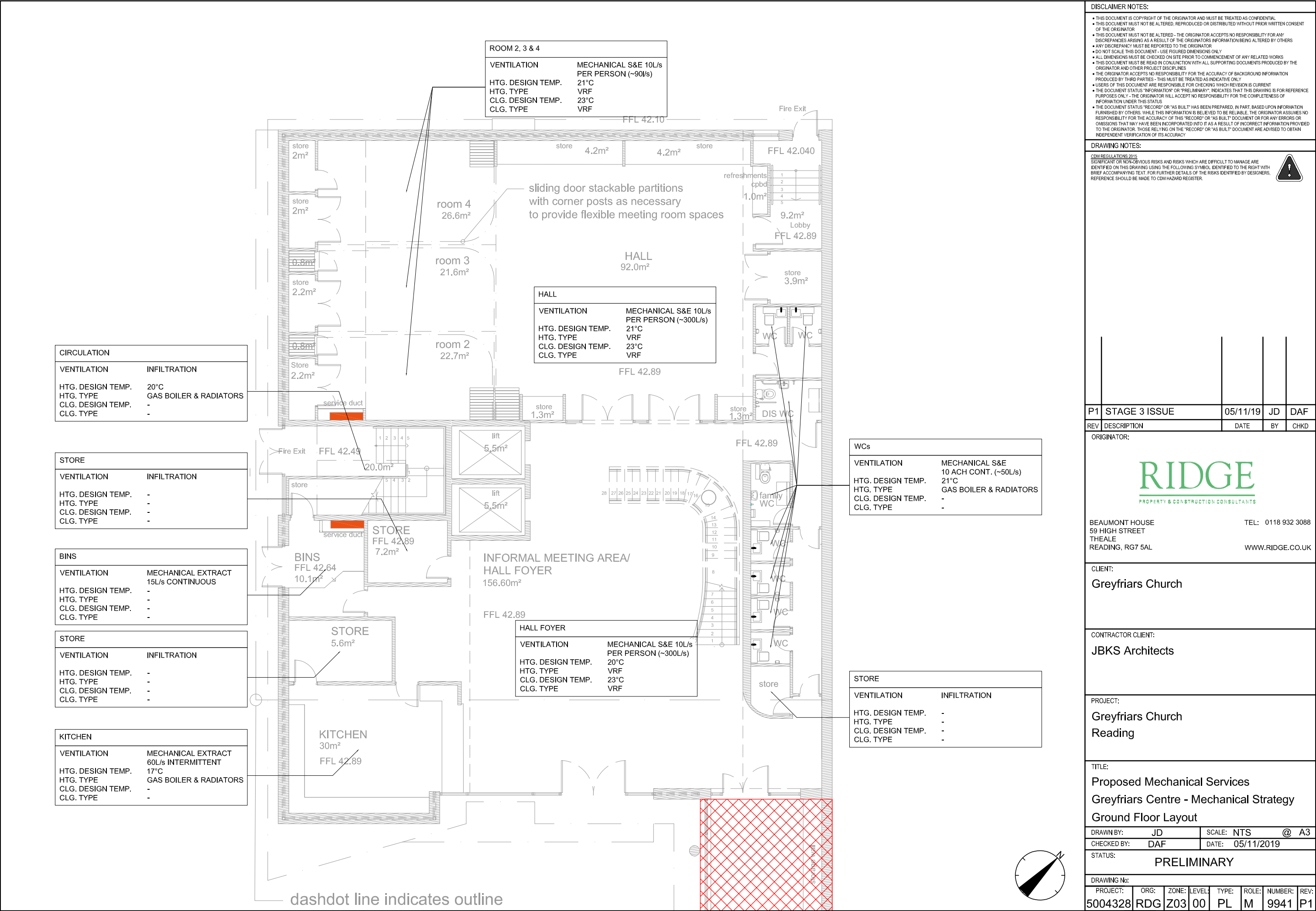
Table 7 - Regulated CO₂ savings

5.6. Conclusions and Recommendations

At this stage and with the assumptions outlined above in this report, the proposed Greyfriars Centre is compliant with Part L of the Building Regulations. To ensure this, it has been proposed that 26No. PV panels be installed on the roof of the Greyfriars Centre. These panels will generate roughly 9.62 kW Peak and, with the use of the VRF ASHP system, sufficiently reduce the carbon emissions for the proposed building to pass compliance.

As the project progresses, it is recommended that the efficiencies of the systems, namely the VRF unit and the gas boilers, be increased to improve the building’s overall performance. It is also recommended that additional solar panels be considered on the roof to further offset the carbon emissions and generate more on site electricity for the building.

APPENDIX A: MECHANICAL AND ELECTRICAL STRATEGY DRAWINGS



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P1	STAGE 3 ISSUE	05/11/19	JD	DAF
REV	DESCRIPTION	DATE	BY	CHKD

ORIGINATOR:

BEAUMONT HOUSE
59 HIGH STREET
THEALE
READING, RG7 5AL

TEL: 0118 932 3088

WWW.RIDGE.CO.UK

CLIENT:

Greyfriars Church

CONTRACTOR CLIENT:

JBKS Architects

PROJECT:

**Greyfriars Church
Reading**

TITLE:

**Proposed Mechanical Services
Greyfriars Centre - Mechanical Strategy
Ground Floor Layout**

DRAWN BY:	JD	SCALE:	NTS @ A3
CHECKED BY:	DAF	DATE:	05/11/2019

STATUS:

PRELIMINARY

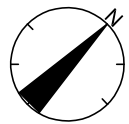
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PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5004328	RDG	Z03	00	PL	M	9941	P1

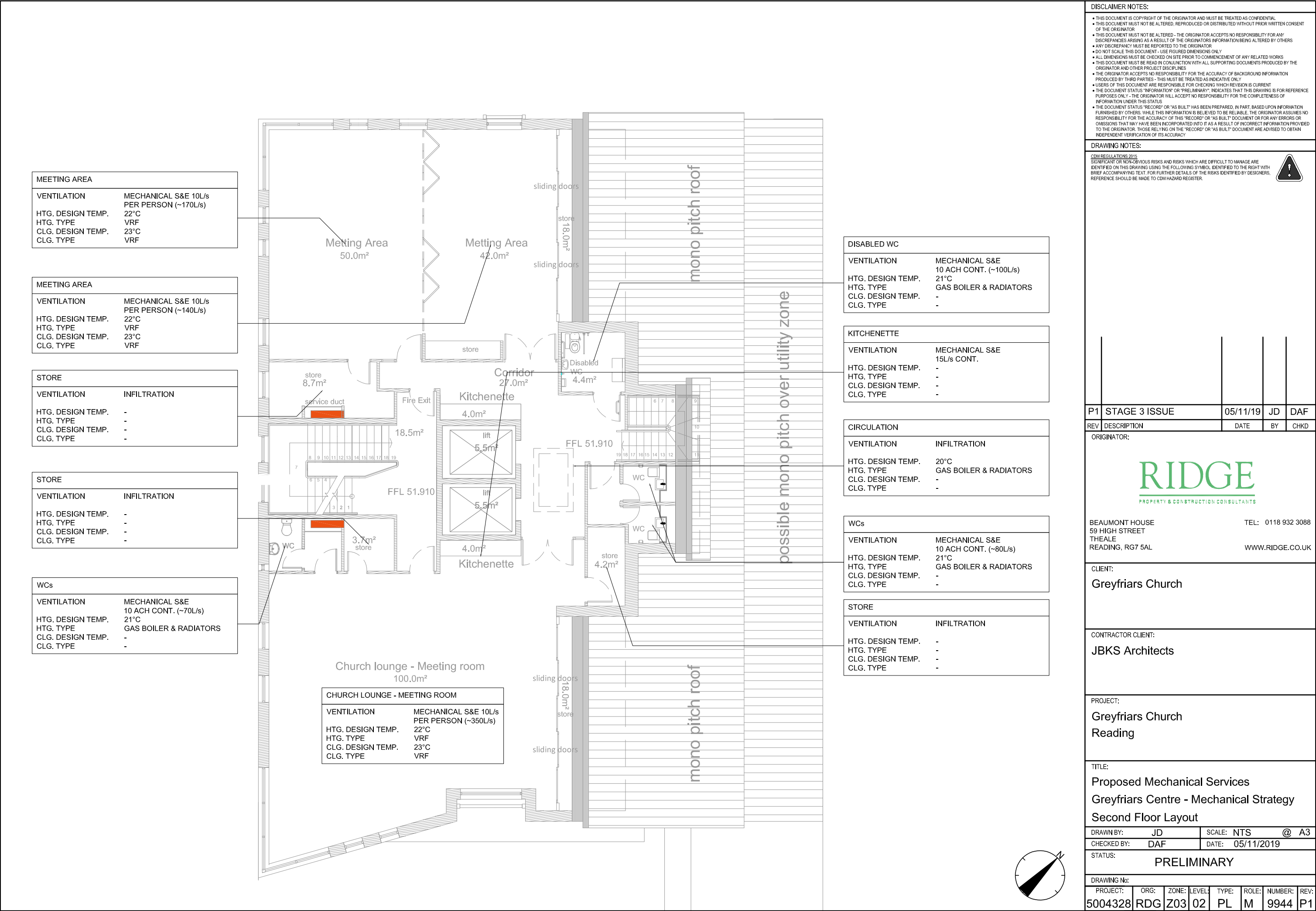
The floor plan illustrates a building layout with several key areas:

- Plant room (top left):** 34m², FFL 45.940.
- Void (top center):** An open space above the main floor level.
- Service duct (top left):** Indicated by a red rectangle.
- Staircase (middle left):** 22.0m², FFL 46.120. The stairs are numbered 1 through 29.
- Lifts (middle right):** Two lift shafts, each 5.5m².
- Plant room (bottom left):** 38m², FFL 45.940. This area is marked with a red cross-hatch pattern and labeled "Plant room (limited ceiling height)".
- Storage (bottom left):** 35m², FFL 45.940.
- Void (bottom center):** Another open space below the main floor level.
- Staircase (bottom right):** A curved staircase with steps numbered 1 through 29.
- Utility zone (far right):** A vertical strip labeled "possible mono pitch over utility zone".

STORE	
VENTILATION	INFILTRATION
HTG. DESIGN TEMP.	-
HTG. TYPE	-
CLG. DESIGN TEMP.	-
CLG. TYPE	-



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PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
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SIGNIFICANT OR NON-OBVIOUS RISKS AND RISKS WHICH ARE DIFFICULT TO MANAGE ARE IDENTIFIED ON THIS DRAWING USING THE FOLLOWING SYMBOL, IDENTIFIED TO THE RIGHT WITH BRIEF ACCOMPANYING TEXT. FOR FURTHER DETAILS OF THE RISKS IDENTIFIED BY DESIGNERS, REFERENCE SHOULD BE MADE TO CDM HAZARD REGISTER.

P1

STAGE 3 ISSUE

05/11/19

JD

DAF

REV

DESCRIPTION

DATE

BY

CHKD

ORIGINATOR:

RIDGE

PROPERTY & CONSTRUCTION CONSULTANTS

BEAUMONT HOUSE

59 HIGH STREET

THEALE

READING, RG7 5AL

TEL: 0118 932 3088

WWW.RIDGE.CO.UK

CLIENT:

Greyfriars Church

CONTRACTOR CLIENT:

JBKS Architects

PROJECT:

Greyfriars Church

Reading

TITLE:

Proposed Mechanical Services

Greyfriars Centre - Mechanical Strategy

Second Floor Layout

DRAWN BY: JD

SCALE: NTS @ A3

CHECKED BY: DAF

DATE: 05/11/2019

STATUS:

PRELIMINARY

DRAWING No:

PROJECT: 5004328

ORG: RDG

ZONE: Z03

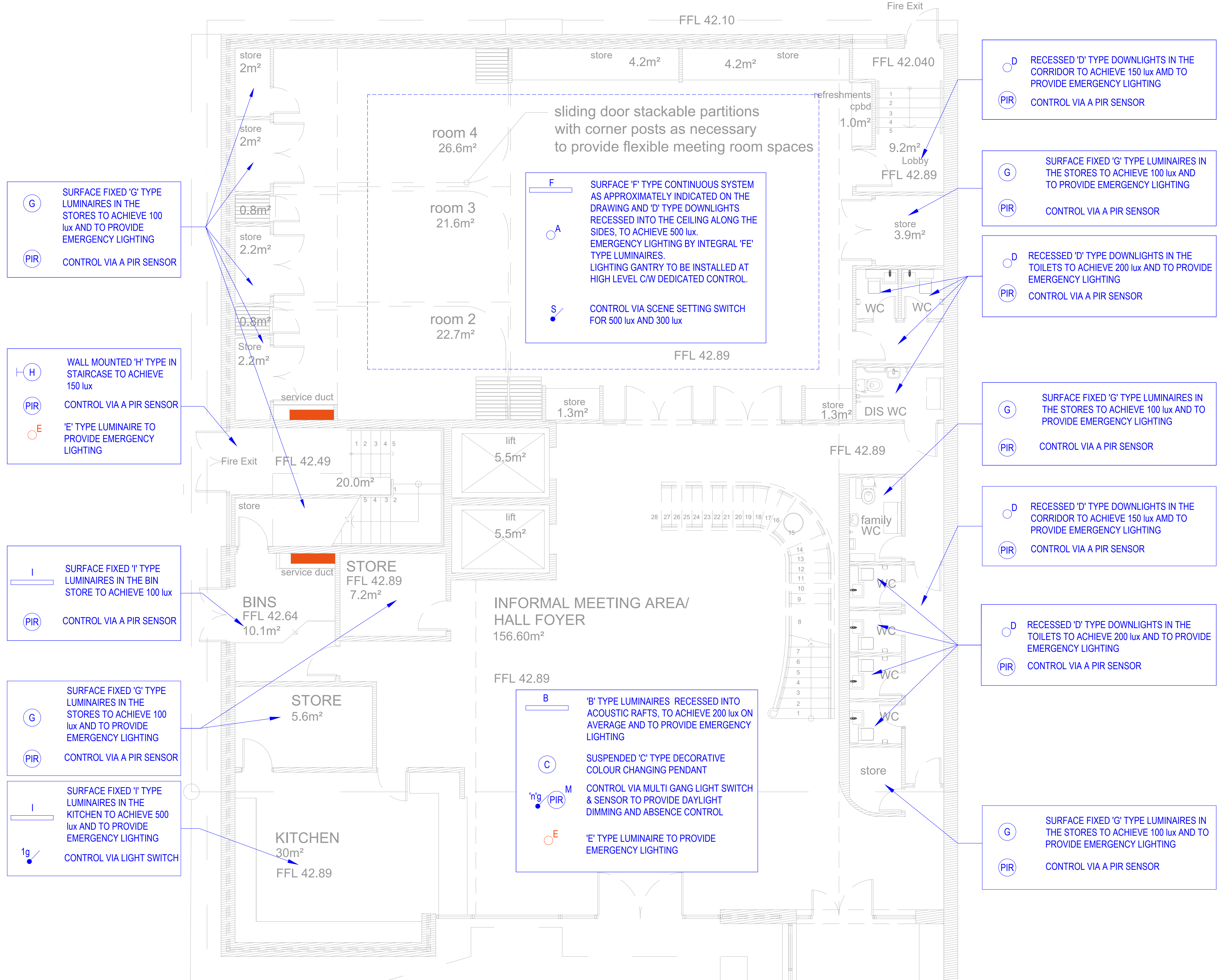
LEVEL: 02

TYPE: PL

ROLE: M

NUMBER: 9944

REV: P1



dashdot line indicates outline of existing building

LIGHTING LEGEND		
	RECESSED LED DOWNLIGHT LUMINAIRE, AS FAGERHULT KASKAD FIXED	
	LED LINEAR RECESSED/SURFACE/SUSPENDED LUMINAIRE, AS HACL INFINITAS RANGE (STANDARD/DIMMABLE AS IDENTIFIED ON THE LAYOUT)	
	PENDANT LED RGB (COLOUR CHANGING) LUMINAIRE, AS HACL EXPLORA HALO	
	RECESSED LED DOWNLIGHT, AS HACL MIDI +510 ATTACHMENT ALSO AVAILABLE AS INTEGRAL EMERGENCY FITTING	
	NON-MAINTAINED LED STAND-ALONE SELF-TEST EMERGENCY LUMINAIRE, AS WHITECROFT FLORIN, TO BE INSTALLED THROUGHOUT - OPEN AREA LIGHT DISTRIBUTION OR CORRIDOR DISTRIBUTION AS NECESSARY TO SUIT EACH SPACE AND RECESSED OR SURFACE FIXED TO SUIT THE CEILING TYPE.	
	LINEAR SURFACE MOUNTED IP68 RATED LED LUMINAIRE, AS ZUMTOBEL TUBILUX, ALSO AVAILABLE AS INTEGRAL EMERGENCY (STANDARD/DIMMABLE AS IDENTIFIED ON THE LAYOUT)	
	SURFACE FIXED BULKHEAD LED LUMINAIRE, AS WHITECROFT PORTAL, ALSO AVAILABLE AS INTEGRAL EMERGENCY	
	WALL MOUNTED LED LUMINAIRE, AS FAGERHULT COMBILUME WALL RANGE	
	SURFACE LINEAR LED IP66 RATED, AS WHITECROFT ACL INDUSTRY. ALSO AVAILABLE AS INTEGRAL EMERGENCY FITTING	

	LED TAPE, AS HACL LIGHT LINE	
	CONTINUOUS RECESSED LINEAR LED LUMINAIRE: DIMMABLE, AS LED LINEAR ADONIS, IP67	
	HOMOGENOUS LED STRIP HOUSED IN THE REAR OF METALLIC SIGNAGE. DIMMABLE, AS LED LINEAR VENUS SV IP67	
	LIGHT SWITCH, NUMBER OF GANG INDICATED. 'S' DENOTES SCENE SETTING SWITCH	
	PASSIVE INFRARED SENSOR WITH CUT OFF FACILITY WHEN SUFFICIENT DAYLIGHT IS AVAILABLE	
	MICROWAVE SENSOR	
	PASSIVE INFRARED SENSOR IN ABSENCE DETECTION	
NOTE: 'E' DENOTES INTEGRAL EMERGENCY LUMINAIRE		

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IN ASSOCIATION WITH: JBKS Architects		PROJECT: Greyfriars Church Reading		DRAWN BY: AN CHECKED BY: AJS DATE: 05/11/2019		SCALE: NTS @ AD		STATUS: PRELIMINARY	
PROJECT: Greyfriars Church Reading		DRAWING NO: 5004328-RDG-Z03-PL-E-0124		PROJECT: ORG: ZONE: LEVEL: TYPE: ROLE: NUMBER: REV:		BEAUMONT HOUSE 59 HIGH STREET THEALE READING, RG7 5AL		TEL: 0118 932 3088 WWW.RIDGE.CO.UK	
P1 Stage 3 Issue		05/11/2019		AN		AJS		0124 P1	
REV DESCRIPTION		DATE		BY		CHKD			

ESCAPE
TO LEVEL 42.10

I
1g
SURFACE FIXED 'I' TYPE LUMINAIRES
WITHIN THE PLANT ROOM TO
ACHIEVE 200 lux AND TO PROVIDE
EMERGENCY LIGHTING
CONTROL VIA LIGHT SWITCH

Plant room
34m²
FFL 45.940

Void

AS GROUND FLOOR

H
PIR
'H' TYPE LUMINAIRE TO PROVIDE
EMERGENCY LIGHTING
CONTROL VIA A PIR SENSOR

FFL 45.940

service duct

FFL 46.120

service duct

FFL 45.940

I
PIR
SURFACE FIXED 'I' TYPE LUMINAIRES
WITHIN THE PLANT ROOM TO
ACHIEVE 200 lux AND TO PROVIDE
EMERGENCY LIGHTING
CONTROL VIA A PIR SENSOR

I
PIR
SURFACE FIXED 'I' TYPE LUMINAIRES
WITHIN THE PLANT ROOM TO
ACHIEVE 200 lux AND TO PROVIDE
EMERGENCY LIGHTING
CONTROL VIA A PIR SENSOR

Plant room
(Limited ceiling height)
38m²
FFL 45.940

Void

AS GROUND FLOOR

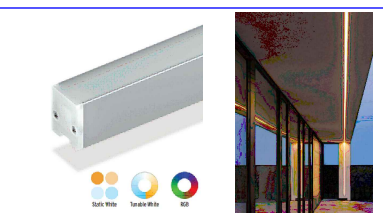
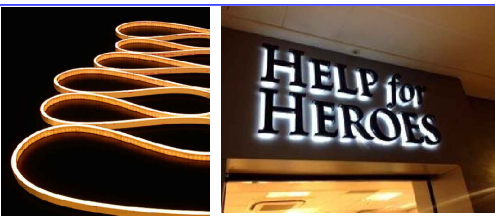
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1g
SURFACE FIXED 'I' TYPE LUMINAIRES
WITHIN THE PLANT ROOM TO
ACHIEVE 200 lux AND TO PROVIDE
EMERGENCY LIGHTING
CONTROL VIA LIGHT SWITCH

FFL 45.940
Storage
35m²

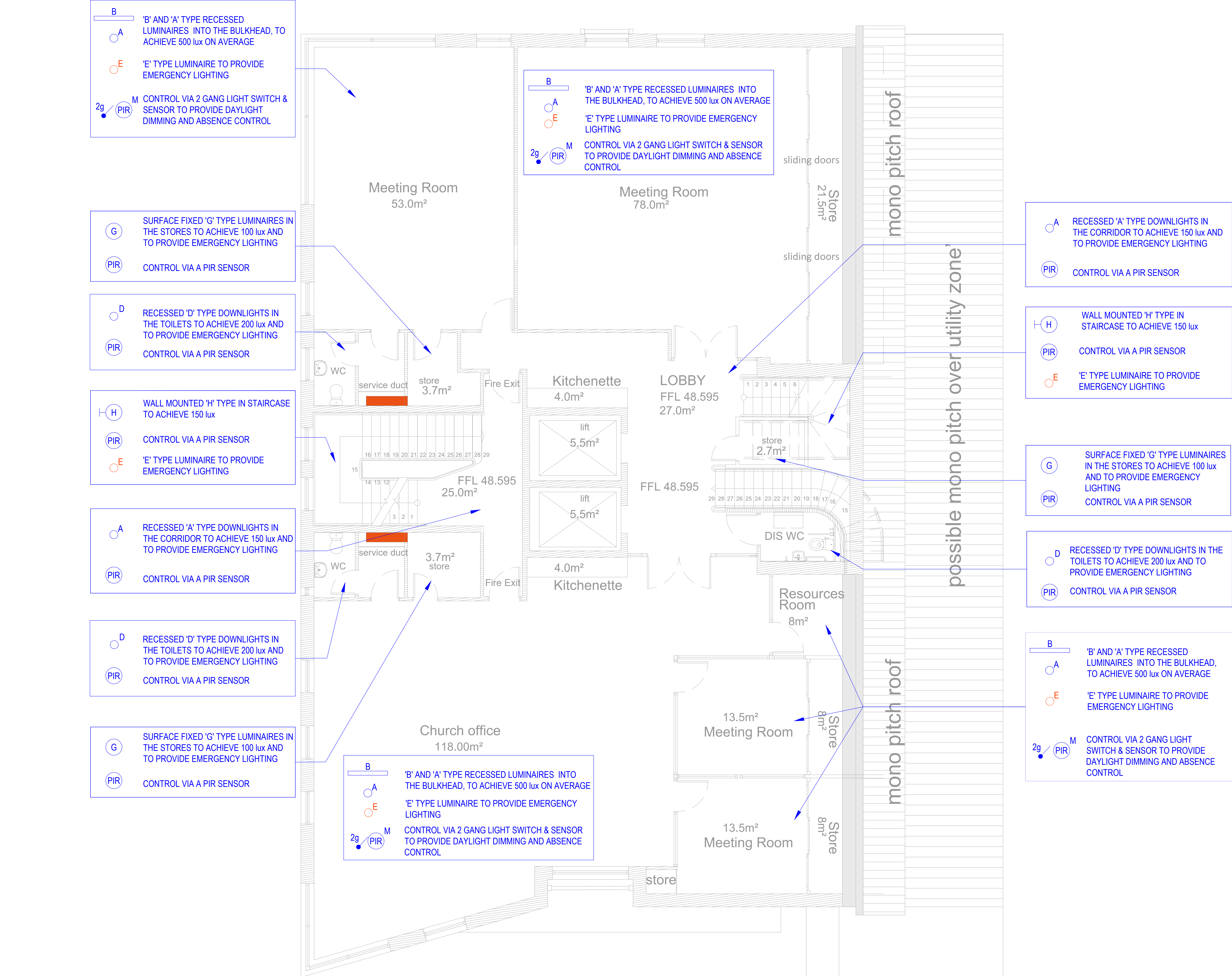
possible mono pitch over utility zone

LIGHTING LEGEND

A	RECESSED LED DOWNLIGHT LUMINAIRE, AS FAGERHULT KASKAD FIXED	
B	LED LINEAR RECESSED/SURFACE/SUSPENDED LUMINAIRE, AS HACL INFINITAS RANGE (STANDARD/DIMMABLE AS IDENTIFIED ON THE LAYOUT)	
C	PENDANT LED RGB (COLOUR CHANGING) LUMINAIRE, AS HACL EXPLORA HALO	
D	RECESSED LED DOWNLIGHT, AS HACL MIDI +510 ATTACHMENT ALSO AVAILABLE AS INTEGRAL EMERGENCY FITTING	
E	NON-MAINTAINED LED STAND-ALONE SELF-TEST EMERGENCY LUMINAIRE, AS WHITECROFT FLORIN, TO BE INSTALLED THROUGHOUT - OPEN AREA LIGHT DISTRIBUTION OR CORRIDOR DISTRIBUTION AS NECESSARY TO SUIT EACH SPACE AND RECESSED OR SURFACE FIXED TO SUIT THE CEILING TYPE.	
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1g	LIGHT SWITCH, NUMBER OF GANG INDICATED. 'S' DENOTES SCENE SETTING SWITCH	
PIR	PASSIVE INFRARED SENSOR WITH CUT OFF FACILITY WHEN SUFFICIENT DAYLIGHT IS AVAILABLE	
PIR ^M	MICROWAVE SENSOR	
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NOTE:	'E' DENOTES INTEGRAL EMERGENCY LUMINAIRE	

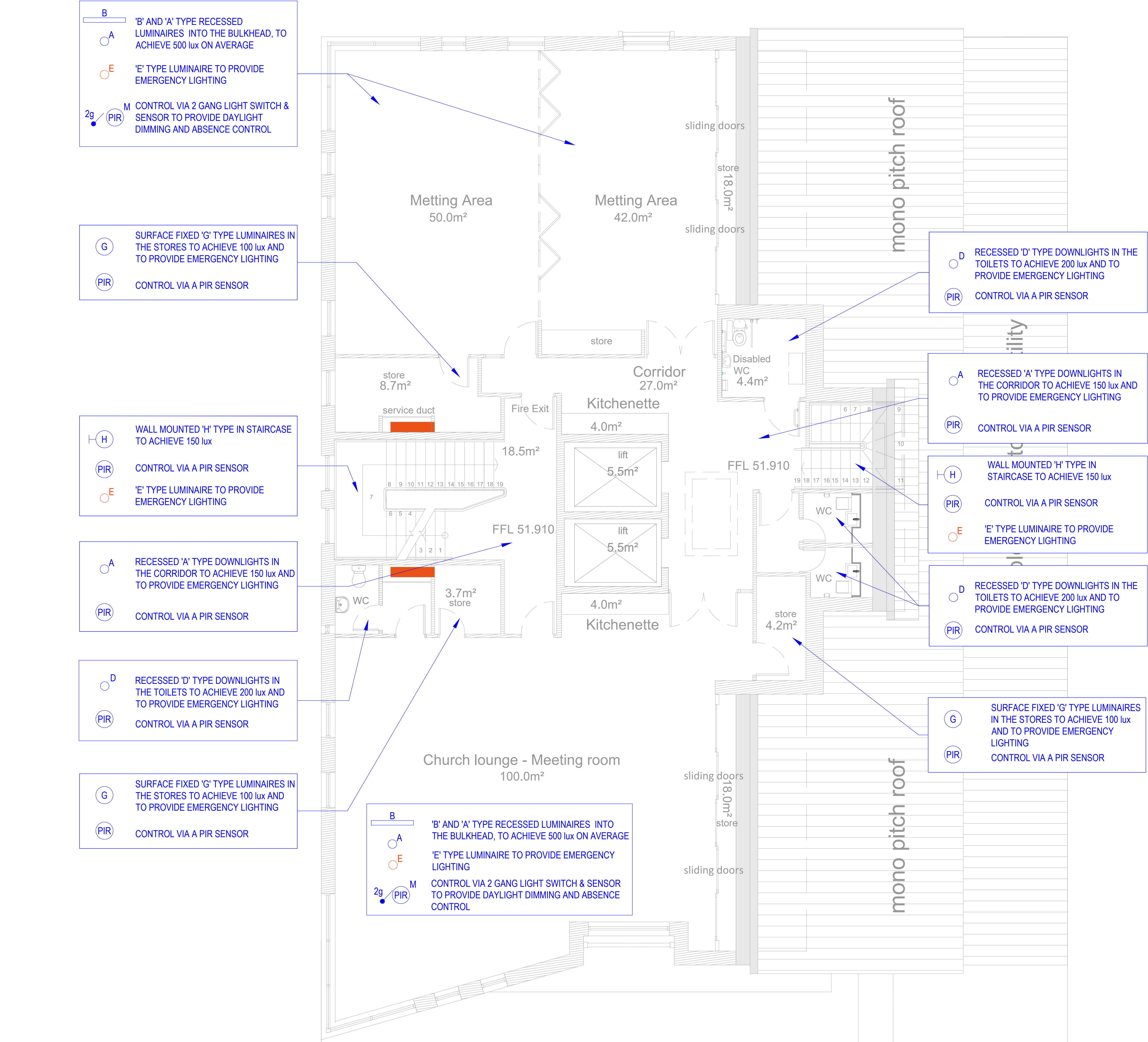
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						IN ASSOCIATION WITH: JBKS Architects			DRAWN BY: AN			SCALE: NTS @ A0		
									CHECKED BY: AJS			DATE: 05/11/2019		
									STATUS: PRELIMINARY					
						PROJECT: Greyfriars Church Reading			DRAWING No: 5004328-RDG-03-MD-PL-E-0125			BEAUMONT HOUSE 59 HIGH STREET READING, RG7 5AL TEL: 0118 932 3088 WWW.RIDGE.CO.UK		
P1	Stage 3 Issue	05/11/2019	AN	AJS		PROJECT: 5004328	ORG: RDG	ZONE: Z03	LEVEL: M0	TYPE: PL	ROLE: E	NUMBER: 0125	REV: P1	
REV	DESCRIPTION	DATE	BY	CHKD										



LIGHTING LEGEND		
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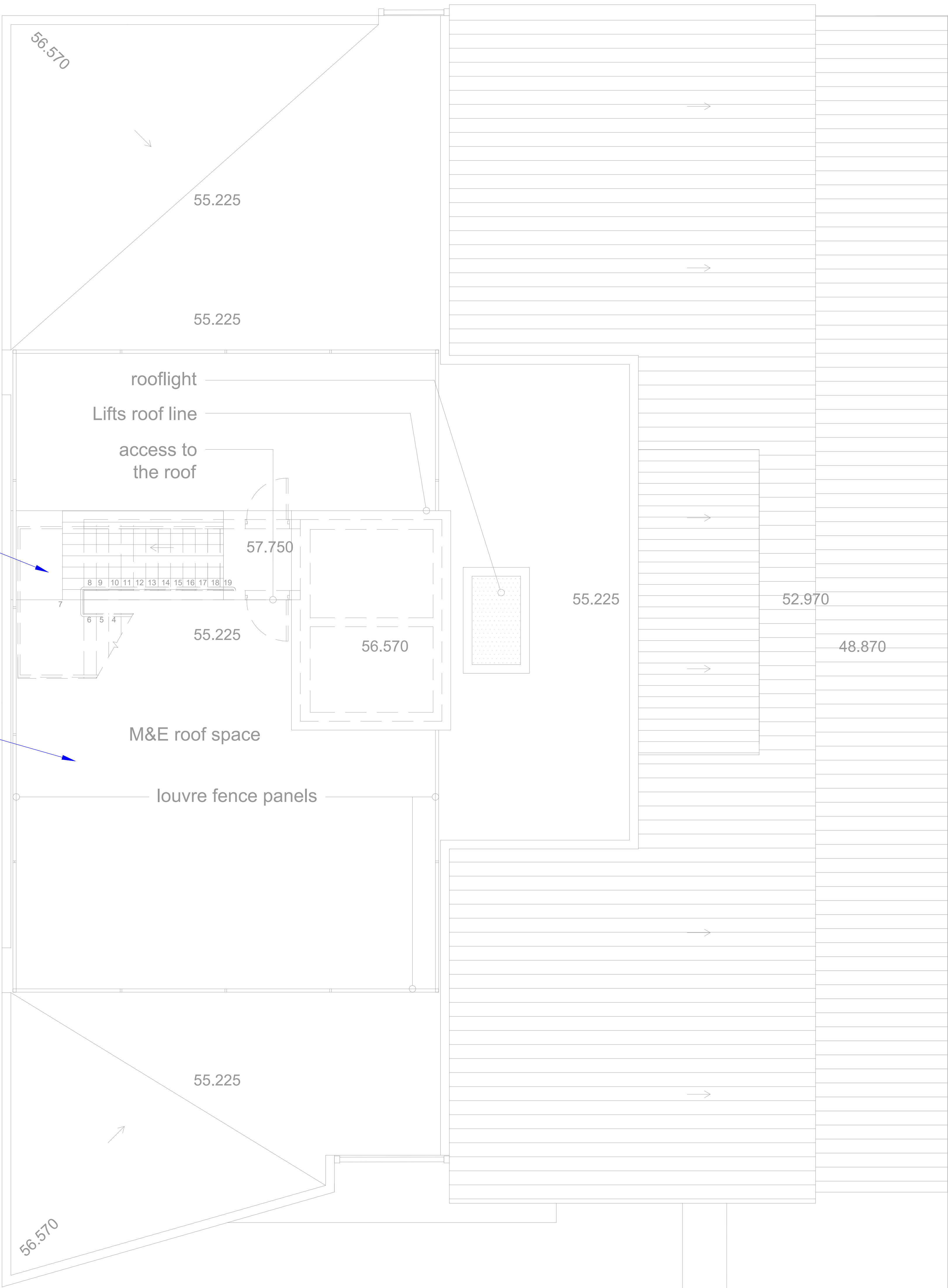
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REV	DESCRIPTION	DATE	BY	CHKD																												



LIGHTING LEGEND		
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IN ASSOCIATION WITH: JBKS Architects		PROJECT: Greyfriars Church Reading		DRAWN BY: AN CHECKED BY: AJS STATUS: PRELIMINARY		SCALE: NTS DATE: 05/11/2019		BEAUMONT HOUSE 59 HIGH STREET THEALE READING, RG7 5AL	
PROJECT: Greyfriars Church Reading		DRAWING No: 5004328-RDG-Z03-PL-E-0127		PROJECT: 5004328-RDG-Z03-02-PL-E-0127		PROJECT: 5004328-RDG-Z03-02-PL-E-0127		TEL: 0118 932 3088	
REV: Stage 3 Issue		DATE: 05/11/2019		BY: AN		BY: AJS		WWW.RIDGE.CO.UK	



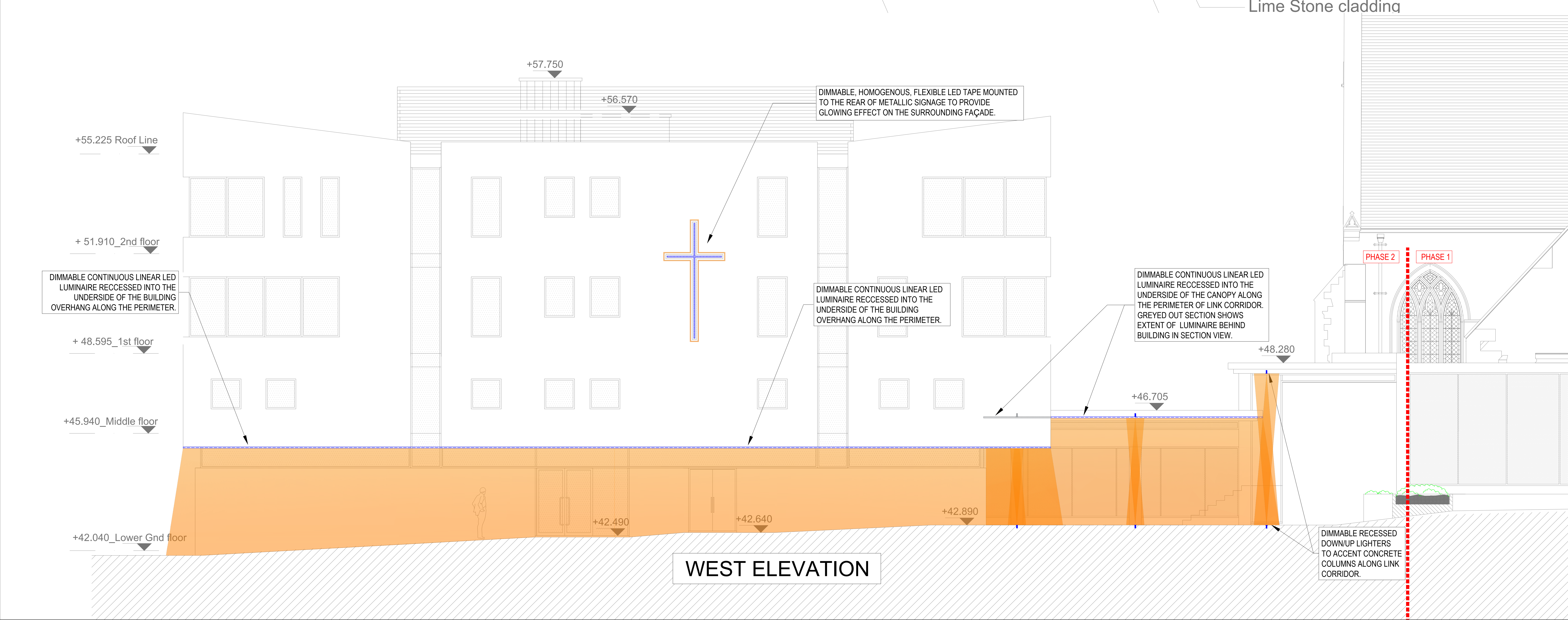
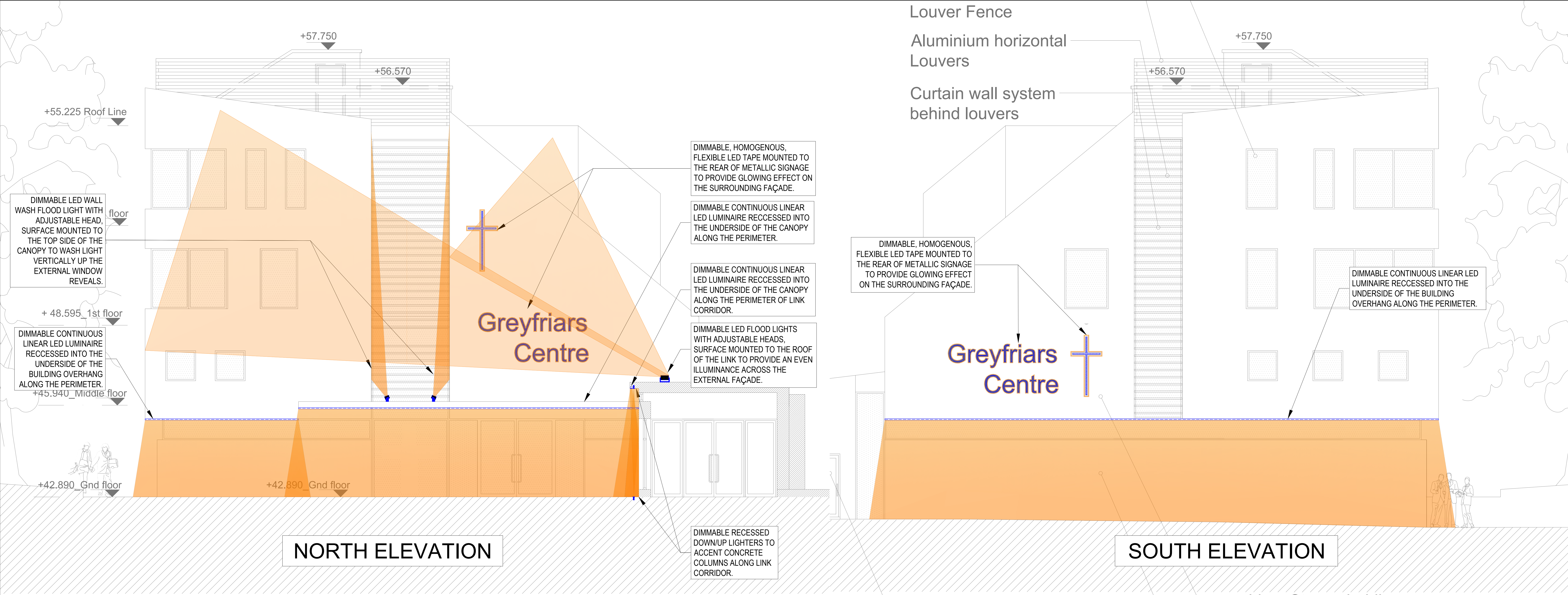
- H** WALL MOUNTED 'H' TYPE IN STAIRCASE TO ACHIEVE 150 lux
- PIR** CONTROL VIA A PIR SENSOR
- E** 'E' TYPE LUMINAIRE TO PROVIDE EMERGENCY LIGHTING

- I** SURFACE FIXED 'I' TYPE LUMINAIRES WITHIN THE PLANT ROOM TO ACHIEVE 200 lux AND TO PROVIDE EMERGENCY LIGHTING
- lg** CONTROL VIA LIGHT SWITCH

LIGHTING LEGEND		
A	RECESSED LED DOWNLIGHT LUMINAIRE, AS FAGERHULT KASKAD FIXED	
B	LED LINEAR RECESSED/SURFACE/SUSPENDED LUMINAIRE, AS HACL INFINITAS RANGE (STANDARD/DIMMABLE AS IDENTIFIED ON THE LAYOUT)	
C	PENDANT LED RGB (COLOUR CHANGING) LUMINAIRE, AS HACL EXPLORA HALO	
D	RECESSED LED DOWNLIGHT, AS HACL MIDI +510 ATTACHMENT ALSO AVAILABLE AS INTEGRAL EMERGENCY FITTING	
E	NON-MAINTAINED LED STAND-ALONE SELF-TEST EMERGENCY LUMINAIRE, AS WHITECROFT FLORIN, TO BE INSTALLED THROUGHOUT - OPEN AREA LIGHT DISTRIBUTION OR CORRIDOR DISTRIBUTION AS NECESSARY TO SUIT EACH SPACE AND RECESSED OR SURFACE FIXED TO SUIT THE CEILING TYPE.	
F	LINEAR SURFACE MOUNTED IP68 RATED LED LUMINAIRE, AS ZUMTOBEL TUBILUX, ALSO AVAILABLE AS INTEGRAL EMERGENCY (STANDARD/DIMMABLE AS IDENTIFIED ON THE LAYOUT)	
G	SURFACE FIXED BULKHEAD LED LUMINAIRE, AS WHITECROFT PORTAL, ALSO AVAILABLE AS INTEGRAL EMERGENCY	
H	WALL MOUNTED LED LUMINAIRE, AS FAGERHULT COMBILUME WALL RANGE	
I	SURFACE LINEAR LED IP66 RATED, AS WHITECROFT ACL INDUSTRY. ALSO AVAILABLE AS INTEGRAL EMERGENCY FITTING	

J	LED TAPE, AS HACL LIGHT LINE	
K	CONTINUOUS RECESSED LINEAR LED LUMINAIRE: DIMMABLE, AS LED LINEAR ADONIS, IP67	
J	HOMOGENOUS LED STRIP HOUSED IN THE REAR OF METALLIC SIGNAGE. DIMMABLE, AS LED LINEAR VENUS SV IP67	
lg	LIGHT SWITCH, NUMBER OF GANG INDICATED. 'S' DENOTES SCENE SETTING SWITCH	
PIR	PASSIVE INFRARED SENSOR WITH CUT OFF FACILITY WHEN SUFFICIENT DAYLIGHT IS AVAILABLE	
PIR^M	MICROWAVE SENSOR	
PIR^A	PASSIVE INFRARED SENSOR IN ABSENCE DETECTION	
NOTE: 'E' DENOTES INTEGRAL EMERGENCY LUMINAIRE		

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P1	STAGE 3 ISSUE	05/11/2019	AN	AJS			
REV	DESCRIPTION	DATE	BY	CHKD			
ORIGINATOR							
RIDGE PROPERTY & CONSTRUCTION CONSULTANTS							
BEAUMONT HOUSE 59 HIGH STREET THAME READING, RG7 5AL			TEL: 0118 932 3088 WWW.RIDGE.CO.UK				
CLIENT Greyfriars Church							
IN ASSOCIATION WITH JBKS Architects							
PROJECT Greyfriars Church Reading							
TITLE Proposed External Lighting Layout Greyfriars Centre							
DRAWN BY: AN		SCALE: NTS @ AD					
CHECKED BY: AJS		DATE: 05/11/2019					
STATUS PRELIMINARY							
DRAWING No: 5004328/RDG-203-XX-EL-E-0129							
PROJECT	RDG	ZONE	LEVEL	TYPE	ROLE	NUMBER	REV
5004328	RDG	Z03	XX	EL	E	0129	P1



dashdot line indicates outline of existing building

SMALL POWER LEGEND

MSP

M

MAIN SWITCH PANEL AND EL. METER

DB 'n'

DISTRIBUTION BOARD, REF. AS INDICATED

MECHANICAL CONTROL PANEL

2

TWIN SWITCHED 13A SOCKET OUTLET

FUSED CONNECTION UNIT

UNSWITCHED SOCKET OUTLET

FLOOR BOX

R

THREE PHASE ISOLATOR

2

DOUBLE DATA OUTLET

DATA CABINET

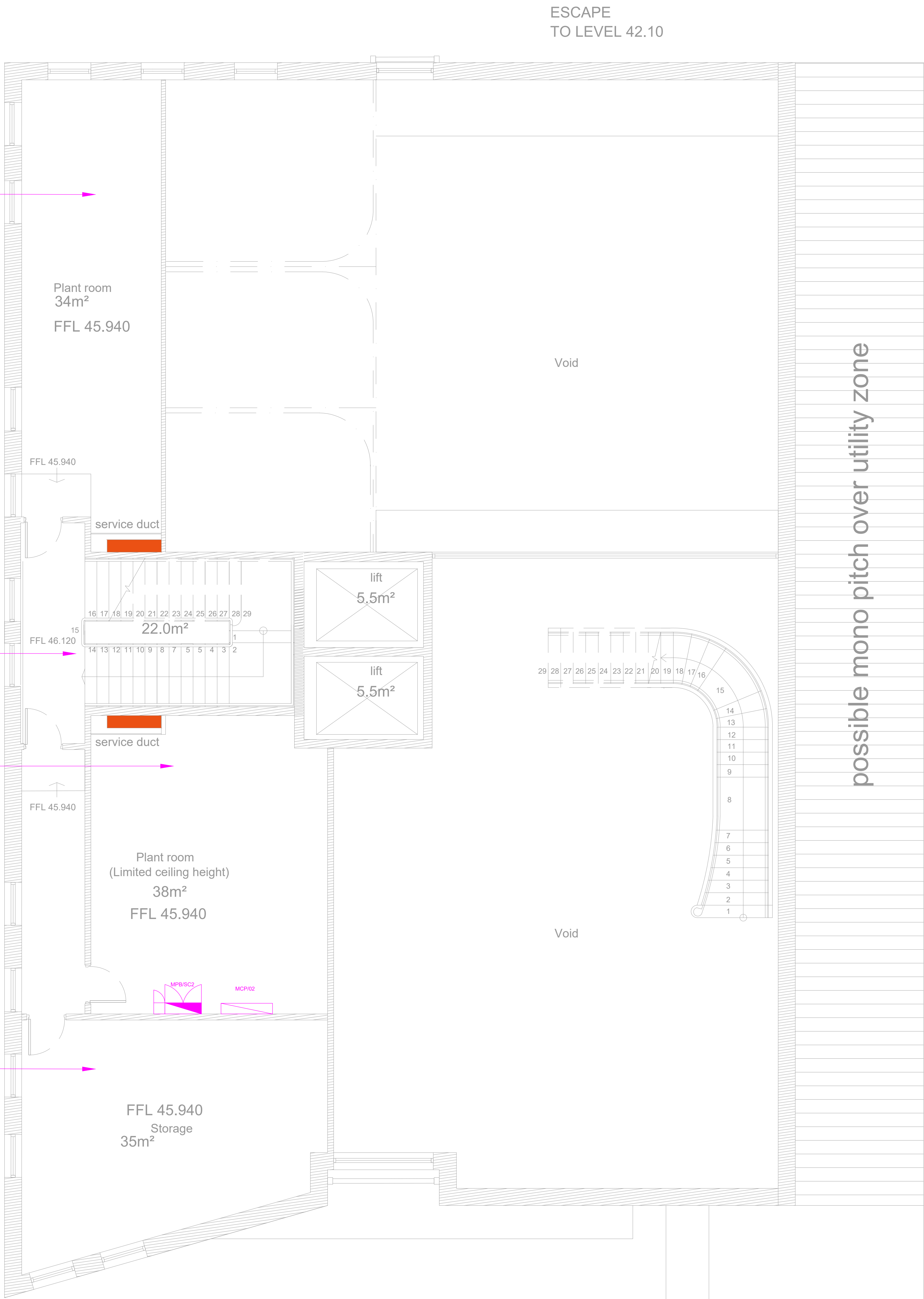
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2 4 No. 13A TWIN SWITCHED SOCKET OUTLETS
NOTE:
ELECTRICAL SUPPLIES TO BE PROVIDED FOR MECHANICAL PLANT AS NECESSARY

2 1 No. 13A TWIN SWITCHED SOCKET OUTLET

2 2 No. 13A TWIN SWITCHED SOCKET OUTLETS

2 4 No. 13A TWIN SWITCHED SOCKET OUTLETS
2 2 No. DATA OUTLETS FOR BMS & MODBUS METERING
NOTE:
ELECTRICAL SUPPLIES TO BE PROVIDED FOR MECHANICAL PLANT AS NECESSARY



SMALL POWER LEGEND

- MSP (M) MAIN SWITCH PANEL AND EL. METER
- DB 'n' DISTRIBUTION BOARD, REF. AS INDICATED
- MECHANICAL CONTROL PANEL
- 2 TWIN SWITCHED 13A SOCKET OUTLET
- FUSED CONNECTION UNIT
- UNSWITCHED SOCKET OUTLET
- FLOOR BOX
- R THREE PHASE ISOLATOR
- 2 DOUBLE DATA OUTLET
- DATA CABINET

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1 No. FLOOR BOX COMPLETE WITH 2 No. TWIN SOCKETS AND 2 No. DOUBLE DATA OUTLET

2 No. 13A TWIN SWITCHED SOCKET OUTLETS ON DADO TRUNKING

4 No. DOUBLE DATA OUTLETS ON DADO TRUNKING, PLUS 1 No. OUTLET AT HIGH LEVEL FOR WI-FI

ALLOWANCE FOR AV CONNECTIONS TO ANY PROJECTORS / SCREENS / SPEAKERS AS REQUIRED.

2 No. 13A TWIN SWITCHED SOCKET OUTLETS

1 No. FCU & UNSWITCHED SOCKET FOR FRIDGE

1 No. FCU FOR HAND DRYER

1 No. 13A TWIN SWITCHED SOCKET OUTLETS

1 No. FCU FOR HAND DRYER

2 No. 13A TWIN SWITCHED SOCKET OUTLETS

1 No. FCU & UNSWITCHED SOCKETS FOR FRIDGE

6 No. FLOOR BOXES COMPLETE WITH 2 No. TWIN SOCKETS AND 2 No. DOUBLE DATA OUTLET

6 No. 13A TWIN SWITCHED SOCKET OUTLETS ON DADO TRUNKING

6 No. DOUBLE DATA OUTLETS ON DADO TRUNKING, PLUS 1 No. OUTLET AT HIGH LEVEL FOR WI-FI

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ALLOWANCE FOR AV CONNECTIONS TO ANY PROJECTORS / SCREENS / SPEAKERS AS REQUIRED.

2 No. 13A TWIN SWITCHED SOCKET OUTLETS

2 No. FCU FOR HAND DRYER AND DISABLED TOILET ALARM

DISABLED TOILET ALARM C/W PULL CORD, RESET UNIT AND OVER DOOR LIGHT/BUZZER

DATA CABINET

2 No. 13A TWIN SWITCHED SOCKET OUTLETS

2 No. DOUBLE DATA OUTLET

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NOTE:
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SMALL POWER LEGEND

MSP

M

MAIN SWITCH PANEL AND EL. METER

DB 'n'

DISTRIBUTION BOARD, REF. AS INDICATED

MECHANICAL CONTROL PANEL

2

TWIN SWITCHED 13A SOCKET OUTLET

FUSED CONNECTION UNIT

UNSWITCHED SOCKET OUTLET

FLOOR BOX

R

THREE PHASE ISOLATOR

2

DOUBLE DATA OUTLET

DATA CABINET

1 No. FLOOR BOXES COMPLETE WITH 2 No. TWIN SOCKETS AND 2 No. DOUBLE DATA OUTLET

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DISABLED TOILET ALARM C/W PULL CORD, RESET UNIT AND OVER DOOR LIGHT/BUZZER

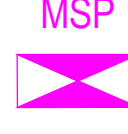
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1 No. FCU FOR HAND DRYER

2 No. 13A TWIN SWITCHED SOCKET OUTLETS

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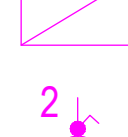
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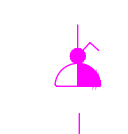
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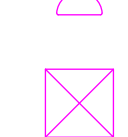
DISTRIBUTION BOARD, REF. AS INDICATED



MECHANICAL CONTROL PANEL



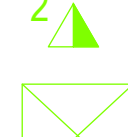
TWIN SWITCHED 13A SOCKET OUTLET



FUSED CONNECTION UNIT



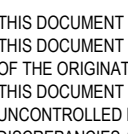
UNSWITCHED SOCKET OUTLET



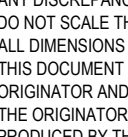
FLOOR BOX



THREE PHASE ISOLATOR



DOUBLE DATA OUTLET



DATA CABINET



SMALL POWER LEGEND

MSP

M

MAIN SWITCH PANEL AND EL. METER

DB 'n'

DISTRIBUTION BOARD, REF. AS INDICATED

MECHANICAL CONTROL PANEL

2

TWIN SWITCHED 13A SOCKET OUTLET

FUSED CONNECTION UNIT

UNSWITCHED SOCKET OUTLET

FLOOR BOX

R

THREE PHASE ISOLATOR

2

DOUBLE DATA OUTLET

DATA CABINET

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CLIENT:

Greyfriars Church

IN ASSOCIATION WITH:

JBKS Architects

PROJECT:

Greyfriars Church Reading

TITLE:

Proposed Small Power & Data Layout - Greyfriars Centre Roof Level

DRAWN BY: AN

SCALE: NTS

@ AD

CHECKED BY: AJS

DATE: 06/11/2019

STATUS:

PRELIMINARY

DRAWING No: 5004328-RDG-Z03-RF-PL-E-0227

PROJECT | ORG | ZONE | LEVEL | TYPE | ROLE | NUMBER | REV

5004328|RDG|Z03|RF|PL|E|0227|P1

ORIGINATOR:

RIDGE

PROPERTY & CONSTRUCTION CONSULTANTS

BEAUMONT HOUSE

59 HIGH STREET

THEALE

READING, RG7 5AL

TEL: 0118 932 3088

WWW.RIDGE.CO.UK

P1

Stage 3 Issue

06/11/2019

AN

AJS

REV

DESCRIPTION

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BY

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